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PROFILE 2016

An Annual Technical Magazine



Time to go green...

ମାଣିପୁର ଇଞ୍ଜିନିୟରିଂ ଓ ଟେକନୋଲୋଜି
Manipur Institute of Technology

A Constituent Collage of Manipur University
Takyelpat, Imphal



time to go green...

PROFILE 2016

VOLUME 3

MIT technical magazine



MANIPUR INSTITUTE OF TECHNOLOGY

A Constituent College of Manipur University

Takyelpat, Imphal

Profile 2015-16

Volume – III

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Manipur Institute of Technology

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Dr. Najma Heptulla
Governor of Manipur



डा० नजमा हेपतुल्ला
राज्यपाल, मणिपुर

Imphal
15th November, 2016

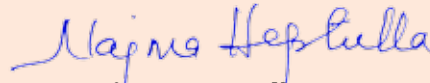


MESSAGE

I am glad that the Manipur Institute of Technology, Takyelpat, Imphal is bringing out its 3rd Volume of Annual Magazine of the Institute entitled "PROFILE" for the year 2015-16.

It is indeed laudable that the Institutes particularly those offering professional courses are bringing out such magazines to keep the people informed of their activities and also issues related to them at large. I do hope that the magazine will also dwell on the importance of living together peacefully and harmoniously in our pluralistic society. Students form a large part of our population and it will be a good effort to motivate them through this magazine to become cogs of nation building so that the society benefits from their contribution. Students today are not only idealistic but full of energy and this energy needs to be harnessed in the right direction so that besides learning skills and knowledge to acquire good jobs they also become good citizens and contribute to the well being of the society. I am hopeful that the Magazine will be able to inspire the teacher and the taught alike for acquiring knowledge and wisdom.

I wish the publication of Annual Magazine all success.


(Dr. Najma Heptulla)



CHIEF MINISTER
MANIPUR

Imphal
26th October, 2016



MESSAGE

I am happy to learn that the Manipur Institute of Technology, Takyelpat, Imphal is going to publish its Annual Magazine entitled "PROFILE" for the year 2015-16.

It is heartening to know that Manipur Institute of Technology (MIT) has grown abundantly in the recent past. With the commitment and dedication of the faculty and staff, I am sure the college will scale even greater heights in the years to come and serve the society. A magazine carries the contributions reflecting ethos and aspirations of the students, faculty and other team members of an Institution. I am sure that this magazine will reflect the tremendous changes that are happening in the MIT campus.

I wish the faculty, staff and students of the Institute success in their future endeavours and wish the publication of the Annual Magazine a grand success.

(O. Ibobi Singh)

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Dr. Kh. Ratan Kumar

Minister

Education & Transport, Manipur



Manipur Secretariat,
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Fax : 0385-2450123 (O)
Te/Fax : 0385-2454708 (R)
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Imphal
27th October, 2016



MESSAGE

I am very happy to learn that Manipur Institute of Technology is publishing IIIrd Volume of Annual Magazine 2015-16 entitled "PROFILE".

I hope the importance of publishing an annual magazine serves its purpose for freedom of expression and also to explore the writing talents of the students of this Institute.

I convey my best wishes and appreciation to the concerted efforts of the students of this Institute that they have undertaken to bring out this Annual Magazine, 2015-16.

(Dr. Kh. Ratankumar)



Vice-Chancellor

Manipur University

Canchipur
Imphal - 795003
Manipur, India

No. MU/VC/MESS/2014
25th October 2016

MESSAGE



I am happy to learn that MIT, Magazine Committee 2015-16, Manipur Institute of Technology, Takyelpat, Imphal are going to publish 3rd Volume of Annual Magazine of Manipur Institute of Technology entitled "PROFILE" for the year 2015-16.

I hope that the Annual Magazine shall provide a good opportunity to the students of the Institute to contribute essays, short stories, poems, etc. in the interest of the students.

I convey my best wishes for the successful publication of the Annual Magazine 2015-16.

(Prof. Amar Yumnam)

Vice-Chancellor



GOVERNMENT OF MANIPUR

No. 1/8/2016-CTE/2417
17th November, 2016



MESSAGE

It gives me immense pleasure to write a few words for, the 3rd Volume of Annual Magazine, 2015-16 entitled "PROFILE" of Manipur Institute of Technology, Takyel, Imphal. College Magazine is exclusively meant for churning out the writing talent which bears immense potentiality of sharpening the communication skill as part of the students' overall personality development.

As the Controller of Technical Education, Government of Manipur, I would like to convey my heartiest wishes on the occasion of the release of the said Magazine.

(M. Ibomcha Singh)

Controller of Technical Education, Manipur



Prof. N. Rajmuhon Singh

Dean

School of Mathematical and Physical Sciences

Date : 17/11/2016

Place : Cachipur



MESSAGE

It gives me immense pleasure to learn that Manipur Institute of Technology is going to publish the Annual Magazine 2015 – 2016 entitled "PROFILE". Magazine plays an important role and it is the mirror and backbone of the Institute. Publication of "PROFILE" will give an ample opportunity to the students to enhance their co-curricular activities, to express their thoughts and aspirations freely and meaningfully, thereby enriching their intellectual faculties.

I wish the publication a grand success.

(Prof. N. Rajmuhon Singh)



Manipur University
Canchipur, Imphal - 795003
Manipur, India

25 October, 2016



MESSAGE

I am glad to know that the Manipur Institute of Technology a constituent College of Manipur University, Takyelpat, Imphal is bringing out its 3rd Volume of Annual Magazine entitled "Profile" for the year 2015-16.

Magazine not only serves as medium for expressing one's views on different aspects of life and society but also provides opportunities to the students for nurturing their talent and explore their creative ideas.

I wish the publication of the magazine a grand success.

(Prof. M. Shyamkesho Singh)

Registar
मणिपुर विश्वविद्यालय
Registrar
Manipur University



Prof. R. K. Hemakumar Singh
Principal I/C, MIT



MESSAGE

I am glad to learn that Manipur Institute of Technology is bringing out its 3rd Volume of "PROFILE" the Annual magazine 2015-2016.

In modern age we are witnessing the age of science and technology and also there is huge demand for technical education. The pattern of day to day life in this age is very much different from the past society even some twenty years back.

I hope this publication will help our technical students to express their scientific ideas and share their views among themselves.

I wish the publication a grand success.

(Prof. R.K. Hemakumar Singh)
Principal I/C, MIT



Faculty-in-Charge, Profile - 2016
Dept. of Electronics & Communication, MIT
Imphal - 795001
Manipur, India



MESSAGE

The world is moving so fast and new technologies are coming up every moment. We need to be proactive and enthusiastic in learning about these new cutting edge tools and research. The most important aim of students should be to absorb as much of these new technologies as they can. They must explore, design, invent and innovate. They should research, collaborate and excel.

There is a huge scope to create something new, to disrupt existing notions, and who will do it if not the students? They are our future.

It really gives me great pleasure and proud to rejuvenate the 3rd Edition of "PROFILE 2015-16", an Annual Technical Magazine of our Institute, MIT. It will be a platform for students to exhibit their work and contribute to the sharing of knowledge and latest engineering technologies. I am confident that this magazine will also give impetus to research culture amongst students.

This issue of magazine include the complete ingredients for joyful and informative reading with more than forty different exciting articles. One more important aspect that newly introduced in this issue is to publish thematic based magazine. Accordingly, we the committee, have decided this issue with a theme "Time to go green" that will focus on the awareness of renewable green energy and clean environment.

I would like to take this opportunity to thank all the faculty, staff and our students for their support throughout the development of the magazine. I never imagine that we have well disciplined and so many talented students in our Institute. It has been a wonderful experience and memorable moments for me to work together with them.

I would also like to extend a special thanks to our respected Principal, Prof. R.K Hemakumar Singh for his valuable advices and consistent support.

I wish the publication of this issue a successful. And I believe that with our students from MIT, the future does look bright.

A handwritten signature in blue ink that reads "Khomdram Jolson Singh".

(Khomdram Jolson Singh)
Assistant Professor, MIT

FROM THE DESK OF EDITOR

TIME TO GO GREEN with this theme we are glad to bring out the third volume of the MIT technical magazine "The Profile 2015-16", which also happens to be our first online publication. Carrying forward our agenda of technical articles information clubbed with general articles, this edition features variety of articles that would light the fire of current technologies and new researchers all over the world and keep the student update with the current trends in technologies. I am positive that the current issue of the magazine would act as a link for sharing various technological articles and some general views.

I am very much thankful to our respected Sir. Khomdram Jolson Singh, faculty-in-charge of The Profile 2015-16, for making this publication successful, also I would like to extend my thanks to our respected Principal Prof. R.K. Hemakumar Singh, for his esteem support, also I would like to acknowledge the efforts of active members Th. Jayenta Singh, Munan Kumar Thakur and N. Sanjeev and the entire editorial member for the team work and finally I would like to thank all the MIT faculty, students and sponsors for making this publication grand success.



Dhanu Chettri
Dhanu Chettri
Editor
PROFILE 2015-16

MIT MAGAZINE COMMITTEE

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Thokchom Jayenta Singh	B.E. Final Year (ECE)
N Sanjeev	B.E. Third Year (ECE)



ABOUT

Since the establishment of Manipur Institute of Technology in 28th August 1998, with a vision of Excellence in Engineering Education and Technology with Global Leadership in Human resource development, MIT has now entered an exciting new phase by opening a PG and PHD course for the department of Electronics & Communication Engineering and Civil engineering under Manipur University.

An overview events and activity timeline of MIT 2015-16 is given below:

1. Teacher's Day celebrated on October 2016
2. RESO a technical event is celebrated
3. VLSI training was conducted IT park, Imphal
4. A workshop on Networking was held at MIT campus
5. Natural Language Processing workshop was conducted by MIT at Manipur university
6. Workshop Numerical Techniques and soft computing was conducted
7. Short training programme on Python was held at MIT campus on
8. Training on Php programming was held on MIT campus
9. Short term training programme on AutoCAD was held at MIT campus
10. Short term training programme on Structural design was held at MIT campus

OUR ALUMNI



Richard Laishram
Software Engineer at D-Link



Lalmani Chanabam,
TCS



Rusnik Mangang
Asst. Professor at NERIST



Luxmi Aribam
Scientist at DRDO



Loitangbam Surajkumar Singh
Asst. Professor at NIT Imphal



Mastana Khan
Passport Seva Kendra,
IT Expert



Jeneeta Tayanjam
Asst. Prof. Manipur
Technical University



Sanjay Heisnam
HP



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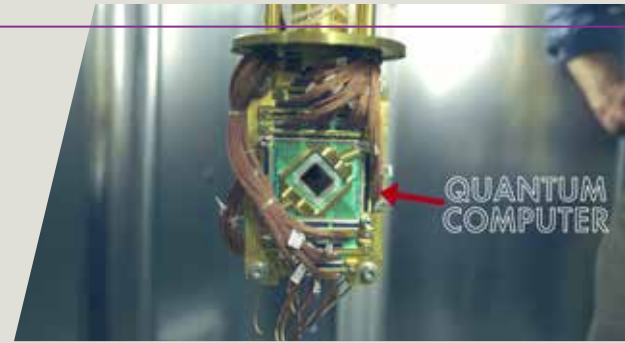
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താഴെ കാണുന്ന വിവരങ്ങൾ
WELCOME



Teaching staffs of MIT



Non-Teaching staffs of MIT



2nd SEMESTER



4th SEMESTER



6th SEMESTER



▶iii

8th SEMESTER

In Memory



Abesanam Thanoujam

D/o Thanoujam Tomcha & Th. (O). Radmamani

Sagolband, Tera Tongram Leikai

Date of Birth: 10/01/1997

Date of Expire: 06/05/ 2015

College Activities

RESO-2015

THE TECHNICAL FEST OF MIT

RESO is a technical festival of Manipur Institute of Technology, which is organised by the combination of all the three departments of MIT. It continuous for three days, in these three days various technical and non-technical competitions were held which was opened for all the students who were interested to take part in the competition. Technical competition include Robotics competition, Electronics debugging, AutoCAD, Structure Design, Code Jumble, Coding etc.

And in non-technical competition there is Graffiti, counter strike, Photography, Dance competition etc.



CIRCUIT DEBUGGING COMPETITION, ELECTRA



RESO CODE JUMBLE COMPETITION







CULTURAL
DANCE



RESO 2015

MVT TECH

5-6-7 NOVEMBER





MIT WEEK-2016

MIT Week is sport and literary meet of MIT, which is organised by the faculty staff of MIT for the students in order boost the spirit of games, sports and literature among MIT students. In the first day social service is conducted were free medical camp is also organised, in the remaining days various games and sports competition is held for the student of MIT, the last day is the literary meet and convocation function.



EDUCATION TOUR

3rd YEARS STUDENTS

Every year the students of MIT studying in 3rd year went for external technical tour in various states and visit industries for the enhancement of technical knowledge and to equip with the knowledge of contemporary technologies.



Department of ECE
External Tour

Department of CSE
External Tour



Department of CE
External Tour



TOPPERS OF MIT OF 2015



Mandingbam Elizabeth Devi
1st Position, Gold Medallist, CE



Pamshangphy Raikham
2nd Position, ECE



Puyam Brighter Kumar
3rd Position, ECE



Khagokpam Seityadas
4th Position, CE



Laishram Rustamkumar Singh
5th Position, ECE



Mandingbam Baby Devi
6th Position, CE



Loushambam Thoithoi Singh
7th Position, ECE



Laishram Praveen
8th Position, EC



Yumnam Joychandra Singh
9th Position, CE

SEMESTER WISE TOPPER 2016

8th Semester Electronics and Communication Engineering



ANURANJAN JHA



DHANU CHETTRI



THOKCHOM JAYENTA SINGH

8th Semester Computer Science Engineering



LILAPATI WAIKHOM



LAISHRAM IBEYAIMA DEVI



SALAM CHARANJIT SINGH

8th Semester Civil Engineering



CHRISTINA USHAM



OINAM MANORANJAN SINGH



LOITONGBAM CHINGLEMBI

6th Semester Electronics and Communication Engineering



Nemthianhoi Zou-P



Munan Kumar Thakur



Laikangbam Aneka

6th Semester Computer Science Engineering



Thingujam Sonia Devi



Ayekpam Alice Devi



Maibam Rojit Meitei

6th Semester Civil Engineering



P. Thang Suan Lun



D. Karimgai



Rex C Haulein

TOPPERS OF 4th SEMESTER

Electronics and
Communication Engineering



Civil
Engineering

Sarangthem Lakpa



Computer Science & Engineering



TOPPERS OF 2th SEMESTER

Sapam Puspita



Ningombam Priya



Electronics &
Communication Engineering



Ngasepam Romen



Yumnam Henthobli



Computer Science &
Engineering



Civil Engineering

Q & A WITH OUR ALUMNI



Mastana Khan completed his B.E in Electronics and communications Engineering from MIT and he is currently working in Passport Seva Kendra, as an IT expert.

1. What was MIT like in your days?

In our days MIT was just a simple Institute without a proper Principal to run it and with not much developed technical and Library infrastructure required for a Technical Institute. Syllabus was not covered at all, during the normal given time. We students had to work very very hard.

2. If you have been given a chance to reverse your life in MIT. what are the things you would like to do differently?

If I have been given the chance, besides our main subject, I would like to request Principal to arrange Extra IT courses so that We can be updated with the changing IT trend.



Hi I am TERIRAMA THINGUJAM, ex-student of MIT, batch of 2010, passed out in 2014. I studied Electronics and Communication Engineering and am currently studying M.tech 2nd year, VLSI AND EMBEDDED in NIT, Manipur.

MIT gave me beautiful memories. I think I spent the four years of graduation in the right place, with the right teachers and friends. I could get help from the teachers as much as I needed regarding studies. College days are the days where you will get a chance to learn different aspects of life and you will get matured with what you learn. For me MIT is the place where I get to learn those.

3. What was the level of competition between students during your stay in MIT?

Not tough but good.

4. what are the challenges which you have faced after your degree in MIT and how do you overcome it ?

As a fresher to get job was not so easy so I did extra IT courses Like CCNA, MCSA etc. and with it Luck favoured me.

4. Would you like to leave any message for juniors?

Besides continuing your courses, you should all have to see and look what is the new IT trend outside your course and if possible do extra IT courses and remain updated of the IT world, so that you don't have to search job instead Job will search you....Prepare professional Resume/Cv and register on the trusted jobsite....wishing nice career ahead.

1) What inspired you to study in MIT?

Since high school time i always used to tell my parents that i will study engineering. After 12th class, I had to choose between NIT, Manipur and MIT. At that time NIT was just a rookie and everybody was telling me that since MIT is an old college, teachers would be more experienced and will have more facilities. Considering this, I had to get admitted to the college and of course i admit that we have the best engineering teachers here!

2) Tell us some challenges that you faced in your college days at MIT?

Honestly speaking, i had a bad impression of the college at the beginning. I couldn't blend in

with the atmosphere for the first 3 semesters. The academic atmosphere was not to my expectation and not to what is expected from an engineering college though seniors were telling that it was much more improved than olden days. Then with the help from the teachers, seniors and friends i started blending in and started making the most out of what i had. But still we couldn't get the required facilities for an active engineering college. These things made the students and even the teachers idle. Students exposure was very less. And most importantly it was very hard to propose the fulfillment of the lacking things to the higher authorities. There were no placement at all. Since we were not in the permanent campus the construction was very slow or we can say there were no repairing/construction despite the lacking in the facilities . Those were the main challenges . But i experienced the fastly improving MIT during the final year of B.E.(2013-14) and the present status is very much healthier.

3) Is MIT a secure place for producing talented Engineers?

With the improving state, i believe it is a very secure and a right place for producing talented engineers. It has already provided good students and employee to many sectors. Some of my college colleagues are working in different sectors with handsome packages. During the final year of B.E., with the replacement of principal, the respected new principal gave so many opportunities for the improvement of the college. I am glad that we could get the taste of the change even though it was for a short time. It is good to know that now the students are getting more opportunities and facilities,like in research field,regarding placement, etc . Now M.Tech course is also introduced and even we can do Ph.D. This is a very big improvement. With the combination of best engineering teachers and opportunities, now it has got most

of the essentials. The students can take the opportunities and make themselves a talented engineers and good example of engineers.

4) Was there any difference of atmosphere while you were at MIT and while doing M.Tech / Further studies?

Yes, there are some differences.

Students-teachers relations are much warmer in the MIT. We cannot develop a proper academic atmosphere without a good student-teacher relation. At this moment, i would like to thank my teachers for providing help and guidance selflessly and endlessly as much as i needed. As i have mentioned, we have the whole packages of the state's qualified engineering teachers in our MIT. I can proudly say that.

On the negative side, everybody must be well aware of how the atmosphere of NITs and IITs are but in MIT while i was studying, we were like 'go to college, get some lecture and go back to hostel /home at around 2 p.m.' There was no other work than this. We already know the law and order conditions of the state. Since all the students are not made compulsory to stay in the hostel, academic calender are often affected . People used to jokingly say 'Students of MIT are very sensitive ' in the sense that we used to bunk classes at any given opportunity (say heavy rainfall). And lastly habit of studying in the library is lacking.

5) What was the level of competition between students during your stay in MIT?

The level of competition was very low. Most of us were exam-oriented and we didn't have anything to do other than appearing semester exams and some internal tests. The style of study was by heart, just write whatever is taught in the class in the exam and score some mark, thats it. So, by just following in the trend we made ourselves blunt and less competitive. I

don't know about the present situation but it was like that in our times. Discussion was less and desire to win against each other was very less .

6) Would you like to leave any message for juniors?

Now the institute is very much improved. You should make the most out of the opportunities given . You have best teachers, more opportunities and a principal who will always work for your benefit. I hope you will take the maximum benefit. And don't forget to enjoy the college days. Spent the moments with your friends and cherish it. You will want to treasure the college days. Lastly ALL THE BEST FOR YOUR FUTURE.

As being the part of MIT family, we would like to request you to answer the following questions sincerely

- 1) What inspired you to study in MIT?
- 2) Tell us some challenges that you faced in your college days at MIT?
- 3) Is MIT a secure place for producing talented Engineers?
- 4) Was there any difference of atmosphere while you were at MIT and while doing M.Tech / Further studies?
- 5) What was the level of competition between students during your stay in MIT?
- 6) Would you like to leave any message for juniors?

FREE BASICS VS NET NEUTRALITY

Nemthianhoizou. P

6th semester

Electronics and Communication Engineering



I highly appreciate and praise the formidable responsibilities of the Telecom Regulatory Authority of India (TRAI) in its decision to block Facebook's FreeBasics along with all arrangements that either charge or have the effect of charging differential pricing. This much-touted programme ran afoul of activists for a free and equal internet in the country. Soon, it met howls of protests from net neutrality supporters decrying the move including 9 start-ups and 42 IIT professors.

But what is Free Basics? What is net neutrality? What is the debate all about? This article will break down the issue for you.



Free Basics is internet.org renamed. A platform where Facebook claims to provide people with access to useful service on their mobile phones in areas where internet access is less affordable. The websites are available for free without data charges and include on things like news, employment, health,

education and local information.

Like Flipkart, my opposition to Free Basics have been recent. On the surface things look rosy but if you peel off the petals one by one you'll realise that you lost your freedom to an entity. It's like a person or a corporate firm offering free gas whereby limiting you to cook only rice and nothing else. Free basics is one such kind. It limits to access of only selective websites partnered with Facebook whereas internet is a free space. You can go anywhere you want, watch what you want and use what you want or create anything that you wish. A group of people or an entity cannot decide what to contain in a library or what to read or the price of a book. It is against the freedom of right to access to the internet. Another important point is it fails to provide free and equal right to all users which is the cornerstone of net neutrality.

So what is this net neutrality? You probably heard the term but perhaps don't understand. Here's a simple guide to what net neutrality is and why is it important. Basically net neutrality is the principle that Internet Service Provider and government treat all data on the internet the same, not charging differentially by users, content, site, platform, apps, and type of attached equipment or mode. To put in simple terms, anyone from anywhere around the world should be able to access or provide services or content or the internet without any discrimination. In an interview to NDTV, R.Chandrashekar the president of NASSCOM (National Association of Software and Services Companies) has voice his support in favour of Net Neutrality. He stated that net neutrality is non-negotiable and neither telecom service providers should have the right to offer

differential pricing as it violates net neutrality. He also suggested that any form of differential pricing should be banned altogether. According to net neutrality activists, zero-rating platforms are in violation of how the internet functions. In the end TRAI asked, “Are there alternative methods or technologies or business model, other than differential tariff plans, available to achieve the objective of providing free internet access to the consumers.” In response Facebook said, “The short answer is yes. Differential pricing as the termed used in the consultation paper should generally continue to be allowed”. If mobile operators had their way, you would get a separate bill for using WhatsApp, another one for watching YouTube videos, yet another one for making a Skype call?—and pay nothing at all for Facebook that struck a deal. Some Internet Service Provider’s want to be able to dictate what you can and can’t use .If they succeed in abolishing net neutrality they will be given power over the internet itself and gain the position of gatekeepers of the internet and all the while perpetuating a massive conflict of interest by also providing their own content. In the worst case scenario a site could be slowed down so much that it would prevent the users from even accessing it effectively censoring the content.

In India, start-ups like, PayTm, Zomato, TrulyMadly, SVG media, Flipclash.com, Teescurt.com, Metislearning, Mouthshut.com and Goquini plunged into the battle criticizing Free Basics that it is in contrary to the idea of free and open internet that encourages technological innovation, a strong economy and a healthy competition.

In the last few months Facebook had entered into a war of words with TRAI asking it to be allowed. The debate followed with Facebook trying to gain support via advertising campaigns and polls on its platform asking users to save FreeBasics. However, following a public outcry from those who want a free and equal internet, a number of firms including Flipkart, Cleartrip, and NDTV pulled out of internet.org. Finally TRAI has put to rest that differential pricing debate that no company via any offer could charge discriminatory tariff for data on basis of content effective immediately .It’ll be interesting to see what TRAI and DoT make of net neutrality in 2016. The issue has been solidly debated for over a solid year now and the final decision will likely influence ideas in other developing countries where corporates try to gain control over the internet. While it’s true that Facebook in its current state has the potential to help improve people lives but Free Basics is not the right platform. But ultimately, ones effort to provide drinking water to drought stricken population; you can only offer the same quality of water that you’d drink yourself.

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4K TECHNOLOGY



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4K & Ultra HD (UHD) Resolution – Comparison of 4k v/s 1080p and Everything You Need to Know



4K technology seems to be on the cusp of taking over the HD digital media world, from TV screens to computer monitors to cameras and projectors, 4K screen resolution and all of its accompanying features are starting to circulate widely.

But, you might be wondering, what exactly is 4K and why is it something you should care about? Well, we're going to cover exactly that here and give you an overview of all the critical information about 4K ultra-high definitions that you need to know as a potential buyer.

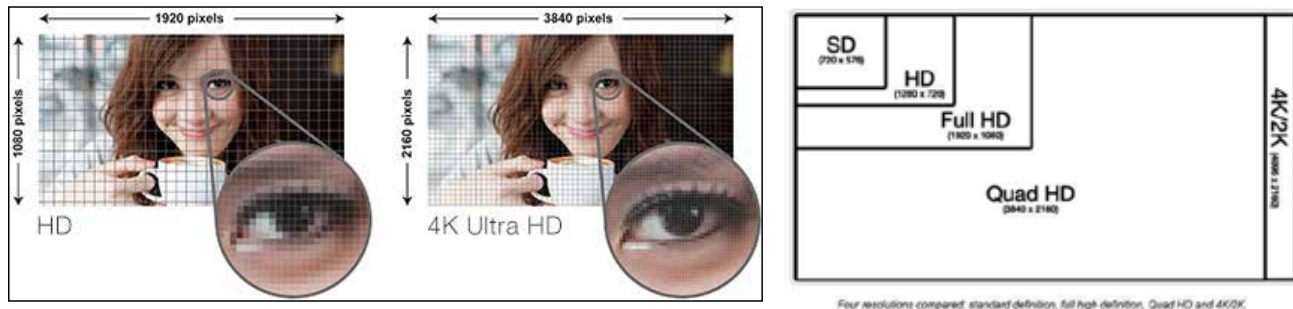
What Exactly Is 4K? 4K, officially known as UHD (Ultra-High Definition), is an overarching term that encompasses visual resolution technology which offers more pixels than regular HDTV (at least 4 times more pixels and thus the name 4K). The ultimate



result of this increased pixel breakdown is a an image clarity that goes well beyond conventional 1080 pixel HD resolution and presents more vibrant, varied and realistic colours as well as much higher frame rates.

Currently, the best display of UHD technology is the 4K resolution TV and many of these have been emerging on the market since mid-2013, although 4K monitors have been around since 2013 and 4K resolution film and photo cameras commercially since at least 2012.

4K display has to consist of at least 3,840 pixels (horizontal) x 2,160 pixels (vertical) of resolution and the horizontal can go above 4,000 pixels. This puts it on the top of the current scale of digital resolutions in which the bottom is occupied by standard definition TV (450X540 pixels), HD with 720 pixels and full HD at 1080p.



In simplest terms, if you measure HD resolution by vertical pixel height (720p, 1080p) then 4K UHD can also be called 2160p. As you can see, 4K outstrips its best HD predecessor by a very wide margin in creating a resolution profile that's two times wider and two times higher than 1080 HD, thus giving a total screen resolution that's 4 times larger overall, thus its name, 4K or, as it used to be called, Quad HD.

4K and UHD, Differences?

Now, we've been using the terms 4K and UHD interchangeably so far and while they basically are interchangeable at the commercial level, they do actually also mean slightly different things. While most UHD that you'll find on TV screens is actually 3,840 pixels as mentioned above, it still gets called 4K because it does after all offer 4 times the resolution profile of regular HD.

However, in a more specialized context, proper 4K is what is most often found as a digital camera resolution standard that involves an actual 4,096 x 2160 pixel resolution at an aspect ratio of 1.9:1 (horizontal: vertical) as opposed to common TV based 3,840p width and aspect ratios of 16:9 or 1.78:1.

Basically, regardless of the fact that 4K TV is officially defined as UHD, you're buying into the same thing whether you see either 4K or Ultra HD used to describe a TV, monitor or film/Photo camera.

Moving 4K into Home Theater

While the origins of 4K film go back quite a ways and have their roots in theatrical releases of films such as Blade Runner: The Final Cut back in 2007, it wasn't until James Cameron filmed his now famous "Avatar" in 4K resolution that the projection platform itself was widely introduced in many theaters eager to please audiences with beautiful crystal screen clarity.

However, going from theaters to something like home entertainment is a big leap and it wasn't until just within the last couple of years that both projectors and the already mentioned TVs became widely available for home theater system set up that would let consumers enjoy UHD clarity in their houses.

Now, in terms of TV 4K systems, this resolution isn't even entirely noticeable unless you enjoy a very large and thus very expensive screen or are sitting abnormally close to your TV. However, when it comes to projectors, the power offered by 4K really does become visible.

Most 4K projectors offer at least 4,096 x 2,160 pixels of resolution and because they typically offer projection area sizes that totally dwarf all but the largest 4K TVs, this is where you really notice the difference between UHD and regular HD content.

With a projector showing native 4K content or even upscaled 1080p HD content, you finally get to experience picture clarity in your own home that imitates on a smaller scale what you'd find with a large UHD public theater screen.

Streaming 4K Content

While 4K content for home theater systems such as projectors and TVs is still pretty scarce on the ground, it is making ground as streaming content. YouTube has had a 4K channel running since as early as 2010 and other developments are definitely on the horizon, especially in countries or regions with excellent internet connectivity that goes above the normal speeds available to most people.

The broadcast industry as a whole is offering the promise of a soon to arrive new standard in streaming content compression during transmission, called H.265 or HVEC (High Efficiency Video Codec). With the implementation of HVEC, broadcasters are assuring the buying public that 4K content will become easy and economical to stream into home theater systems and thus will become much more common. TV manufacturers themselves have been keeping up to date with this promise and have ensured that every new 4K TV to be released this year and in 2015 or further down the road is fully capable of decoding the HVEC standard for its users.

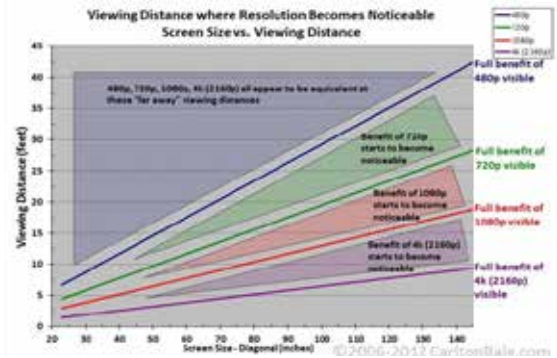
The Benefits of UHD 4K TV

4K TVs don't just come with the benefit of enormously enhanced resolution. They include a number of other features that distinguish them from more conventional TVs.

First of all, let it be clear that even if the difference in resolution isn't too noticeable on a typical 4K screen size from a normal viewing distance, it is definitely there. The extra and much smaller pixels make a real difference whether your eye sight lets you notice them or not and additional features like ultra-high refresh rates and specialized technologies like MotionFlow (found in Samsung brand 4K TVs) will dramatically improve your viewing experience.

Furthermore, buying a 4K TV gives you access to future connectivity specs and future visual specs that will come in handy as broadcasters catch up to the new technology.

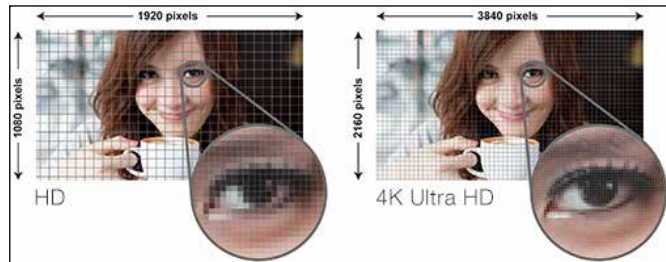
Also, the illumination capacities of most UHD TV brands use highly advanced technologies such as LCD panels illuminated by LED backlights in the form of local dimming or full array dimming systems that dramatically improve picture brightness and contrasts.



If what you're looking for is maximal image quality features –even if you don't particularly care about 4K UHD resolution itself—the major 4K lines of TVs from major manufacturers also happen to offer the top of the line in terms of these other image enhancement capabilities and they offer them at prices that are steadily dropping towards very affordable ranges.

Finally, understand that 4K content is growing into the market as you read this. 4K film camera prices are dropping too and a lot of new content is being filmed and distributed based on this platform. Furthermore, the Blu-ray Disc Association is well along with plans to have its 4K version of Blue-ray ready for public release by the end of this year.

And as we've already covered above with streaming content, compression and transmission codecs such as HVEC are going to make sure that both 4K broadcasts and 4K home theater systems are mutually compatible for delivering UHD content even if bandwidth conditions for most homes don't improve significantly.



HDMI and 4K

Conventional HDMI 1.4 can handle 4K TV, but only up to speeds of 24 frames per second. Unfortunately this is still a common standard on many 2013 4K TVs but that's changing and the latest TV models as well as the latest 4K projectors and computer monitors will all be outfitted with HDMI 2.0 ports, which are designed to handle the much higher frame rates and bit depths of UHD content.

So the bottom line for HDMI is: buy a TV, monitor or projector that's already been outfitted with the latest version and you'll be perfectly fine.

What About Regular HD Content on 4K Screens?

This is one of the key questions around the question of buying into 4K TVs and projectors. (Particularly TVs though, since they're far more affordable). And the answer is a resounding Yes!

Almost all of the latest 4K TV models will not only easily play 1080P HD, 1080i, Blu-ray, HD DVD or even 720P content but will also upconvert any of these formats so that they're rendered more clearly in UHD. Now while there is some debate on just how visibly your conventional content improves with this upconversion technology, it does indeed get rendered more sharply and especially so on the higher end TV brands with much more powerful upconversion engines running inside them.

Thus, the bottom line is that yes, your TV will display and even improve conventional HD content of all types but you should be sure to buy a make and model of TV (or projector) whose upconversion engine is widely considered to be superior.

Should I Buy into 4K?

The answer is a pretty definite yes across the board:

If you want a video or photo camera that will deliver image and film clarity like nothing you've ever created before, then yes, you should buy a 4K camera.

If you'd like a home theater projector that's ready for the arrival of 4K films and streaming content, then yes, go for 4K, though it will still cost you at least several thousand dollars to get your hands on one.

If you'd like a computer monitor that can render the latest games and UHD web content in the clarity they were designed for, then you should definitely get your hands on a 4K monitor. This applies even more so if you're a professional designer or architect who's involved in work that requires extremely detailed rendering of graphics.

And finally, in terms of the most dominant 4K product on the market today, the TV, then if you want to future proof your set for viewing the wide array of 4K entertainment options that will definitely be appearing in the next year or two, you should buy a UHD TV screen from a high quality manufacture. Even if 4K content is slow to arrive in your area, you'll at least benefit from a wide array of top of the line resolution upconverting, rendering and display technologies which will drastically improve all of your regular HD content much more beautifully.

What's the Bottom Line, Is 4K Here to Stay?

This certainly looks to be the case. Current 4K UHD trends are developing at a much faster and steadily more affordable pace than what we're seeing with plasma TV and the still incredibly expensive OLED display technology. In fact, plasma TVs, which for a time were thought to be the next wave in Ultra HD TV display technology are failing completely so far. With Their main manufacturer having ceased production this year.

This means that 4K is almost certainly going to have its large space on the TV market as new UHD content emerges, and the technology is already well established as the latest and possibly best in cameras and film projectors.

Yes, major manufacturers are already working on experimental development projects in the even more powerful 8K resolution technology but many of the problems that already exist with displaying and streaming 4K will need to be worked out even further before 8K ever becomes a commercial product. So for now, it seems that 4K is here to stay at least for the next few years and getting ready for it is a great idea now that prices for TVs, cameras and even projectors are dropping.

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QUANTUM COMPUTER



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Introduction

A quantum computer is a computer design which uses the principles of quantum physics to increase the computational power beyond what is attainable by a traditional computer. Quantum computers have been built on the small scale and work continues to upgrade them to more practical models.

Traditional Computers function by storing data in a binary number format, which result in a series of 1s & 0s retained in electronic components such as transistors. Each component of computer memory is called a bit and can be manipulated through the steps of Boolean logic so that the bits change, based upon the algorithms applied by the computer program, between the 1 and 0 modes (sometimes referred to as "on" and "off").

A Quantum computer, on the other hand, would store information as either a 1, 0, or a quantum superposition of the two states. Such a "quantum bit," called a qubit, allows for far greater flexibility than the binary system.

Specifically, a quantum computer would be able to perform calculations on a far greater order of magnitude than traditional computer, a concept which has serious concerns and applications in the realm of cryptography & encryption. Some fear that a successful & practical quantum computer would devastate the world's financial system by ripping through their computer security encryptions, which are based on factoring large numbers that literally cannot be cracked by traditional computers within the life span of the universe. A quantum computer, on the other hand, could factor the numbers in a reasonable period of time. To understand how this speeds things up, consider this example.

If the qubit is in a superposition of the 1 state and the 0 state, and it performed a calculation with another qubit in the same superposition, then one calculation actually obtains 4 results: a 1/1 result, a 1/0 result, a 0/1 result, and a 0/0 result. This is a result of the mathematics applied to a quantum system when in a state of decoherence, which lasts while it is in a superposition of states until it collapses down into one state. The ability of a quantum computer to perform multiple computations simultaneously (or in parallel, in computer terms)



is called quantum parallelism).

The exact physical mechanism at work within the quantum computer is somewhat theoretically complex and intuitively disturbing. Generally, it is explained in terms of the multi-world interpretation of quantum physics, wherein the computer performs calculations not only in our universe but also in other universes simultaneously, while the various qubits are in a state of quantum decoherence. (While this sounds far-fetched, the multi-world interpretation has been shown to make predictions which match experimental results).

NASA's quantum computer just solved a problem 100 million times faster than a conventional computer chip could.

Few years back Quantum computer was just a hypothetical computer but recently Google and NASA together with D-Wave have successfully built quantum computer, it could be considered one of the huge success and technical advancement accomplished by mankind. But the current quantum computer must be kept at very low temperature and certain constraints must be maintained to run the computer making it unsuitable like the traditional computers.

With Quantum computer the processing speed of a computer would be greatly increased and huge works such as simulation of Big Bang, star formation can be done to understand the universe moreover Quantum physics can be well understood with quantum simulation, THE ONLY LIMITATIONS YOU CAN WITH THE QUANTUM COMPUTER IS THE LIMITATION OF YOUR THOUGHT.

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WIND ENERGY AS POTENTIAL SOURCE OF RENEWABLE ENERGY



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Introduction:

Change in climate is the biggest and most urgent environmental threat in the world. The greenhouse gas which is produced by human activity, by burning of fossil fuels such as coal, oil and natural gas cause increases in global temperatures, leading to more severe weather patterns such as floods, droughts and storms, rising sea levels and threat entire ecosystems. Thus the inconsistent environmental condition rising global emissions as well as price fluctuation of fossil fuels have forced many countries to develop environmentally friendly alternatives such as solar energy, wind, geothermal, tidal, hydro, etc. and among the alternatives wind energy have become a most reliable source of energy for power generation.

For many years wind energy has been used for many small purposes like for water pumping with the capacity of 10 - 250 kW and for producing mechanical power to operate some small devices, but nowadays it is also being used to produce electricity with the application of wind turbines which is also known as wind mill. Wind turbine consists of a rotor shaft and a generator mounted in a nacelle.

Based on axis of rotation, wind turbines are divided into two types: Horizontal axis wind turbines (HAWT) and vertical axis wind turbines (VAWT). Currently HAWT dominate the wind energy market due to their large size and high power generation characteristics. However, VAWT are capable of producing a lot of power, and offer many advantages such as small, quit, easy to install, can take wind from any direction, and operate efficiently in turbulent wind conditions, eventually a new area in wind turbine research has opened up to meet the demands of individuals willing to take control and invest in small wind energy technology.

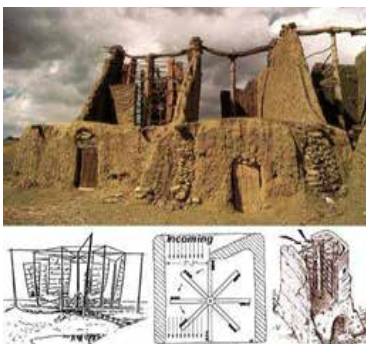


Figure 1 – Ancient Persian windmill

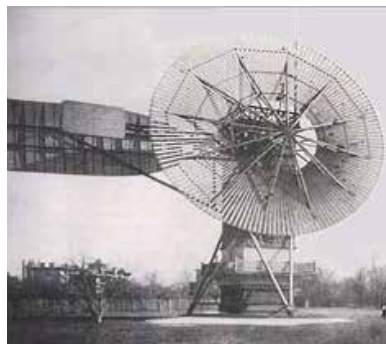


Figure 2 - Charles Brush wind turbine, Cleveland, Ohio

Evolution of Wind Turbine technology:

Human beings have been harnessing wind power since ancient times. The history of wind turbines originates around 200 B.C. somewhere in Persia. But the practical wind mills were invented in Sistan, Iran in 7th century with long vertical blades. They were used to grind corn and pump water. The first electric wind turbine was built in Scotland

in 1887 and a larger one was built in Cleveland, Ohio in 1888 by Charles Brush. Charles Brush wind turbine

had a rotor with 17 m diameter and was installed on an 18m long base. His turbine has generated 12 kW of power. Wind mills were effectively used in farms for producing electricity and pumping water in 1930's in USA. Thus technology has evolved over the years to utilize them for pumping water, powering sawmills, grinding grains and recently generating electricity. The first commercial multi megawatt wind turbine was constructed in 1978 in Denmark. In 1991, the first commercial wind farm was built in the United Kingdom using 400KW turbines. But in India manufacture, installation and operation of wind turbine for generating electrical power was started in the year 1995 only and this mission was entrusted to Suzlon Energy Limited which was founded in 1995.

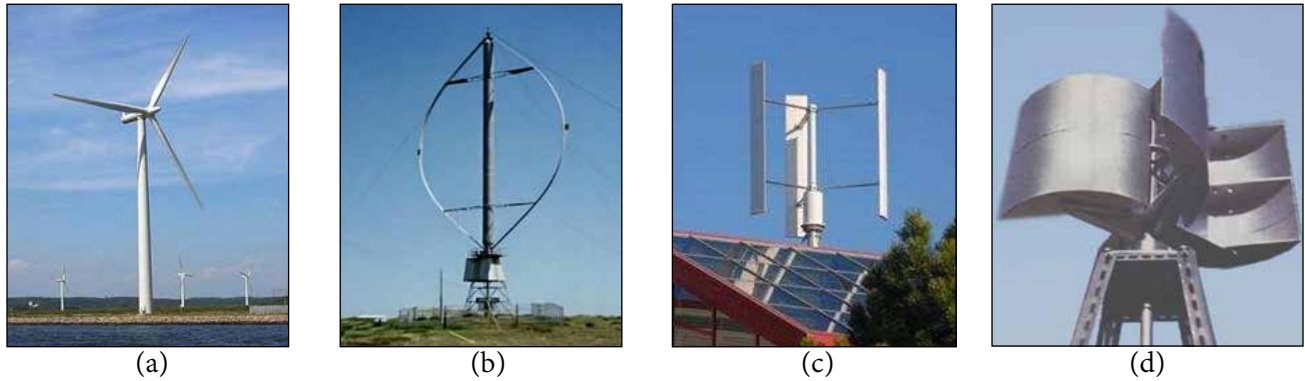


Figure 3 : (a) A horizontal axis wind turbine in Aalborg, Denmark (b) A Darrieus vertical axis wind turbine (lift based) in Magdalen Islands, Canada (c) A Giromill vertical axis wind turbine (lift based) (d) Savonius vertical axis wind turbine (drag base)

Figure 4 shows the evolution of wind turbines with time, rotor diameters and capacity ratings. Since the late 1970's, there has been a remarkable improvement in the capacity, efficiency and design characteristics of wind turbines. The latest turbine models have long blade lengths which can sweep and capture wind energy from a large area to produce more electricity, thereby bringing the cost per unit of energy generated down. In the last two decades, wind turbines have increased in size by a factor of more than 100 (from 25kW to 2500kW and beyond), the cost of energy has reduced by a factor of more than 5 and wind turbine rotor diameters have been increased by a factor of 8. The largest wind turbine currently in operation has a rotor diameter of 126m and a capacity of 7.58MW. Evolution of wind turbine technology is centered on increased reliability and efficiency, noise reduction, compatibility with the grid network and effective aerodynamic blades.

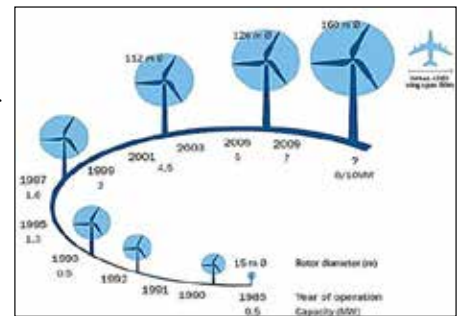


Figure 4: Size evolution of wind turbines over time

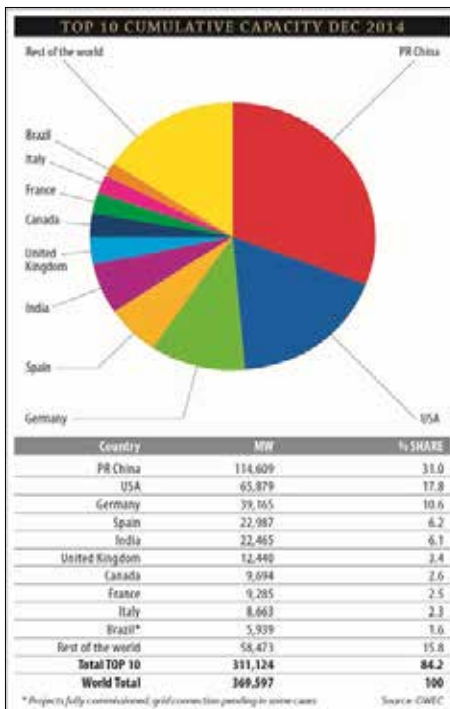
Wind turbine blades begin to spin typically when wind speed reaches about 3 meters/second (m/s) - 5 m/s. It keeps generating power until around 30 m/s at which point wind is considered to be too strong and destructive. The blades are attached to a rotating shaft which transfers the power in the wind to a generator through a gearbox. The power generated is fed to the utility grid through a transformer. Wind turbines have an average life span of 20-25 years, after which the turbines can be replaced with new ones or withdrawn. New developments and innovations in wind turbine designs are continuously being exploited worldwide. The required technological improvements are simple and straight forward: taller towers, lighter weight blades with

better aerodynamic features, larger rotors and continuing monitoring process. This would increase the reliability and improve the compatibility when connected to the grid. At present, advanced and the most common wind turbine concept is based on horizontal axis design with 3 blades, variable pitch, upwind operating at variable speed feeding power to the grid through power electronic interfaces. Offshore wind power refers to wind farms constructed in bodies of water to generate electricity from wind. These are in developmental phase with global offshore wind power capacity expected to reach a total of 75 GW by 2020. They are placed in the sea at depths up to 30m. Stronger and more constant offshore wind speeds help to produce larger amounts of electricity. Currently, offshore wind power capacity is much more expensive than onshore wind power. Wind turbines with ratings up to 5MW have been developed for offshore use until now. Larger wind turbine designs are being developed and are expected to give a boost to offshore wind farms. Clearly the wind energy industry is in early stages of development and is still evolving. This industry achieved great progress over the past two decades and will play an important role in the production of electricity from renewable energy sources in the future.

Global Wind Energy Statistics:

In 2011, a new record was set in the world market for wind turbines which gained momentum after a comparatively weak year in 2010. A 21% increase was noted over the previous year's capacity. The total capacity of wind power by the

end of 2014 was around 369.6 MW and is expected to touch 666.1 MW by the end of 2019. Various countries, in order to meet their growing power demand are installing large scale wind farms both on shore and off shore. In 2014, China has installed capacity of around 114,609 MW of wind energy contributing 31.0% of the total wind power followed by USA, Germany, Spain and India which produce 65,879 MW, 39,165 MW, 22,987 MW and 22,465 respectively as shown in Figure 5. In the current scenario large scale wind turbines farms (like offshore wind farm “London Array” which is around 100 km2 and onshore wind farm “Alta Wind Energy Centre” which is around 36.5 km2) are required in order to match the increasing power demand. This will lead to expansion of the wind farms and finally would result in large scale continental wind farms.



The Enercon E-126, with a rated capacity of 7.58 MW is the largest operating wind turbine at present. It has an overall height of 198 m a rotor diameter of 126 m and has been the world's largest-capacity wind turbine since its introduction in 2007. Many companies are currently working on the development of a 10MW turbine. Many organizations such as the Global Wind Energy Council and National Renewable Energy Laboratory (NREL) have come up with projections on the future of wind energy development. According to the U.S. Department of Energy, “The U.S. possesses sufficient and affordable wind resources to obtain at least 20% of its electricity from wind by the year 2030.” Thus Global Wind Energy Outlook analyzed scenarios on the future potential of wind power and came up with a range of possible outcomes for the global wind energy market.

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CARBON BASED SOLAR CELL TECHNOLOGY



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Introduction:

Where solar technology currently stands

As the most abundant source of renewable energy available to us at this time, it makes sense that expanding the use and efficiency of solar energy collection technology would be a top priority for engineers and scientists. The amount of energy from the sun that hits the earth every day far outstrips our current energy usage, and finding a way to efficiently capture and distribute this energy resource would supply all of our energy needs. The current most commonly used method of capturing solar energy is with photovoltaic (solar) cells. Current solar cells are usually made of silicon crystals or organic polymer dyes. Organic dye cells are cheaper but less efficient than silicon cells. As always happens with technology, newer and better types of solar cells are being researched and built today. One of the materials used in new solar cells is carbon, in the form of carbon nanotubes or bucky balls. Both structures hold promising futures as materials for more efficient solar cells, though current efficiencies are lacking compared to commercial cells. With further research and experimentation, it is very likely that the efficiency of carbon based cells can increase greatly, possibly surpassing that of silicon based cells, allowing them to be. As someone who has always been interested in the prospects of newer types of energy, better, more efficient and (hopefully) cheaper solar cells can do no wrong in my mind.



100KWP Floating Solar Technology design for Loktak Lake, MANIPUR

Floating Solar Technology

The first question we should consider before we talk about the technology is 'why should we move towards floating solar technology when the land-based ones perform well?' Well! One simple yet strong explanation can be limited availability of land for land-based solar plants. It is known that solar plants take up

a large amount of land which almost can be put to no other use and in countries where cities are dense and agricultural land is limited, installing land-based solar plants are not a wise solution. Rather, installing water-based solar power or floating solar power plant is alternative to harness the sun power, without taking up extra space on land.

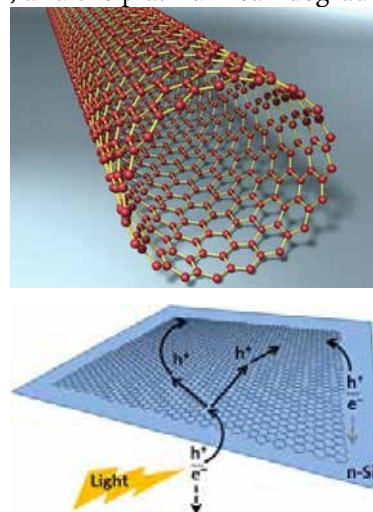
Moreover, research suggests that solar panels installed on land face reduction of yield as the ground heats up and affects the rear surface of the solar panel. Studies also suggests that if the rear surfaces of solar panels are kept cooler, then their ability to generate power goes up by as high as to 16%. This advantage is leveraged by installing solar panels on water bodies which keeps the panels cooler and solves the problem of heating to a great extent. When placed on top of the water the solar panels will be able to cool themselves more efficiently which means they will last longer and produce more energy. Likewise, installation of floating solar panels on the water bodies is not expected to affect the ecology of the water body. Rather, it proves to be beneficial to the water itself as they reduce water evaporation and discourage growth of the algae thus, help preserve water levels during extreme summer conditions. However, the picture is not all rosy and there are disadvantages as well as challenges too as you move towards installing and commissioning them in real-life. These problems include corrosion 100KWP Floating Solar Technology design for Loktak Lake, MANIPUR due to presence of high moisture content and adverse environmental conditions, stability in times of inclement weather. Besides, safely transporting the power from the floating objects is another challenge which is solved by utilizing shock-proof materials. As mentioned earlier, this power plant of capacity 10 kWp was successfully established and tested by India-headquartered module manufacturer Vikram Solar in Rajarhat New Town in Kolkata in December 2014. Yet another project for installation of floating solar plant has been commissioned by Manipur Renewable Energy Development Agency (MANIREDA). This floating solar power plant has a capacity of 100KWP and would be installed at Loktak Lake in Manipur, the largest fresh water lake in North East India. MANIREDA has taken this initiative in collaboration with Arka Ignou Community College of Renewable Energy. College would work with MANIREDA in fixing the detail design parameters, drawings, specifications, finalization of tender and issue of work order.

Current Solar Panel Technology

Silicon Based Cells Silicon based solar cells have been around for several decades, and even today are the most widespread type of solar cell. While modern silicon cells have gotten considerably more complex, the basics behind them remain the same. Silicon cells work by creating a current of electrons through the cell when it is hit by sunlight. Normally, the electrons knocked loose by sunlight wouldn't form a current, but this is solved by the addition, or doping, of small amounts of other elements to the structure of the silicon, most commonly gallium and arsenic. These elements are chosen so that they naturally have one less or one more valence electron than silicon (gallium has one less, arsenic one more), leading to areas of positive and negative charge throughout the cell. These areas of imbalanced charge, called p-type and n-type silicon respectively, are what move when sunlight hits the cell to form a current, each excess electron moving to fill a "hole" and leaving a hole behind. Modern silicon cells sometimes stack multiple systems of semiconductors to get better range of light absorption, but efficiencies of these "tandem cells" have yet to exceed 40%, and standard silicon cells haven't exceeded 30%, and there is little room for improvement due to natural limitations in the materials. **Organic Dye Based Cells** "Dye Sensitized Solar Cells" (DSSCs) are a newer type of solar cell, and still a very promising one. They are less efficient than silicon cells, but also considerably cheaper and more cost efficient overall, and efficiencies are expected to rise with further research. They consist of a thin transparent semiconductor on conducting glass that acts as one electrode, with another glass plate coated with platinum as the other electrode. Lightsensitive dye molecules are attached to the semiconductor, and an electrolyte, usually iodine triiodide, immerses the setup. Light knocks electrons from the dye molecules loose from the semiconductor, and they travel through the electrolyte to the other electrode, and then through an external circuit back to the first electrode. Efficiencies have reached up to 12%. The current focus of carbon solar cells is in replacing the dye or the entire semiconductor setup with cheaper carbon materials.

Carbon Solar Cells

Advantages of Carbon Nanotube Cells over DSSCs. There are several reasons why carbon nanotube based solar cells (CNSCs) have the advantage over DSSCs. Firstly, the materials in DSSCs have limited life spans, and will need to be replaced somewhat frequently the dyes may bleach, and the platinum can degrade due to contact with the electrolyte. In CNSCs, Carbon nanotubes are used in place of the semiconductor, eliminating the need for a dye. Secondly, the materials of DSSCs are expensive, in the case of platinum, and/or rare, in the case of the indium used in the transparent semiconductor. In CNSCs, carbon nanotubes can be used to replace both the counter electrode that requires platinum, and the transparent semiconductor that requires indium. And last, the assembly of carbon nanotube cells is simple and cheap, compared to the many components of DSSCs that are needed to be assembled. All Carbon Solar Cells "All carbon solar cells" (ACSCs) are exactly what they sound like: solar cells made completely out of carbon structures. ACSCs are still in development, but already show advantages over silicon cells. ACSCs can be made of bucky balls or carbon nanotubes, depending on what exactly is wanted from the cell. ACSCs using carbon nanotubes need to use very pure nanotubes, otherwise the efficiency is so low that the cell is not worth using. Or the cell may not be worth using at all. In experiments led by MIT Chemistry Professor Michael Strano, carbon nanotubes of a single type, single walled, and all oriented with the same symmetrical configuration were used. The prototype ACSCs were most adapt at capturing light in the near infrared part of the electromagnetic spectrums, an area that contains 40% of the sun's energy that reaches earth, and that silicon based solar cells cannot absorb. This means that even if the efficiency of the cells cannot be increased to the level of silicon cells (efficiency as of June 2012 was $\sim 0.1\%$), they will still be wanted for the extended absorption range they offer so long as the cost is low enough. As an added bonus, ACSCs could be coupled with silicon cells to cover a much greater portion of the sun's rays than either alone. Other Carbon Solar Cells ACSCs are still a technology in development, and are not likely to see commercial applications for several years. Similarly, other solar cells utilizing carbon nanotubes and bucky balls are still being researched and continuously improved. One type of carbon cell uses "double walled carbon nanotubes" (DWNT) coating silicon wafers as the cell. DWNT cells are sturdy and cheap, but only reach efficiencies of 7%8%. Further studies using single walled nanotubes in place of DWNTs to improve efficiency are ongoing. Another type of carbon solar cell involves coating a carbon fiber with polysilicon to create a hair like solar cell. The polysilicon is doped with boron and phosphorus so that the ptype is on the inside and the ntype on the outside. When sunlight hits the cell, electrons are displaced throughout the n layer and holes throughout the player, creating an electric field. Current efficiencies of these types of cells are still very low, but as with all types of solar cells, it can be improved with research and experimentation.



Solar energy has been around for several decades, but is still one of the fastest expanding fields of technology. The current level to which it is utilized is good, but it can always be better. Solar power can only do humanity good the less our reliance on expendable resources such as coal and oil, the greater our chances of survival. Carbon based solar cells are still an emerging technology, and one that holds great potential for future use. We continuously append the list of what carbon nano tubes can do with new uses and applications. Solar power won't run out any time soon; we've got billions of years to figure out where to go once we lost it. And considering how far we've come in just a few million, the potential is limitless.

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RFID (RADIO FREQUENCY IDENTIFICATION)

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There are different types of identification techniques, among them one of the most widely used technique is the Radio frequency identification, or RFID, which is a generic term for technologies that use radio waves to automatically identify people or objects. There are several methods of identification, but the most common is to store a serial number that identifies a person or object, and perhaps other information, on a microchip that is attached to an antenna (the chip and the antenna together are called an RFID transponder or an RFID tag). The antenna enables the chip to transmit the identification information to a reader. The reader converts the radio waves reflected back from the RFID tag into digital information that can then be passed on to computers that can make use of it.



Fig: RFID tags

An RFID system consists of a tag, which is made up of a microchip with an antenna, and an interrogator or reader with an antenna. The reader sends out electromagnetic waves. The tag antenna is tuned to receive these waves. A passive RFID tag draws power from field created by the reader and uses it to power the microchip's circuits. The chip then modulates the waves that the tag sends back to the reader and the reader converts the new waves into digital data. RFID uses the low-end of the electromagnetic spectrum. The waves coming from readers are no more dangerous than the waves coming to your car radio. RFID is not necessarily "better" than bar codes.



Fig: RFID Reader

The two are different technologies and have different applications, which sometimes overlap. The big difference between the two is bar codes are line-of-sight technology. That is, a scanner has to "see" the bar code to read it, which means people usually have to orient the bar code towards a scanner for it to be read. Radio frequency identification, by contrast, doesn't require line of sight. RFID tags can be read as long as they are within range of a reader. Bar codes have other shortcomings as well. If a label is ripped, soiled or falls off, there is no way to scan the item. And standard bar codes identify only the manufacturer and product, not the unique item. The bar code on one milk carton is the same as every other, making it impossible to identify which one might pass its expiration date first. Bar codes are inexpensive and effective for certain tasks. It is likely that RFID and bar codes will coexist for many years.

RFID is a proven technology that's been around since at least the 1970s. Up to now, it's been too expensive and too limited to be practical for many commercial applications. But if tags can be made cheaply

enough, they can solve many of the problems associated with bar codes. Radio waves travel through most non-metallic materials, so they can be embedded in packaging or encased in protective plastic for weather-proofing and greater durability. And tags have microchips that can store a unique serial number for every product manufactured around the world. Many companies have invested in RFID systems to get the advantages they offer. These investments are usually made in closed-loop systems—that is, when a company is tracking goods that never leave its own control. That's because all existing RFID systems use proprietary technology, which means that if company A puts an RFID tag on a product, it can't be read by Company B unless they both use the same RFID system from the same vendor. But most companies don't have closed-loop systems, and many of the benefits of tracking items come from tracking them as they move from one company to another and even one country to another.

Just as your radio tunes in to different frequency to hear different channels, RFID tags and readers have to be tuned to the same frequency to communicate. RFID systems use many different frequencies, but generally the most common are low- (around 125 KHz), high- (13.56 MHz) and ultra-high frequency, or UHF (850-900 MHz). Microwave (2.45 GHz) is also used in some applications. Radio waves behave differently at different frequency, so you have to choose the right frequency for the right application.

Different frequencies have different characteristics that make them more useful for different applications. For instance, low-frequency tags are cheaper than Ultra high frequency (UHF) tags, use less power and are better able to penetrate non-metallic substances. They are ideal for scanning objects with high-water content, such as fruit, at close range. UHF frequencies typically offer better range and can transfer data faster. But they use more power and are less likely to pass through materials. And because they tend to be more "directed," they require a clear path between the tag and reader. UHF tags might be better for scanning boxes of goods as they pass through a bay door into a warehouse. It is probably best to work with a consultant, integrator or vendor that can help you choose the right frequency for your application.

Most countries have assigned the 125 kHz or 134 kHz area of the radio spectrum for low-frequency systems, and 13.56 MHz is used around the world for high-frequency systems. But UHF RFID systems have only been around since the mid-1990s and countries have not agreed on a single area of the UHF spectrum for RFID. Europe uses 868 MHz for UHF and the U.S. uses 915 MHz. Until recently, Japan did not allow any use of the UHF spectrum for RFID, but it is looking to open up the 960MHz area for RFID. Many other devices use the UHF spectrum, so it will take years for all governments to agree on a single UHF band for RFID. Government's also regulate the power of the readers to limit interference with other devices. Some groups, such as the Global Commerce Initiative, are trying to encourage governments to agree on frequencies and output. Tag and reader makers are also trying to develop systems that can work at more than one frequency, to get around the problem. Radio waves bounce off metal and are absorbed by water at ultra-high frequencies. That makes tracking metal products or those with high water content problematic, but good system design and engineering can overcome this shortcoming. Low- and high-frequency tags work better on products with water and metal. In fact, there are applications in which low-frequency RFID tags are actually embedded in metal auto parts to track them.

Active RFID tags have a battery, which is used to run the microchip's circuitry and to broadcast a signal to a reader (the way a cell phone transmits signals to a base station). Passive tags have no battery. Instead, they draw power from the reader, which sends out electromagnetic waves that induce a current in the tag's antenna. Semi-passive tags use a battery to run the chip's circuitry, but communicate by drawing power from the reader. Active and semi-passive tags are useful for tracking high-value goods that need to be scanned over long ranges, such as railway cars on a track, but they cost a dollar or more, making them too expensive to put on low-cost items. Companies are focusing on passive UHF tags, which cost under 50 cents today in volumes of 1 million

tags or more. Their read range isn't as far -- typically less than 20 feet vs. 100 feet or more for active tags, but they are far less expensive than active tags and can be disposed of with the product packaging. The Electronic Product Code, or RFID, was developed by the Auto-ID Center as a successor to the bar code. It is a numbering scheme that will be used to identify products as they move through the global supply chain.

It depends on the vendor and the application, but typically a tag would carry no more than 2KB of data—enough to store some basic information about the item it is on. Companies are now looking at using a simple "license plate" tag that contains only a 96-bit serial number. The simple tags are cheaper to manufacture and are more useful for applications where the tag will be disposed of with the product packaging. Microchips in RFID tags can be read-write or read-only. With read-write chips, you can add information to the tag or write over existing information when the tag is within range of a reader, or interrogator. Read-write tags usually have a serial number that can't be written over. Additional blocks of data can be used to store additional information about the items the tag is attached to. Some read-only microchips have information stored on them during the manufacturing process. The information on such chips can never be changed. Other tags can have a serial number written to it once and then that information can't be overwritten later.

One problem encountered with RFID is the signal from one reader can interfere with the signal from another where coverage overlaps. This is called reader collision. One way to avoid the problem is to use a technique called time division multiple access, or TDMA. In simple terms, the readers are instructed to read at different times, rather than both trying to read at the same time. This ensures that they don't interfere with each other. But it means any RFID tag in an area where two readers overlap will be read twice. So, the system has to be set up so that if one reader reads a tag another reader does not read it again. Another problem readers have is reading a lot of chips in the same field. Tag collision occurs when more than one chip reflects back a signal at the same time, confusing the reader. Different vendors have developed different systems for having the tags respond to the reader one at a time. Since they can be read in milliseconds, it appears that all the tags are being read simultaneously.

The read range of passive tags (tags without batteries) depends on many factors: the frequency of operation, the power of the reader, interference from metal objects or other RF devices. In general, low-frequency tags are read from a foot or less. High frequency tags are read from about three feet and UHF tags are read from 10 to 20 feet. Where longer ranges are needed, such as for tracking railway cars, active tags use batteries to boost read ranges to 300 feet or more.

International standards have been adopted for some very specific applications, such as tracking animals. Many other standards initiatives are under way. The International Organization for Standardization (ISO) is working on standards for tracking goods in the supply chain using high-frequency tags (ISO 18000-3) and ultra-high frequency tags (ISO 18000-6). EPC global, a joint venture set up to commercialize Electronic Product Code technologies, has its own standards process, which was used to create bar code standards. EPC global intends to submit EPC protocols to ISO so that they can become international standards. There are many different RFID vendors with different areas of expertise. RFID Journal has compiled a searchable database and directory of vendors around the world. RFID is used for everything from tracking cows and pets to triggering equipment down oil wells. It may sound trite, but the applications are limited only by people's imagination. The most common applications are tracking goods in the supply chain, reusable containers, high value tools and other assets, and parts moving to a manufacturing production line. RFID is also used for security (including controlling access to buildings and networks) and payment systems that let customers pay for items without using cash.

Thousands of companies around the world use RFID today to improve internal efficiencies. Club Car, a maker of golf carts uses RFID to improve efficiency on its production line. Paramount Farms—one of the world's largest suppliers of pistachios—uses RFID to manage its harvest more efficiently. NYK Logistics uses RFID to improve the throughput of containers at its busy Long Beach, Calif., distribution center. And many

other companies are using RFID for a wide variety of applications. Some companies are combining RFID tags with sensors that detect and record temperature, movement, even radiation. One day, the same tags used to track items moving through the supply chain may also alert staff if they are not stored at the right temperature, if meat has gone bad, or even if someone has injected a biological agent into food. Most passive RFID tags simply reflect back waves from the reader. Energy harvesting is a technique in which energy from the reader is gathered by the tagged, stored momentarily and transmitted back at a different frequency. This method may improve the performance of passive RFID tags dramatically. RFID technology is a labor-saving technology so it's likely that some workers will be laid off. That's because fewer workers will be needed to scan bar codes. But the transition from bar codes to RFID could take a decade or more, so it is unlikely that RFID will lead to wide-scale displacement of workers. The technology will likely create new jobs, just as Internet technologies creating new jobs, from Web developers to warehouse workers managing inventory for online stores. The jobs that will be affected by RFID are those that involve scanning bar codes. Most of those jobs also have other components, such as moving products or restocking shelves. Those jobs will not go away because of RFID. So, the future scope of RFID is so broad that it can save both the time, money as well the human labor.

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CAN GOOGLE REALLY ANSWER EVERYTHING?

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In this modern age of technology, “Google” has become indispensable in the lives of every internet savvy human beings on earth. When most of us think of the Internet, we're thinking of the sites and services we use on a daily basis, which are accessible by regular browsers and searchable with Google. But beneath this everyday web lies a whole other Internet where sites are hidden unless you know how to use them and what to look for. Deep Web, also known as “Deep net,” the “Invisible Web,” the “Undernet” or the “hidden Web,” are parts of the Internet that are not considered part of the “surface web,” or the portion of the World Wide Web that is indexed by conventional search engines. Many deep web sites are not indexed because they use dynamic databases that are devoid of hyperlinks and can only be found by performing an internal search query. The Deep Web technically includes all Internet pages that aren't accessible by regular search engines, including archived sites and unlinked content. Then there's the stuff that resides on a subset of sites that aren't accessible from a regular browser at all. These darknets have URLs that don't end in the traditional host suffixes (like .com, .fr, .eu, and so on) and require special browsers to open.

The vast majority of the Deep Web holds pages with valuable information. Among the worlds largest are the U.S. National Oceanic and Atmospheric Administration, NASA, the Patent and Trademark Office and the Securities and Exchange Commission's EDGAR search system, all of which are public. The next batch has pages kept private by companies that charge a fee to see them, like the government documents on LexisNexis and Westlaw or the academic journals on Elsevier. Another 13% of pages lie hidden because they're only found on an Intranet. These internal networks, for instance, at corporations or universities have access to message boards, personnel files or industrial control panels that can flip a light switch or shut down a power plant. Then there's **Tor, the darkest corner of the Internet**. It's a collection of secret websites (ending in .onion) that require special software to access them. People use Tor so that their Web activity can't be traced. It runs on a relay system that bounces signals among different Tor-enabled computers around the world.

It's not possible to determine exactly how many deep web pages there are at any given time, or to provide a comprehensive picture of everything in it because of the very stealthy nature of certain parts of the dark web. No one can say with certainty that they've fully explored its depths. It's also a rapidly changing landscape based on the comings and goings of new services and marketplaces. Due to this, **Deep Web has shadowy associations to black market activities. It is a place on the web where pornography, hit man services, weapons, stolen accounts, cracked software, drugs and regular porn are all kosher.** Individual vendors also maintain their own sites on the Deep web too. These dealings are done using a special type of money called “**Bitcoins**”, a peer-to-peer digital currency that regulates itself according to network software.

On August 1st, 2013, the Federal Bureau of Investigations (FBI) arrested Eric Eoin Marques, a 28-year-old Irishman who owns and operates Freedom Hosting on Tor network, on charges of distributing and

promoting child abuse material online. On the following day, approximately half of Freedom Hosting's hidden services reportedly suffered from malware attacks and taken offline, many of which were suspected to host illegal activities, including the criminal hacking site HackBB, money laundering services and a vast portion of online child pornography. But the most famous of all of them is the busting of the **Silk Road**. Silk Road was founded in February 2011 and is a site on the Deep Web where you can literally pick up ANYTHING you want. ANYTHING! You name it, somebody has got it on here and you'll pay with your bitcoins and it'll arrive in an untraceable package a few days later. It really is that easy with a 97% success rate. Silk Road is set up kind of like eBay or Amazon. There are buyers and sellers and each buyer and seller has their own feedback rating. So when you're looking to pick up some forbidden things that fancied you, like drugs, arms or even human beings, you'll have a look through the site, find a seller with good feedback for that particular 'fancy thing' and then pay them with a bitcoin and sit back and wait for it to turn up. It's that easy. The feedback system is integral to its success as it ensures that users of the site don't mistake it for a scam site as it would be VERY easy to just take someone's money and never send them anything, especially as you're using bitcoins on the deep web so there would be no way to track anyone down who screwed you over. Although scammers do inevitably exist, Silk Road seems to have combated this by implementing this system and has completely nailed the idea of buying drugs online. In October 2013, the Federal Bureau of Investigation (FBI) shut down the website and arrested Ross William Ulbricht under charges of being the site's pseudonymous founder "Dread Pirate Roberts". On 6 November 2013, Silk Road 2.0 came online, run by former administrators of Silk Road. It too was shut down and the alleged operator was arrested on 6 November 2014 as part of the so-called "Operation Onymous". Ulbricht was convicted of seven charges related to Silk Road in U.S. Federal Court in Manhattan and was sentenced to life in prison without possibility of parole. Further charges alleging murder-for-hire remain pending in Maryland.

The Deep web is also used by people who "want to remain anonymous or set up sites that can't be traced back to a physical location or entity." That includes people who need to protect their identity and communications from state and private surveillance, like whistle blowers and journalists. The report also notes that "dissidents in restrictive regimes may need anonymity in order to safely let the world know what's happening in their country."

The Deep web even has their own famous social media like Facebook, known as the **Blackbook**. It is not illegal to just "browse" the dark web alone, in theory, unless you're looking at sites that host illegal content (e.g. child pornography, human trafficking sites). If you do it repeatedly, of course, then it is. It really depends on what sites you're accessing, and also what you're viewing and/or purchasing from them. The **HiddenWiki** is the site on Deep web which contains all the mainstream URLs of the websites that are on the Deep Web.

This article just provides a brief overview of the Deep Web. But how deep it is, no one could tell! There are still much more hidden things inside the deep web. It is said that the Deep web consists of 99% of the database that are on the internet. While the Deep Web stays mostly hidden from public view, it is growing in economic importance. Whatever search engine can accurately and quickly comb the full Web could be useful for Big Data collection particularly for researchers of climate, finance or government records.

Everything is not just black and white! The world we live in is much more complicated than how we perceive it to be. There are yet many things that are unseen and hidden like the Deep Web. Believing that Google can answer most of the queries of our everyday life is like throwing dust in our own eyes.

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ENERGY FROM FUEL CELLS



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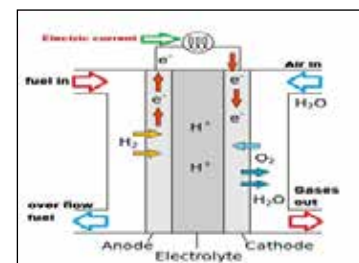
Energy can neither be created nor destroyed, but can be converted from one form to another. According to the 1st law of thermodynamics, the law tells that there is a fixed amount of energy in the universal states and 2nd law states that the entropy is always increase of any isolated system. The optimal case would be that the entire portion of the energy source be converted to the form of our choice then utilize the available energy to alter it into a form which is useful to us. For example, an automobile gasoline would produce the energy which is exactly equal to the energy released by breaking the bonds of the hydrocarbon fuel through combustion.

When energy conversion is concerned, there are always losses. This means that the source energy isn't exactly converted to just one form of energy. Therefore, when engineers designing machine the losses is minimised to the greatest extent by utilizing the second law of thermodynamics which deals with the concept of "Entropy". Basically this law explains the directionality of energy transfer. Considering the example of a automobile gasoline in a car, chemical energy from the gasoline is first converted to thermal energy by combustion and then into mechanical energy leading to low efficiencies. If we could eliminate the process of conversion to a lower level energy, we could create a more efficient power device. This is exactly the purpose behind a "Fuel Cell" which directly converts chemical energy to electrical energy

The first fuel cell were invented in 1838 but the commercial use of fuel cells came more than a century later in NASA space programs to generate power for satellite and space capsules. Since then, fuel cells have been used for many applications.

Working of Fuel Cell

The fuel cell is basically an electrochemical energy conversion device working on a principle which is reverse to "Electrolysis". In electrolysis, water is broken down by applying electricity into hydrogen and oxygen whereas; in a fuel cell hydrogen gives its electrons to oxygen and forms water. It consists of an anode; cathode and electrolyte that assign positively charged hydrogen ions to move between the two side of the fuel cell. The anode and cathode contain catalysts that cause the fuel to experience oxidation reaction that generate positively charge hydrogen ions and electron. The hydrogen ions are drawn through the electrolyte after the reaction. At the same time, the path taken by the electrons are drawn from the anode to the cathode is directed through a circuit which produces electricity. At the cathode, hydrogen ions, electrons, and oxygen react to form water which as by product.



The basic fuel hydrogen is supplied through pressurized gas containers and oxygen from air. The pressurized hydrogen container is quite a heavy instalment and therefore there are certain fuel cells which are designed to operate from hydrogen containing gases like clean natural gas or renewable biogas whereas if fuel cells can constantly keep producing electrical energy as long as the fuel is supplied

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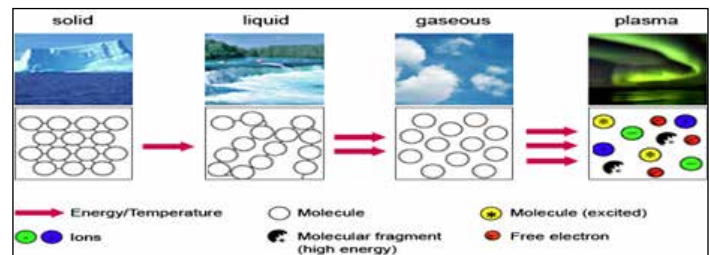
PLASMA – THE FOURTH STATE OF MATTER



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Plasma technology is based on a simple physical principle. Matter changes its state when energy is supplied to it: solids becomes liquid, and liquids becomes gaseous. If even more energy is supplied to a gas, it is ionized and goes into the energy-rich plasma state, the fourth state of matter.

Plasma was first discovered by IrvingLangmuir in 1928. It is not rare; actually, quite the opposite is true. More than 99% of the visible matter in the universe is in the plasma state. It can be seen in its natural form on earth as lightning or as polar light in the Arctic and Antarctic, for example. During a solar eclipse, plasma can be observed as a bright circle of light (corona) around the sun.



With increasing energy input, the state of matter changes from solid to liquid to gaseous. If additional energy is then fed into a gas by means of electrical discharge, the gas will turn into plasma.

Plasma energy changes the world

The term plasma designates matter with a high, unstable energy level. When plasma comes into contact with solid materials like plastics and metals, its energy acts on the surfaces and changes important properties, such as the surface energy.

In the manufacturing industry, this principle is used for selectivemodification of material characteristics. Treatment with Openair plasma energy causes a targeted and exactly adjustable increase in the adhesiveness and wettabilityof surfaces. This makes it possible to use completely new (even non-polar) materials and environmentally-friendly, solvent-free (Volatile Organic Compounds-free) paints and adhesives industrially. Today, many chemical surface treatment processes can be replaced with Openair plasma treatment.

Plasma treatment for almost all areas of industry

Because it is easy to use and can be integrated inline, plasma treatment has been used for many years in almost all areas of industry, including automobile engineering, transport, electronics manufacturing, packaging technology, consumer goods, life sciences, textiles and new forms of energy.

Applications of Plasma technology in the field of Electronics

- 1) **Crystal-clear displays: plasma treatment for flawless protection and functional coatings**

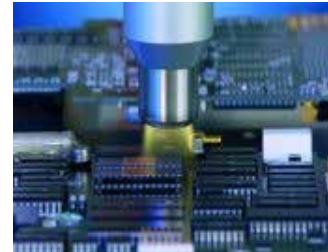


Modern touchscreens, LCD displays and TV screens make high demands on production processes as the plastic parts must be provided with highly transparent scratch-proof and anti-static coatings before they are bonded. The high degree of automation in the electronics industry demands a surface treatment process that can perform inline with the utmost reliability, delivering a high degree of activation at high speed.

The micro-fine atmospheric plasma cleaning and plasma activation provided by the Openair process offers the electronics industry extremely effective solutions. Plastic displays are treated with plasma directly before application of the antistatic and scratchproof coating in the coater. Thanks to the high surface energy achieved by the Openair Plasma technology, the applied coating spreads evenly to form a homogeneous film. This results in a flawless appearance and significantly reduces reject rates in production.

2) Plasma Treatment for Printed Circuit Boards with Zero Volts – New Possibilities for Sensitive Electronic Applications

As the substrate for electronic components, printed circuit boards are partially conductive. Until now, this has meant that atmospheric procedures could not be used to process printed circuit boards. Any pre-treatment method that even comes close to conducting electrical potential creates shorts resulting in the destruction of layout and components.



With these types of electronic applications in mind, plasma jets developed by Openair work with zero voltage input to the component. This unique feature of Openair plasma treatment opens up possibilities for a whole range of industrial applications.

Advantages of Openair Plasma treatment for printed circuit boards:

- Potential-free surface treatment (e.g., super-fine printed circuit board cleaning)
- Makes new, more efficient process architectures feasible
- Eliminates whole production lines in the manufacturing process
- Makes it possible to selectively activate plasma in electronic components.

3) Premium Quality and Appearance – Openair Plasma Pre-treatment for Mobile Telephones

In today's consumer electronics market, design, appearance and feel are primary drivers in purchase decisions, in addition to pure technical functionality.

Top quality design of the casing is particularly important for mobile telephones. Along with general quality and design, manufacturers are looking increasingly to environmentally friendly manufacturing technologies and avoiding the use of VOC's (volatile organic compounds).



Openair plasma treatment has been successfully used for years to achieve quality finishes on mobile telephone half shells:

- Plasma energy reliably removes all particles using super-fine cleaning.
- Greater surface tension on the plastic casing significantly improves finish dispersion and adhesion and makes it possible to use water-based finishes.
- The scrap rate in the finishing stage of production is significantly reduced.
- Plasma technology can be integrated inline in existing finishing lines.
- Higher production speeds mean noticeable cost savings.

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CLOUD COMPUTING

Selina Khoirom

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Computing is all what we need when we design a software or a hardware computing is must it is again said to be a goal oriented activity requiring, benefiting from, or creating a mathematical sequence of steps ,It includes designing ,developing ,structuring and also managing various kind of information

Most individuals use some form of computing every day whether they realize it or not. Swiping a debit card, sending an email, or using a cell phone can all be considered forms of computing.

The another name of network is Cloud...

Cloud Computing is an Internet based computing where resource are shared and data to computers and other devices on demand it also provides various capabilities to store and process data to third party data centres, it is also modelled for enabling on demand access and pay per use.

Cloud computing enables companies to consume compute resources as a utility -- just like electricity -- rather than having to build and maintain computing infrastructures in-house. Cloud computing promises several attractive benefits for businesses and end users.



Basic benefits of cloud computing include:

Self-service provisioning: End users can spin up computing resources for almost any type of workload on-demand.

Elasticity: Companies can scale up as computing needs increase and then scale down again as demands decrease.

Pay per use: Computing resources are measured at a granular level, allowing users to pay only for the resources and workloads they use.

Linking with Government:

As public service increasingly provided via Internet by the Government making it virtual for the user as they are less concerned about the way in which authorities organize themselves behind the computer screen.

Low Cost: Lower cost in the investment and operational phase for hardware.

Cloud can be public, private and hybrid.



Private cloud are designed with the concept of business data centres to the internal user

Public cloud are third-party provider delivers the service over the Internet. Public cloud services are sold on-demand. Customers only pay for the CPU cycles Storage or Bandwidth they consume. Some of the cloud providers are Amazon Web Services (AWS), Microsoft Azure, IBM/Soft Layer and Google Compute Engine.

Hybrid cloud is a combination of public cloud services and on-premises private cloud – with orchestration and automation between the two, this cloud gives business greater flexibility and more data deployment options , an enterprise can deploy an on-premises private cloud to host sensitive or critical workloads, but use a third-party public cloud provider, such as Google compute Engine , to host less-critical resources, such as test and development workloads

Services in term of cloud means any resources that is provided to the client via Internet where some of the Services provided by the cloud are Paas(Platform as a service), SaaS(Software as a service) and IaaS(Infrastructure as a service)

IaaS : Offers physical or virtual machines and other resources IaaS cloud often offer additional resources such as a virtual machine disk -image library, raw block storage ,file or object storage, firewalls , load balancer, IP address , virtual local area network from the large pool data centers on demand by the client .

Paas : Offers a deployment environment to the application developer , it delivers a computing platform including operating system ,programming language execution environment ,database and a web server.

Developers can run and test on a cloud platform without the cost and complexity of buying and managing the underlying hardware and software layer eg are Microsoft Azure and Google app engine.

SaaS:They allow access to the application software and database ,it is referred to as on demand software In this model cloud providers install and operate application software in the cloud and cloud user access the software from the cloud.



AbOuTCIOuDAPPLIcAtIoN.....

This the application program that functions in a cloud with the characteristic of pure desktop and pure web page where the desktop app entirely resides on the the single device on the user location where the web page are entirely on a remote server an is delivered over the internet through the browsers as an interface cloud app can provide fast responsive an can work offline Like web apps, cloud apps need not permanently reside on the local device, but they can be easily updated online. Cloud apps are therefore under the user's constant control, yet they need not always consume storage space on the user's computer or communications device.

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ARTIFICIAL INTELLIGENCE

Munankumar Thakur
6th Sem ECE



Definition of Artificial intelligence

"A field of study that seeks to explain and emulate intelligent behaviour in terms of computational processes" (Schalkoff, 1990) "The branch of computer science that is concerned with the automation of intelligent behaviour". (Luger and Stubblefield, 1993).

AI addresses one of the ultimate puzzles. How is it possible for a slow, tiny brain, whether biological or electronic, to perceive, understand, predict, and manipulate a world far larger and more complicated than itself? How do we go about making something with those properties? These are hard questions, but unlike the search for faster-than-light travel or an antigravity device, the researcher in AI has solid evidence that the quest is possible.

Why artificial intelligence is so important?

The field of artificial intelligence, or AI, attempts to understand intelligent entities. AI strives to build intelligent entities as well as understand them. Another reason to study AI is that these constructed intelligent entities are interesting and useful in their own right. AI has produced many significant and impressive products even at this early stage in its development. Being human we want every think with comfort so, AI can be regarded as a medium to reduce our human physical effort .Applications of AI are in area that involves more data than humans can handle on our own, but which involves decisions simple enough that an AI can get somewhere with it. AI is regarded as future of technology because it is not just technology it is technology with intelligence by the help of computational processes. In AI a pre- data is stored of various tasks and the brains of it do the rest calculations.



Why artificial intelligence is regarded as a threat to Mankind?

The best answer of this question is given by one of the great Physicist of our century Stephen Hawking. According to him the primitive forms of AI developed so far have already proved very useful, but he fears the consequences of creating something that can match or surpass humans "it would take off on its own, and redesign itself at an ever increasing rate". We humans, who are limited by slow biological evolution, couldn't compete, and would be superseded.

INTERSETING THINGS ABOUT ARTIFICIAL INTELLIGENCE

- AI can trace its roots pretty far back
- Alan turning was a huge influence on AI
- Formal AI research started in the 1950's
- Natural language processing is key to AI

- Investors are funding new AI companies
- AI-powered robots can think together
- AI is polarizing.
- Big tech companies are betting on AI
- Some robots can socialize

Top Humanoid robots designed to match human capabilities and emotions.

1) **ATLAS UNPLUGGED**

2) The Atlas unplugged robot was developed by Google –owned Boston Dynamics with the US Defence Advanced Research projects Agency for its robotics challenge, designed to negotiate rough, outdoor terrain in a bipedal manner, while being able to climb using hands and feet as a human would.

The first version, released in July 2013,required an electrical and control tether to power and operate the robot. The new generation of the robot ,dubbed “Atlas unplugged” as it can operate on battery on battery power and can be controlled wirelessly

ASIMO AND HONDA P-SERIES

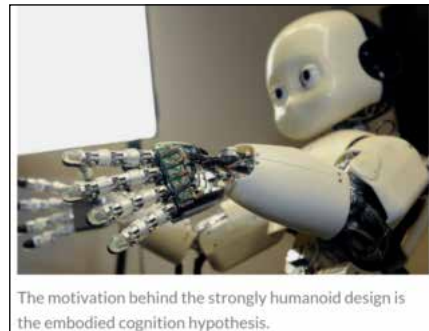
ASIMO is the 11th in a line of walking robots developed by Honda, called the P-series. Unveiled in 2000, ASIMO could walk and run like a human ,which was an amazing feat. ASIMO has a significant upgrade in 2005,that allowed him to run twice as fast (6km/hr. or 4.3 mph),interact with humans and perform basics task like holding a platter and serving food. ASIMO,with his space suit looking appearance ,is cheerful and endearing. He has paved the way for many subsequent walking, human like robots, but still holds his own as an advanced and powerful robot.



ICUB

Icub is created by the robot cub consortium, of several European universities. The name is a partial acronym, cub standing for cognitive universal body.

The motivation behind the strongly humanoid design is the embodied cognition hypothesis, that human –like manipulation plays a vital e in the development of human cognition. A baby learns many cognitive skill by interacting with its environment and other humans using its limbs and senses ,and consequently its internal model of the world is largely determined by the form of the human body.



ROMEIO

Romeo seeks to become the leader in the areas of robotic care giving personal assistance with a more emotional element. Romeo builds off a smaller humanoid robot called NAO that generated more than 5,000 sales or rentals worldwide.

THE robot has a size of a 8 year old child (1.40m)and weights 40 kilos.

ACTROID-SIT

Actroid –SIT can function autonomously, talking and gesturing while interacting with people. In fact researchers have recently demonstrated how improvements to Actroid's behaviour can make it look smarter and more expensive than our average android. She knows sign languages, such as Point or swing that automatically adapts to the position of the interlocutor.

Some Disadvantages for Artificial intelligence (AI)

- Over reliance on AI
- Human feel- As they are machines they obviously can't provide us with Human touch and quality.
- Misuse-There is no doubt that this level of technology in the wrong hands can cause mass destruction, where robot armies could be formed which could cause a threat to human civilization.



Some Advantages for Artificial intelligence (AI)

- They don't stop-As they are machines they don't get tired and ill as Human .They are positive point in industries.
- Their functions are almost limitless.

Conclusion

AI is the new centre of a new enterprise to build computational models of intelligence. The main assumptions are that intelligence can be represented in terms of symbolic structures and symbolic operations which can be programmed computer in a digital computer. Aspects of intelligence behaviour, such as solving problems, making inferences, learning and understanding language, have already been coded as computer programs, and within very limited domain. The great challenge of it is to find ways of representing the common sense knowledge and experience that enable people to carry out every day activities and when we succeed in it another biggest challenge will be to use them wisely and not allowing the artificial brain to develop so much that it becomes the reason of our destruction i.e. Human extinction.

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BRANDING WITH MATERIAL DESIGN



Dhaneshori Hijam
6th Semester, CSE

The interface

Like all digital brands, our experiences with Google center around product interfaces. These experiences involve interactions with stuff made of metal and plastic, like phones and keyboards, but involve significantly more interactions with stuff made of pixels, like weather apps and word processors. Those pixels create our experience and perception of the brands behind them. Those pixels are the “brand”.

Material Design doesn't just create order, it creates order with purpose and meaning. It's a sensory expression of Google's brand. If it finds purchase, it could be the first serious threat to Apple's apparent monopoly on sublime user experience. Material is a design language that unites GOOGLE and ANDROID under a rich style and set of principles. The language is based on the concept of paper and ink while the design approach is grounded in grid-based layouts, vibrant colors, large imagery, and typographic scale. Working with the core MATERIAL team we were influential in all aspects of the project.

Material design offers a system for designing functional and elegant software.



Material starts with mobile but extends to any other device. It is rooted in a few principles:

1. **Realistic visual cues:**

The design is grounded in reality and actually inspired by design with paper and ink.

2. **Bold, graphic and intentional:**

Fundamental design techniques drive the visuals. Typography, grids, space, scale, color and imagery guide the entire design. Elements live in defined spaces with a clear hierarchy. Color and type choices are bold and deliberate.

3. Motion provides meaning:

Animation is a key component of Material Design, but it can't just be there for the sake of movement. Animations need to happen in a single environment, serve to focus the design and include simple and easy transitions. Movements and actions should mirror the physical world.

Material Design has borrowed plenty of design concepts from the flat aesthetic and other trendy techniques. In fact, some would argue that Material Design is a close cousin to Flat Design 2.0 because many of the visual treatments are quite similar.

What separate layered interfaces from totally flat design is that effects are needed to create more three-dimensional spaces and to mimic lighting. In essence, designers are bringing back some of the design tricks eliminated with flat. The difference is that they're using these tricks to improve usability rather than simply as decorative accents.

What it is?

Material Design is a design language developed by Google to provide continuity across its web and mobile products.

Why it matters?

Material Design provides a uniformity of experience that Google products have been lacking. It's mobile-centric focus also represents an important shift in the company's approach to design.

Who does this affect?

End users will likely notice changes in the UX of many Google products. Developers and designers will need to slightly alter their approach to take full advantage of the Material Design.

When did this happen?

The source code for Material Design became generally available on November 3, 2014 and over the air (OTA) updates began on November 12, 2014.

How to take advantage of Material Design?

Google has provided best practices and guidelines for proper implementation of Material Design.

Google's Material Design is a design language that seeks to unify the user experience across Google products and across platforms.

Material Design was originally known by the codename "Quantum Paper". One of the first implementations of the design was present in the "cards" associated with Google Now. According to the Google website for Material Design, it's goal is to blend many principles of classic design with the innovations we've come to expect from science and technology.

Conceptually, Material Design is based on just that—real world materials. Using shadows and lighting to create depth and edges, elements respond in a similar way to how we would expect them to in real life. Again, Google said that Material Design is based on paper and ink and print-based design.

According to Google, there are three core principles at work:

1. Material is the metaphor
2. Bold, graphic, intentional
3. Motion provides meaning

While its foundation is rooted in what is known as flat design, Material Design is more of a hybrid with its addition of drop shadows and gradients to convey physical space.

Material Design uses bold colors and both the "Roboto" and "Noto" typefaces. Lastly, specific rules for motion and animation of design elements are key to maintaining proper relationships between elements and functionality.

Why it matters?

There are a few main reasons why the introduction of Google's Material Design truly matters. It begins with the realization that a good product will only get you so far without good design.

Good design matters. With Material Design, Google is better protecting the sanctity of its brands by delivering a design language that is both modern and practical.

Material Design is mobile-centric, and the fact that a company as large as Google is centering its entire design philosophy around the mobile experience adds weight to the idea that mobile will continue to take precedent as our preferred way of access the web.

Who does this affect?

Android users will be the most affected by the influence of Material Design, as the principles in the design itself greatly affect the UX of the OS. However, as Material Design continues to spread throughout the Google ecosystem it will, however slightly, affect any and all users of Google products and services.

For developers, Material Design provides new tools that will make it easier to build usable apps that also look good. Outside of application development, professional web designers and hobbyists alike will also be able to use Material Design Lite to add the look and feel of Material Design to their websites.

If you're planning to develop things for multiple platforms, like a website and an Android app, material will provide a unified experience across all devices, which will aid user-friendliness and subtly help your branding.

If you're interested in having animations, material's the way to go, as it comes in with built-in ones of the type that would have to be done manually otherwise.

Cons:

- » Like it or not, Material Design is inextricably tied to Google. If if you want to distance yourself from that, and create a unique identity for your site or app, it'll be that much harder if you use Google's guidelines to make it.
- » Not all systems will be able to pull off the intended framerates. And it can be hard to know what, if anything, you can do to improve usability for those who can't.

- » The animations drain mobile users' batteries.
- » Forcing developers to adhere to rendering guidelines may further stifle individual creativity and slow the development of more animations and decorative features.

Conclusion:

Material design really isn't that big a departure from flat design: both use the same clean and minimal aesthetic. And while material design's animations have been widely praised, when you boil it down, they just serve to make things more user-friendly. In fact, there's nothing that says that you can't combine the aesthetics of the two, using material to give some extra pop to a flat site that remains otherwise unchanged.

In my opinion, flat websites are practical. They load faster than websites full of animation and complex graphics. If you're designing a site that has to be simple, is aimed at a wide variety of users or just place a lot more focus on user-friendliness over form, flat design might be for you. If you're not interested in having any animations or motion graphics on your site, and are primarily interested in raw simplicity and usability, I'd definitely suggest you opt for flat design. However, If you want to build a more fancy site with animations, definitely opt for material design.

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GOOGLE GLASS

Basob Roy
6th Semester ECE

Google Glass is an optical head mounted display that is designed in the shape of a pair of eye glasses. It was developed with the mission of producing a ubiquitous computer. Google glass displayed information in a smartphone like hands free format. Wearers communicated with the internet via natural language voice command. Google Glass is smaller and slimmer in size than previous head mounted display. The Google Glass prototype resembled standard eyeglasses with the lens replaced by a head-up display.



It was developed in February 2013 and was available to consumers on May 15, 2014. On January 14, 2015, Google announced the Google Glass Prototype but remained committed to the development of the product. According to Google, Project Glass was ready to “graduate” from Google X, the experimental phase of the project.

They filed a new application with the Federal Communication Commission for a new version of the Google Glass on December 28, 2015.

The following features of Google Glass

1. Touchpad- A touchpad is located on the side of Google Glass, allowing users to control the device by swiping through a timeline-like interface displayed on the screen. Sliding backwards shows current events, such as weather and sliding forwards shows past events such as phone calls, photos etc.
2. Camera-Google Glass has the ability to take photos and record 720p HD video.
3. Display-Prism projector, 640*360 pixels (equivalent of a 25 in/64cm screen from 8 ft/2.4 m away).
4. Show Messages: Google Glass will show you text messages as well as emails you received and allow you to reply to them via voice commands.
5. Show Maps: The widely used Google Maps are integrated into Glass, so that users will be able to chart the course of their journey or look up locations or establishments via voice commands.
6. Live video sharing: You can share live video experiences with your friends and family member. And make them a part of experience.
7. Applications- Google Glass applications are free applications built by third party developers. Glass also uses many existing Google apps. Such as Google Now, Google Maps, Google+ & Gmail.

8. Voice Activation- Other than the touchpad, Google Glass can be controlled by using voice actions. To activate Glass, wearers tilt their heads 30 degree upward or tap the touchpad and say O.K Glass. Once Glass is activated wearers can say an action such as take a picture, record video etc.

Technical Specifications :

- » Android 4.4
- » 640x360 Himax HX7309 LCoS display.
- » 5 megapixel camera capable of 720p video recording.
- » Bluetooth
- » 16GB storage(12 Gb available including OS)
- » 1 GB RAM
- » 3 Axis gyroscope
- » 3 Axis accelerometer
- » 3 Axis magnetometer
- » Bone conduction audio transducer

Google glass hopes to be one of the newest and the most innovative technologies in recent times. It is still in the development process. There are also potential ethical problem, such as privacy issues that may come up with the use of google glass. The google glass will have a significant impact on the direction that the technology industry follows in the future.

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E-COMMERCE: AN OVERVIEW

Kshetrimayum Robert
6th Semester , CSE

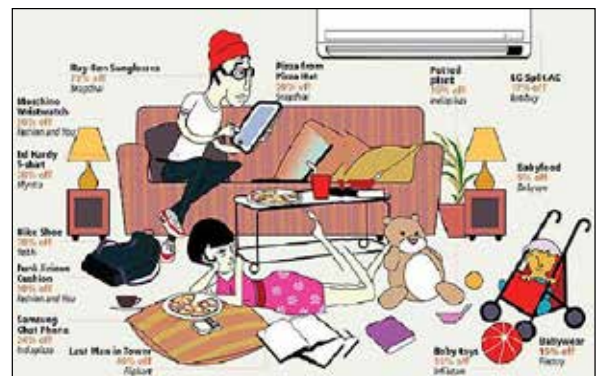
Carry ‘the globe’ in your shopping bag!! It’s not exaggerating the fact if I say: the world is now coalesced to a click on our computers& smartphones. Since long ago, all alluring materials around have taken an exodus to the world of internet. No often do we now think of taking a stroll through the market before buying a mobile handset, but a healthy online research which in some cases is consequently followed by an online purchase. The scenario is not limited to mobiles alone. It covers a wide range of products like home appliances, consumer electronic goods, books, apparels, travelling packages etc and even the electronic content itself.

What is E Commerce?

E Commerce stands for electronic commerce and caters to trading in goods and services through the electronic medium such as internet, mobile or any other computer network. It involves the use of Information and Communication Technology (ICT) and Electronic Funds Transfer (EFT) in making commerce between consumers and organizations, organization and organization or consumer and consumer. With the growing use of internet worldwide, Electronic Data Interchange (EDI) has also increased in humungous amounts and so has flourished e-commerce with the prolific virtual internet bazaar inside the digital world which is rightly termed as e-malls.



We now have access to almost every knick-knack of our daily lives at competitive prices on the internet. No matter one is educated or illiterate, an urbane or a countryman, in India or in U.K; all you need is an internet connection and a green bank account. With e-commerce then, you can buy almost anything you wish for without actually touching the product physically and inquiring the salesman n number of times before placing the final order. Here is a beautiful picture depicting how has human life evolved to adapt to the digital world and hence trading over the internet. As seen, from pizza and potted plant to pair of shoes, we have everything on sale on the internet available in tempting offers...!! Snapdeal.com, Amazon, eBay, Naaptol, Myntra, etc are some of the most popular e-commerce websites.



The Breakthrough Beginners

Tracing some steps back, it’s been recorded that some institutes of the western world started exchanging information and data electronically by the late 1970s. But the concept of online trading of goods

was first witnessed much later with the dawn of 1990. In 1994, Jeff Bezos; an American businessman started his e-commerce website Cadabra.com, now popularly known as Amazon.com. Amazon was the first online firm to execute secured online transactions. At the onset, Amazon was known as an online bookstore, but with the whelming customer-response it expanded to trading in books, music, apparels, CDs/DVDs, electronics, MP3s, videogames and many more. Running successfully, round-the-clock since 1994, surprisingly Amazon recorded its first profit in the year 2003 only. Although, Amazon proved to be a successful business model by late 2003, it's no less than a fact stating its tremendous popularity. The 'enriched library', online review system and a user friendly website are still the starred assets of this e-commerce company.

Dell Inc emerged as the first company ever to record sales in millions of dollars in 1997. It was also the first company to sell large number of assembled computers online. It is popularly known for its successful business model and in the year 2007, it was listed as the 34th largest company in the Fortune500 list.

Types of E-Commerce

Divulging the types of e-commerce requires throwing some light on the narrow line of distinction between e-commerce and e-business on the first hand. While e-commerce uses ICT in making inter-business, inter-organizational and business-to-consumer transactions, e-business is a broader term and uses technology in enhancing one's business. It concentrates on adding customer value by using digital media.

E-Commerce can be classified into the following categories:

- **B2B e-commerce** - B2B or business-to-business is the type of e-commerce in which the trading takes place between two businesses or organizations/companies without the involvement of consumer. The product may then be sold to the consumer by any of the organization under its brand name. For example, a car manufacturer may purchase some of its accessories from another company and then sell the finished product to its customers. Another, direct specimen is HP and Intel. HP computers are integrated with processors made by Intel. A majority of such deals occurs over the internet. A lot of revenue in e-commerce is garnered from B2B type of internet commerce.
- **B2C e-commerce** - In recent times, B2C or business-to-consumer e-commerce has grown into the most popular and prolific form of online trade. It is commerce between businesses and consumers. It is more commonly known as online retailing and involves customers purchasing goods and services online. Amazon.com, Dell computers, Drugstore.com, Travelocity, etc are some of the flourishing examples of B2C e-commerce. B2C e-commerce has facilitated a click and drag online store in place of the conventional brick and mortar retailing stores. It has reduced transaction costs by increasing consumers' access to information thereby easing the whole procedure of buying and selling goods and services. Consumers can now easily compare various features offered by different brands over the same product and add genuineness to their decision. In addition to this, we also have some good online reviewers like rotten tomatoes, top10reviews, etc, that provides online reviews for various products and services and helps consumers in making a best buy both online as well as offline.
- **B2G e-commerce** - B2G stands for business-to-government e-commerce. When the commerce takes place between companies and some government organization, it is called as business-to-government commerce. These types of transactions are usually undertaken in public interest in order to make the system more transparent and fidel.

- **C2C e-commerce** - Consumer-to-consumer commerce is the trade between two consumers or private individuals. C2C transactions bear an analogy with the traditional trading methods corresponding to classified ads, auctions and other vertical industries. Popular websites facilitating C2C e-commerce are eBay, BaZee.com, Napster, etc. The consumer commerce over online bazaar helps buyers to negotiate and buy at a selective price.
- **M-commerce** - M-commerce or mobile commerce is the budding area of digital commerce which uses wireless technology for online trading. Cellular telephones, tablets, personal digital assistants and other handheld devices are used for m-commerce. This imminent source of electronic commerce facilitates a faster, cheaper, easily accessible and more secure method for exchange of goods and services. Mobile commerce has stimulated other useful applications such as mobile/SMS banking, e-recharge, application development and many more.

Conceptual Framework

Internet economy is a broader term which includes both e-commerce and e-business. There are various elements governing the process of online trading of goods and services. These elements are classified as different layers as per the framework given by Center for Research and Electronic Commerce (CREC) at the University of Texas in the following manner:

1. Layer 1- Internet and Network Infrastructure

This layer is facilitated by the companies that provide enabling hardware, software and networking devices for the internet, internet service providers (ISPs), fiber optic cable makers, PC manufacturers, etc. Examples for such providers include CISCO, AT&T, AOL, etc. This layer also deals with the network framework which establishes an effective connection between the buyer and the supplier. The network lattice on which the internet works today is based on packet switching technique. In this technique, the message is broken down into small packets. Every packet bears the address of its source and destination. This way the message enjoys a flexible and faster medium of communication. These packets are then assembled in order at the destination computer for ultimate delivery. The internet infrastructure works under the governance of certain protocols. These set of rules and regulations are collectively termed as TCP/IP protocol. Here TCP stands for Transmission Control protocol and IP signify Internet protocol.

2. Layer 2- Internet Applications Infrastructure

This layer is facilitated by companies that design software products for buyer's web- interface with the seller. Integrity at this layer enables a secure online transaction. Such companies comprise IBM, Adobe, Oracle, TCS, etc. These companies provide web development design and consultancy services to various online businesses. It is at this layer where the type of e-commerce is determined.

3. Layer 3- Internet Intermediaries

This layer facilitates the real scenario of e-commerce. It includes companies that establish links between the buyers and the sellers by creating the virtual market where the online trading takes place. It interfaces the application layer to the users. Interactive catalogs and directory support services are examples of this layer. While the interactive catalog deals with people, the directory catalog deal interacts directly with software applications. Online travel agents like Travelocity; Content Aggregators like Yahoo! and Google, etc are examples of such intermediaries.



4. Layer 4- Internet Commerce

This layer is facilitated by companies that sell products or services directly to consumers and businesses. These companies include the online retailers or the E-tailers like Amazon, Dell, eBay, etc.

Applications of e-commerce

The development in e-commerce industry has fuelled growth in many other industries as well in parallel.

- **E-banking** - E-banking or internet banking is a sophisticated form of banking which facilitates consumers to make monetary transactions online using their existing bank accounts, credit cards, debit cards, ATM cards or stored-value cards. One can view his/her account details, transfer funds, make payments, and take mini statements for account history. The Electronic Payment System (EPS) via e-banking completes the loop of e-commerce by making payment thereby assuring sellers of the buyers and vice versa. It facilitates a secure and swift payment gateway for any online transaction. The huge input and public response for e-commerce has prompted almost every public and private bank to be visibly active in the online market also.
- **Shipping industry** - If there is one industry which stands to gain with the growing spirit of electronic commerce, its shipping and courier industry for sure. E-commerce had instigated the establishment and growth of international and national shipping firms. FedEx (FDS) and United Parcel Service (UPS) are two of the major shipping companies responsible for shipping a large sector of online purchase.
- **Electronic Media** - Visibly present as newspapers and news channels round the globe since years, the print media has steadily but beautifully occupied the digital world with the growth of internet users and internet economy hence, in recent times. In comparison to the on-paper news, electronic newspaper can give latest/current news readily available at a click.
- **Electronic Auctions** - The brick and mortar trading stores have witnessed an innovative approach for making goods available at a market-negotiated price; called auction. The internet has added a new dimension to this area as in E-Auction where buyers and sellers can bid online and trade in a wide range of products. eBay.com, Olx, and AuctionIndia.com are some of the popular e-auction websites.

Latest Trends and Future Scope

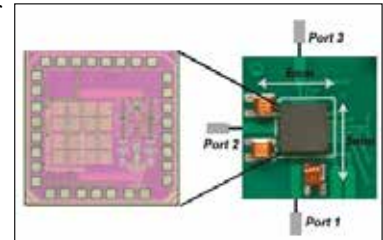
1. The social media buzz, needless to mention is a seraphic area for maximizing e-commerce. More and more businesses are available on SN sites to build as well as promote their brand names on the e-bazaar. Integrating the facebook applications such as 'like' and 'share' is the favorite customization for e-commerce websites these days.
2. Search engine optimization for e-commerce website.
3. With the rising use of internet on mobile handsets, development of mobile specific websites is a god idea to promote m-commerce.

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RF WIFI DOUBLER

Ringku Ingudam
6th Semester, ECE

A team of researchers from Columbia University's School of Engineering and Applied Science has developed a full-duplex radio integrated circuit (IC) that, it claims, can be implemented in nanoscale CMOS that needs only one antenna to enable simultaneous transmission and reception at the same frequency in a wireless radio. This breakthrough is said to enable a smaller overall system.



"This technology could revolutionize the field of telecommunications," said Professor Harish Krishnaswamy. The circulator is the first to be put on a silicon chip, and get literally orders of magnitude better performance than prior work. Full-duplex communications, where the transmitter and the receiver operate at the same time and at the same frequency, has become a critical research area and now they've shown that Wi-Fi capacity can be doubled on a nanoscale silicon chip with a single antenna. This has enormous implications for devices like smartphones and tablets.

Prof Krishnaswamy's group has been working on silicon radio chips for full duplex communications for several years and became particularly interested in the role of the circulator, a component that enables full-duplex communications where the transmitter and the receiver share the same antenna. In order to do this, the circulator has to 'break' Lorentz Reciprocity, a fundamental physical characteristic of most electronic structures that requires electromagnetic waves travel in the same manner in forward and reverse directions.

"Reciprocal circuits and systems are quite restrictive because you can't control the signal freely," said Negar Reiskarimian, who developed the circulator. "We wanted to create a simple and efficient way, using conventional materials, to break Lorentz Reciprocity and build a low-cost Nano scale circulator that would fit on a chip."

The traditional way of breaking Lorentz Reciprocity and building radio-frequency circulators has been to use magnetic materials such as ferrites, which lose reciprocity when an external magnetic field is applied. But these materials are not compatible with silicon chip technology, and ferrite circulators are bulky and expensive. The team designed a miniaturized circulator that uses switches to rotate the signal across a set of capacitors to emulate the non-reciprocal 'twist' of the signal that is seen in ferrite materials.

"Being able to put the circulator on the same chip as the rest of the radio has the potential to significantly reduce the size of the system, enhance its performance, and introduce new functionalities critical to full duplex," explained Jin Zhou, another of the researchers.

Non-reciprocal circuits and components have applications in many different scenarios, from radio-frequency full-duplex communications and radar to building isolators that prevent high-power transmitters from being damaged by back-reflections from the antenna. According to the researchers, the ability to break reciprocity also opens up new possibilities in radio-frequency signal processing that are yet to be discovered.

Full-duplex communications has the potential to double network capacity, compared to half-duplex communications that current mobile phones and Wi-Fi radios use. The Krishnaswamy group is already working on further improving the performance of their circulator, and exploring "beyond-circulator" applications of non-reciprocity.

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ROLE OF CIVIL ENGINEERS TODAY

Dr. K Rambha Devi

Department of Civil Engineering



The recent result of examinations conducted by Manipur Service Public Commission for the posts of Assistant Engineers (AE) and Section Officers (SO) in various departments of Government of Manipur should be extremely encouraging to the students of civil engineering studying in this institute. Besides bagging the first position for both AE and SO examinations, the passed out students of this institute have occupied many seats for these posts. In the past too, students from this institute have come out with flying colours in many examinations conducted by various departments and are well placed in these departments. Many others are pursuing higher studies in prestigious institutions of the country like IIT, NIT etc. However, in the euphoria of getting a job, I would like to remind the ex-students that they have a big role to play for sustainable development.

The world today needs development but this development should be a sustainable one. While going in for big constructions, care should be taken such that the natural environment and its resources are not depleted to a level that would leave the future generations in a sorry state of affair. The country today is facing acute environmental related problems like drought in some parts while some other parts are reeling under heavy floods. This is not the result of the wrath of nature but an outcome of unplanned activities of mankind which has brought an upheaval to the climate. Depletion of ground water to alarming levels due to removal of underground water without taking adequate measures to recharge it, flooding of city due to constructions without proper drainage systems, mud slides and landslides due to cutting of forest area for commercial and other purposes etc are a few examples of these activities. Restoring natural environments like forests, lakes, wetlands etc, proper waste management, improve water supply, development of natural resources etc need to be given thrust in our state.

The need of the hour today is to develop new technology and techniques for planning, designing, construction and maintenance of approaches which not only sustains but also builds the natural environment. This may require to promote inter disciplinary, integrated and multi-objective goals in the different phases of project planning and implementation. The engineers whose role previously was cut out as planners, designers and constructors have a bigger role now as managers, innovators, and integrators of technology and techniques for sustainable development. These engineers also have to act as managers of risk and uncertainty caused by natural events and manmade threats. Tactics to reduce such incidences and their effects need to be developed. They also have to act as leaders and problem solvers if need be to make the public understand the importance of such development and help in framing policies towards the end.

The roles of the young engineers are many-fold. They have to take active participation by taking keen interest in the developments going on in other parts of the world, attending seminars, participating in research and development, keeping up to date with the latest and taking genuine interest in upliftment of the state.

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ASIMO

Ronenjit Oinam
ECE, 8th Semester



Honda ASIMO or Advanced Step in Innovative Mobility is a state-of-the-art humanoid robot created by Honda in the year of 2000. Aimed to be a multi-functional portable assistant, ASIMO is intended to function in real-world environments. The invention of ASIMO was to conceive people who are bedridden or disabled. ASIMO to hit human tasks which can be destructively dangerous for them for instance, going in hazardous areas, scrapping fires or defusing a bomb. The composition of ASIMO has been kept throughout its body help ASIMO move smoothly with ease purely welcoming and friendly. Honda engineers created ASIMO with 34 Degrees of Freedom that help it walk and perform tasks much like a human. One Degree of Freedom is the ability to move right and left or up and down. These degrees of freedom act much like human joints for optimum movement and flexibility. Lightweight materials, like a magnesium alloy structure, combined with powerful computers and 34 servo motors.



HEAD	Neck joint (Up/Down, Left/Right Rotation)	3 DOF		
ARMS	Shoulder joints (Forward/Backward, Up/Down Rotation)	3 DOF		
	Elbow joints (Forward/Backward)	1 DOF		
	Wrist joints (Up/Down, Left/Right, Rotation)	14 DOF	=	7 DOF x 2 arms
HANDS	4 fingers (to grasp objects) / Thumb	26 DOF	=	13 DOF x 2 hands
HIP	Rotation	2 DOF		
LEGS	Crotch joint (Forward/Backward, Left/Right Rotation)	3 DOF		
	Knee joints (Forward/Backward)	1 DOF		
	Ankle joints (Forward/Backward, Left/Right Rotation)	12 DOF	=	6 DOF x 2 legs
TOTAL		57 DOF		

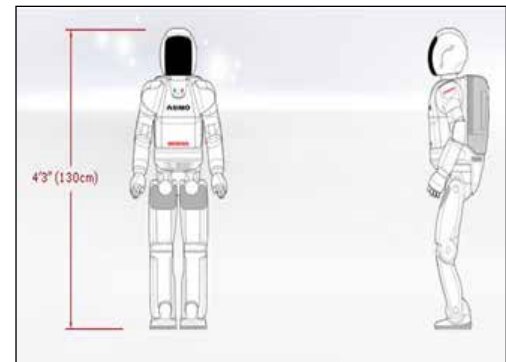
DOF = Degree of freedom

Era of ASIMO

The period of robots existence has been a topic of continuous debates and has invited numerous advantages and disadvantages of the actuality of robots but, Honda with its very first creation has proved that robots can operate. Honda, with the joint efforts of its eccentric robotic research and development team, successfully launched ASIMO after 20 years of consecutive hard work. Following the trail, ASIMO team continues to excel and refine their incredible creation.

ASIMO's configuration

HEIGHT	4 ft 3in (130 cm)
WEIGHT	110 pounds (50 kg)
WALKING SPEED	1.7 mph (2.7 km/hour)
RUNNING SPEED	4.3 mph (7 kph)
WALKING CYCLE	Cycle Adjustable, Stride Adjustable
GRASPING FORCE	0.5 kg/hand (5 finger hand)
ACTUATOR	Servomotor+Harmonic Speed Reducer+Drive Unit
CONTROL UNIT	Walk/Operating Control Unit, Wireless Transmission Unit
SENSORS: FOOT	6-axis Foot Area Sensor
SENSORS: TORSO	Gyroscope & Acceleration Sensor
POWER	Rechargeable 51.8V Lithium Ion Battery
OPERATING TIME:	1 hour
OPERATION	Workstation and Portable Controller



Height =>The brainy master piece stands tall with the height of 4 feet 3inch, and weight around 48 kg further making it a welcoming robot. The average height of ASIMO brands it a participant of comfortable conversations with the elderly and people with less ability to move. Its height makes it a perfect size for assisting household tasks and people confined to bed or wheel chairs.

Skills=>ASIMOWas tossed with a purpose of aiding the needs of the elderly and disabled as well as manage household errands. ASIMO has human like features as it can make gestures, speak and interact like humans which makes it a friendlier robot. ASIMO holds the capability to sense the movements of numerous objects whilecapturingvisual information by its camera eyes. Determination of direction and distance is also done by the two camera eyes of ASIMO. The former features of ASIMO enables human like features

Movement =>ASIMO is accomplished in average walking with a speed of 2.7 kilometers per hour. Taking about running speed, then ASIMO can run with an average speed of around 9 kilometers per hour. The movements of ASIMO is managed by aimed Zero Moment Point control as well as floor reaction control that allows ASIMO to stay firm at a particular position and maintain it healthily. The body position, length of steps and speed are adjustable by ASIMO. ASIMO's hands, legs, waist and neck have variable degrees of movement. The degree of freedom is defined specifically of each robot and to frame further, ASIMO has 57 degree of freedom. The fundamental body parts of ASIMO like wrist, shoulder, hip joints and neck individually has around three degrees of freedom whereas, hands with one thumb and four fingers have two degrees of freedom.

For determination of obstacles, ASIMO has visual sensors. In totality, ASIMO has sensors which helps it in autonomous navigation. The lower portion of ASIMO has one infrared sensor and one laser sensor. The infrared sensors help ASIMO determine the floor patterns to confirm the navigational path of strategic map while the laser sensor aids ASIMO to sense ground surface.

Other Specifications of ASIMO

Battery => ASIMO runs on a Lithium ion battery which is fixed in its backpack and takes 3 hours to completely charge ASIMO. The battery weighs around 6 kg.

Operating Time => ASIMO can successfully run or walk for a good one hour.

Languages => ASIMO is skilled in English and Japanese language.

The Verdict

The level of technology used and years of tremendous research have made ASIMO a state-of-the-art creation. Sky is the limit for ASIMO's cost which makes it attainable only by the celebrities or by the government. Well, now we all wait for ASIMO's presence in public healthcare hospitals, private hospitals and in households to assist elderly and need. Although due to its star value and its normal built cost, the era of an ASIMO in every house is years away.

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SOCIAL NETWORKING: FRIEND OR FOE

Th. Deepak Singh
2nd Semester, CE

Now is an era of social networking. Everyone from a small kid to a very old person is now very busy engaged in social sites. It is a fact that a person needs Oxygen, Water and Food at fundamental to live a life. But a time has now come where posting a status, uploading selfish in different position in social sites is more important than anything else. In short, now life without SOCIAL NETWORKING is like living in Hell. Especially, the new young generation are the one affected by the impact of social sites like FACEBOOK, INSTAGRAM, and TWITTER etc. But what is this social networking thing? How it's affecting the young generation? Is it good or bad?

WHAT IS SOCIAL NETWORKING?? SOCIAL NETWORKING is the use of internet-based social media programs to make connections with friends, family, classmates, customers and clients. According to the Oxford Dictionary, a "social network" is a dedicated websites or other application that enables users to communicate with each other by posting information, comments, messages, images, etc. **IMPACT ON SOCIETY** Social network has now made a major impact on life of everyone's. But the most affected people are the new young generation. And it is so because of the new living style adopted by our new generation. Kids nowadays are made available with new gadgets and new stuffs from very young age from which they get to access to the virtual world and got attached to it. They start using it and later on get addicted to it. They forget their duty and responsibilities of what they are and just keep on spending their whole time networking on social sites like FACEBOOK, INSTAGRAM, etc. Other effects of it can be seen in business and cyber-crimes happening increasingly in the world.

ADVANTAGES AND DISADVANTAGES

Like everything has its good sites and bad sites, Social networking also has its merits and demerits.

ADVANTAGES

1. You can stay connected with people who are far away from you like friends, family, etc. and can also make new friends from all over the world.
2. Share your real life events with friends and family through pictures, video, etc.
3. Advertisement can be also done.
4. Awareness programs can be executed through this.
5. Spreading of news all over the world gets faster and easier.

DISADVANTAGES

1. CYBER CRIMES increases.
2. Risk of Fraud or Identity Theft.
3. Also a good platform for wasting time.
4. Advertisements with viruses in it that can harm your devices are also there.
5. Excessive uses of social network can also harm your health.

CONCLUSION : Social networking is a good friend if used in proper way and correct manner but at the same can turn into a foe that can destroy your life.

GRAPHENE SENSOR

Ringku Ingudam
6th Semester, E.C.E



University of Southampton Scientists from the University of Southampton, in partnership with the Japan Advanced Institute of Science and Technology (JAIST), have developed a graphene-based sensor and switch that can detect harmful air pollution in the home with very low power consumption.

The sensor detects individual CO₂ molecules and volatile organic compound (VOC) gas molecules found in building and interior materials, furniture and even household goods, which adversely affect our living in modern houses with good insulation.

These harmful chemical gases have low concentrations of ppb (parts per billion) levels and are extremely difficult to detect with current environmental sensor technology, which can only detect concentrations of parts per million (ppm).

In recent years, there has been an increase in health problems due to air pollution in personal living spaces, known as sick building syndrome (SBS), along with other conditions such as sick car and sick school syndromes.

The research group, led by Professor Hiroshi Mizuta, who holds a joint appointment at the University of Southampton and JAIST, and Dr Jian Sun and Assistant Professor Manoharan Muruganathan of JAIST, developed the sensor to detect individual CO₂ molecules adsorbed (the bond of molecules from a gas to a surface) onto the suspended graphene (single atomic sheet of carbon atoms arranged in a honeycomb-like hexagonal crystal lattice structure) one by one by applying an electric field across the structure.

By monitoring the electrical resistance of the graphene beam, the adsorption and desorption (whereby a substance is released from or through a surface) processes of individual CO₂ molecules onto the graphene were detected as 'quantised' changes in resistance (step-wise increase or decrease in resistance). In the study, published today in *Science Advances*, the journal of the American Association for the Advancement of Science (AAAS), a small volume of CO₂ gas (equivalent to a concentration of approximately 30 ppb) was released and the detection time was only a few minutes.

Professor Mizuta said: "In contrast to the commercially available environmental monitoring tools, this extreme sensing technology enables us to realise significant miniaturization, resulting in weight and cost reduction in addition to the remarkable improvement in the detection limit from the ppm levels to the ppb levels."

Research group members, Dr Harold Chong from Southampton and Dr Marek Schmidt and Dr Jian Sun of JAIST, have also recently developed graphene-based switches (published in the March issue of *Nanoscale*, the journal of the Royal Society of Chemistry) using a uniquely thin film developed at the University of Southampton.

The switches, which require remarkably low voltages (below three volts), can be used to power electronic components on demand, greatly improving the battery lifetime of personal electronic devices.

Professor Mizuta and the research group are now aiming to bring the two technologies together to create ultra-low-power environmental sensor systems that can detect single molecules.

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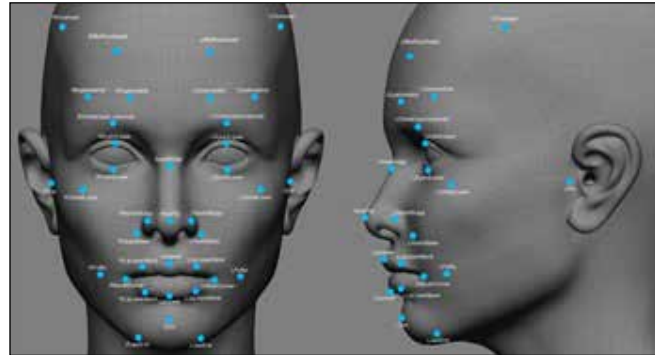
FACIAL RECOGNITION SYSTEM

Laikangbam Aneka
6th Semester, ECE



Humans have always had the innate ability to recognise and distinguish between faces, yet computers only recently have shown the same ability. In the mid 1960s, scientists began work on using the computer to recognise human faces. Since then, facial recognition software has come a long way.

Facial recognition is a type of biometric software application that can identify a specific individual in a digital image by analysing and comparing patterns. From the word Facial recognition, it is understood that the software is based on the ability to recognise a face and then measured the various features of the face. Each human face has approximately 80 nodal points. Some of these measured by the software are:

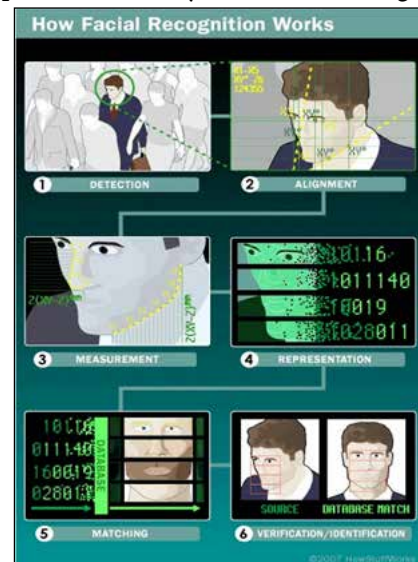


1. Distance between the eyes
2. Width of the nose
3. Depth of the eye sockets
4. Cheekbone shape
5. Length of jaw-line

These nodal points are measured creating a numerical code called a faceprint representing the face in database.

In the past, facial recognition software relied on 2D image to compared or identify another 2D image from the database. The software was very weak as to captured an image effective and accurate it is needed that the face was looking almost directly at the camera, with little variance of light or facial expression from the image in the database. Even the smallest change in the light orientation may cause troubled leading to a high rate of failure. To avoid these problems the facial recognition software now uses 3-D Facial Recognition technology. It removes the disadvantages of correct lighting aspects. Thus, the photo of the person can be taken even in improper lighting and that too in any angle(in a range of almost 90 degrees). 3-D facial recognition uses distinctive features of the face (i.e., rigid tissue and bone which is most apparent such as the curves of the eye socket, nose and chin) to identify the subject.

For 3D software, the system goes through different steps to verify the identity of an individuals with an existing database:



Detecting the person :

The image that is to be compared with the database is obtained either as a photo [2-D] or as a video image [3-D].

Alignment of image :

Once it detects a face, the system determines the head's position, size and pose even if the angular position of the face towards the camera is at 90 degrees, while with 2-D, the head must be turned at least 35 degrees toward the camera.

Measurement of the face :

The face recognition software makes templates on the different curves of the face. The face will be measured in micrometer scales.

Transfer of Measurement :

The measurement taken is then transferred into a unique code. The code makes each template unique and thus represents the different features of the face.

Matching with database :

If both the image taken and the image in database are 3-D, then there is no problem in the matching process. However, there is a challenge currently facing databases that are still in 2-D form, the 3-D image has to be converted to a 2-D image before comparison.

Verification or Identification :

In verification, an image is matched to only one image in the database (1:1). For example, an image taken of a subject may be matched to an image in the Department of Motor Vehicles database to verify the subject is who he says he is. If identification is the goal, then the image is compared to all images in the database resulting in a score for each potential match (1:N).

With advancement in Face image technology, images can be captured from a distance without touching the person being identified, and hence finds its application in various fields it is used for security in banks to catch people trying to fraud. The system is also equally used in airports to check whether the foreigners visiting the country had any resemblance to criminals or suspects. Another important application of this technology is in ATM's and check-cashing security. Before transacting the money, a photograph of the person is taken and verified with the database to see whether the customer is valid. Thus identify thief and fraudulent transactions can be avoided. By using the facial recognition software, there's no need for a picture ID, bankcard or personal identification number (PIN) to verify customers identity.

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MICROWAVE OVENS

N Sanjeev
6th Sem E.C.E



How our ancestors would have loved microwave ovens! Instead of sitting around smoky wood fires for hours on end, boiling up buffalo stew for their Stone-Age friends, they could have just tossed everything in the microwave, pressed a few buttons, and had a meal ready in a minute or two. Of course, they had no electricity, which might have been something of a problem...

When microwave ovens became popular in the 1970s, they lifted household convenience to a new level. A conventional oven heats food very slowly from the outside in, but a microwave oven uses high-powered radio waves to cook food more evenly (loosely speaking, we sometimes say it cooks from the "inside out"—although that isn't quite correct). This is why a microwave can cook a joint of meat roughly six times faster than a conventional oven. Microwave ovens also save energy, because you can cook immediately without waiting for the oven to heat up to a high temperature first. Let's take a closer look at how they work!

How heat?

Microwave ovens are so quick and efficient because they channel heat energy directly to the molecules (tiny particles) inside food. Microwaves heat food like the sun heats your face—by **radiation**.

A microwave is much like the electromagnetic waves that zap through the air from TV and radio transmitters. It's an invisible up-and-down pattern of electricity and magnetism that races through the air at the speed of light (300,000 km or 186,000 miles per second). While radio waves can be very long, microwaves have much shorter wavelengths and frequencies. The microwaves that cook food in your oven are just 12 cm (roughly 5 inches) long. (You can read more about electromagnetic waves in our article on the electromagnetic spectrum.)



Despite their small size, microwaves carry a huge amount of energy. One drawback of microwaves is that they can damage living cells and tissue. This is why microwaves can be harmful to people—and why microwave ovens are surrounded by strong metal boxes that do not allow the waves to escape. **Microwaves can be very dangerous, so never fool around with a microwave oven.** Microwaves are also used in cellphones (mobile phones), where they carry your voice back and forth through the air, and radar.

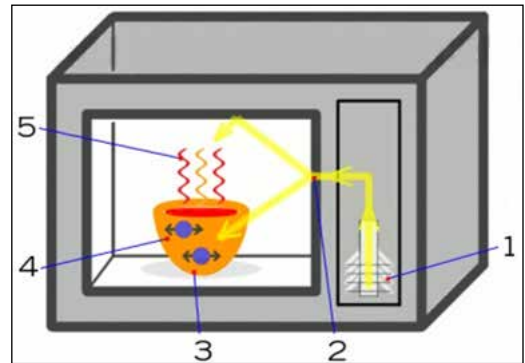
Photo (above): *The "cooking cavity" of a typical microwave oven. This strong metal box stops harmful microwaves from escaping. The microwaves are generated by a device called a magnetron, which is behind the perforated metal grid on the right hand side (just behind the lamp that illuminates the oven inside). If you peer through the grid, you might just be able to see the horizontal cooling fins on the magnetron (which look like a stack of parallel, horizontal metal plates). Note also the turntable, which rotates the food so the microwaves cook it evenly. The back*

of the door is covered with a protective metal gauze to stop microwaves escaping. You can see into the oven when the door's shut because light can get through the holes in the gauze. Microwaves, however, are much bigger than light waves, so they're too big to get through the holes and remain safely "locked" inside.

How do microwaves cook food?

How does a microwave turn electricity into heat? Like this!

1. Inside the strong metal box, there is a microwave generator called a magnetron. When you start cooking, the magnetron takes electricity from the power outlet and converts it into high-powered, 12cm (4.7 inch) radio waves.
2. The magnetron blasts these waves into the food compartment through a channel called a wave guide.
3. The food sits on a turntable, spinning slowly round so the microwaves cook it evenly.
4. The microwaves bounce back and forth off the reflective metal walls of the food compartment, just like light bounces off a mirror. When the microwaves reach the food itself, they don't simply bounce off. Just as radio waves can pass straight through the walls of your house, so microwaves penetrate inside the food. As they travel through it, they make the molecules inside it vibrate more quickly.
5. Vibrating molecules have heat so, the faster the molecules vibrate, the hotter the food becomes. Thus the microwaves pass their energy onto the molecules in the food, rapidly heating it up.



Inside out?

In a conventional oven, heat has pass from electric heating elements (or gas burners) positioned in the bottom and sides of the cooker into the food, which cooks mostly by conduction from the outside in—from the outer layers to the inner ones. That's why a cake cooked in a conventional oven can be burned on the edges and not cooked at all in the middle. People sometimes say microwave ovens cook food from the "inside out," which is a bit of a gloss and isn't quite correct. When people say this, what they really mean is that the microwaves are simultaneously exciting molecules right through the food, so it's generally cooking more quickly and evenly than it would otherwise.

Exactly how the food cooks in a microwave depends mostly on what it's made from. Microwaves excite the liquids in foods more strongly, so something like a fruit pie (with a higher liquid content in the center) will indeed cook from the inside out, because the inside has the highest water content. You have to be very careful eating a microwaved apple pie because the inside may be boiling hot, while the outside crust is barely even warm. With other foods, where the water content is more evenly dispersed, you'll probably find they cook from the outside in, just like in a conventional oven.

Another important factor is the size and shape of what you're cooking. Microwaves can't penetrate more than a centimeter or two (perhaps an inch or so) into food. Like swimmers diving into water, they're losing energy from the moment they enter the food, and after that first centimeter or so they don't have enough energy left to penetrate any deeper. If you're cooking anything big (say a joint of meat in a large microwave

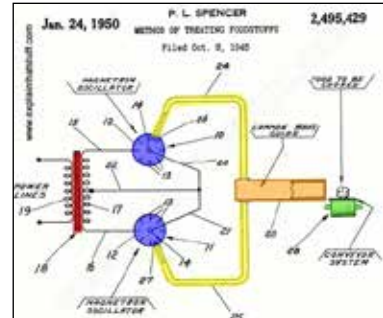
oven), only the outer "skin" layer will be cooked by the waves themselves; the interior will be cooked from the outside in by conduction. Fortunately, most of the things people cook in small microwave ovens aren't much more than a couple of centimeters across .

You'll notice that microwaveable dinners specify a "cooking time" of so many minutes, followed by a "standing time" that's often just as long (where you leave the cooked food alone before eating it). During this period, the food effectively keeps on cooking: the hotter parts of the food will pass heat by conduction to the cooler parts, hopefully giving uniform cooking throughout.

Who invented the microwave oven?

Like many great inventions, microwave ovens were an accidental discovery. Back in the 1950s, American electrical engineer Percy Spencer (1894–1970) was carrying out some experiments with a magnetron at the Raytheon Manufacturing Company where he worked. At that time, the main use for magnetrons was in radar: a way of using radio waves to help airplanes and ships find their way around in poor weather or darkness.

One day, Percy Spencer had a chocolate bar in his pocket when he switched on the magnetron. To his surprise, the bar quickly melted because of the heat the magnetron generated. This gave him the idea that a magnetron might be used to cook food. After successfully cooking some popcorn, he realized he could develop a microwave oven for cooking all types of food. He was granted a series of patents for this idea in the early 1950s, including one for a microwave coffee brewer (US patent 2,601,067, granted June 17, 1952) and the one I've illustrated here (US patent 2,495,429 "Method of Treating Foodstuffs" on January 24, 1950), which shows the basic operation of a microwave oven. In this patent, you can find Spencer's own pithy summary of how his invention works:



"...by employing wavelengths falling in the microwave region of the electromagnetic spectrum... By so doing, the wavelength of the energy becomes comparable to the average dimension of the foodstuff to be cooked, and as a result, the heat generated in the foodstuff becomes intense, the energy expended becomes a minimum, and the entire process becomes efficient and commercially feasible."

Spencer's early equipment was relatively crude compared to modern wipe-clean microwaves—his first oven was around 1.5 meters (5 ft) high! Since then, microwave ovens have become much more compact and millions of them have been sold throughout the world.

Artwork: *One of Percy Spencer's original patent drawings for the microwave oven. Recognize how very similar it is to the microwave described up above. On the left (red), we have the incoming electrical power. That makes a pair of magnetrons (blue) generate microwaves, which are channeled down transmission lines (yellow) and a wave guide (orange) to the cooking compartment (green). Artwork courtesy of US Patent and Trademark Office.*

How efficient are microwave ovens?

You might expect a microwave to be much more efficient than other forms of cooking: in other words, you'd expect more of the energy going in from the power cable to be converted into heat in your food and less to be wasted in other ways. Broadly speaking, that's correct: cooking in a microwave is cheaper and quicker than cooking with a conventional oven because you don't have to heat up the oven itself before you can cook.

But that's not the whole story. If you want to heat up only a small quantity of food (or a cup of hot water), a microwave oven is not necessarily the best thing to use. When you microwave something, apart from

putting energy into the food, you're also powering an electric motor that spins a relatively heavy glass turntable. Although you don't have to heat up the food compartment for the oven to cook, a microwave oven does, in fact, get fairly warm after it's been on for a while, so there are some heat losses. A magnetron is not perfectly efficient at converting electricity into microwaves: it will get hot. And you also have to power an electronic circuit, a timer display, and probably a cooling fan. Taken together, all these things make a microwave less efficient than it might be.

How much less efficient? Physicist Tom Murphy recently compared the energy efficiency of different methods of boiling water and found (perhaps surprisingly) that it was only about 40 percent efficient, which is about half as efficient as using an electric kettle

Effects on Foods and Nutrients

Raisins when overcooked in a microwave produce considerable smoke.

Comparative cooking method studies generally find that, if properly used, microwave cooking does not affect the nutrient content of foods to a larger extent than conventional heating, and that there is a tendency towards greater retention of many micronutrients with microwaving, probably due to the reduced preparation time. Microwaving human milk at high temperatures is contraindicated, due to a marked decrease in activity of anti-infective factors.



Any form of cooking will destroy some nutrients in food, but the key variables are how much water is used in the cooking, how long the food is cooked, and at what temperature. Nutrients are primarily lost by leaching into cooking water, which tends to make microwave cooking healthier, given the shorter cooking times it requires. Like other heating methods, microwaving converts vitamin B12 from an active to inactive form. The amount inactivated depends on the temperature reached, as well as the cooking time. Boiled food reaches a maximum of 100 °C (212 °F) (the boiling point of water), whereas microwaved food can get locally hotter than this, leading to faster breakdown of vitamin B12. The higher rate of loss is partially offset by the shorter cooking times required. A single study indicated that microwaving broccoli loses 74% or more of phenolic compounds (97% of flavonoids), while boiling loses 66% of flavonoids, and high-pressure boiling loses 47%, though the study has been contradicted by other studies. To minimize phenolic losses in potatoes, microwaving should be done at 500W.

Spinach retains nearly all its folate when cooked in a microwave; in comparison, it loses about 77% when boiled, leaching out nutrients. Bacon cooked by microwave has significantly lower levels of carcinogenic nitrosamines than conventionally cooked bacon. Steamed vegetables tend to maintain more nutrients when microwaved than when cooked on a stovetop. Microwave blanching is 3-4 times more effective than boiled water blanching in the retaining of the water-soluble vitamins folic acid, thiamin and riboflavin, with the exception of ascorbic acid, of which 28.8% is lost (vs. 16% with boiled water blanching).

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Time Management Tips for College Students

N Sukumar Singh

Asstt. Prof. Civil Department, MIT



All college students suffer distractions, whether from extracurricular activities, surfing the internet, meeting new people or working a job. Discover resources that can help students better manage their time.

Many universities offer time management techniques that can help college students succeed in their classes. These tips include eliminating procrastination, better organizing daily activities, reducing anxiety and increasing motivation and confidence. Dartmouth College and Pennsylvania State University have outlined several time management tips on their school websites.

Get Organized

When developing time management techniques in college, it's important that students first understand their goals and then set out to develop and follow a routine schedule. Without these factors, it may be hard for students to get motivated to employ their time management strategies. Students may download or purchase a scheduler; a weekly, monthly and yearly planner; and worksheets pertaining to the distribution and organization of one's tasks. This will help them avoid waiting until the last minute and having to cram.

Plan Out Your Studies

Many universities recommend that students take the time to plan each school day. Making a daily list of tasks to accomplish can help students to concentrate on tasks one at a time. Individuals should be specific when setting goals. For example, a student might want to set the goal of reviewing his or her lecture notes each day after classes. It can also be helpful to schedule fixed blocks of time to study with clear start and stop times, as well as specified break periods. Students can start with more difficult subjects first and also work on assignments or tests that are due first.

Use Mental Exercises

Students should devise ways to build on their success, keeping their long-term goals in mind when pursuing better time management. Mental awareness can help with this. Individuals should try to be mindful of when they're falling into unproductive patterns and should identify specific triggers or distractions that lead to procrastination. Meditation and exercise might also help some people clear their heads and help them build confidence and focus when studying.

Seek Help

Students may look for advice from teachers, coaches, mentors or peers on better time management strategies. Individuals can also work with other classmates who are on top of their assignments and willing to provide reminders or encouragement.

Avoid Common Time Wasters

Common threats to good time management habits are external distractions. Students should seek to eliminate or at least lessen these common distractions. Here are some common time wasters:

- Television
- Phone conversations
- Commuting Extracurricular activities
- Social media and Internet use
- Running errands

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OVERCOMING THE WORLD'S MOST DANGEROUS TRIANGLE



Micky Akoijam
8th Semester, CSE



In 2001, I Micky Akoijam and some of my friends Cyprus, Varun, Sanayai, Satyajit, Gopen, Kalpana, Jeson, Nickita, Mathoungamba decided to explore the secrets of the Bermuda Triangle. We were the member of US navy. I lead of the operation which start on June 30th, 2001. We took submarine X-U01 the best available and got through the Atlantic ocean. We were 1200km away from our base. As planned we were going to set up base on a Hawarian Island which is only 600km away from our triangle.



We set camp and had dinner and settled in for the night. The next day we propagated a remote controlled camera plane. Cyprus was controlling the plane and lose control only a few hundred feet away from target. The next day we decided to locate the plane by going round the triangle we were not able to find it. We decided to go little closer to search. I told them that we are going into the triangle tomorrow.

The next day we had taken all the precautions.
We wore life timer to coneect us to the sub.
We created an emergency start wire for the sub
to pull if we were sinking. At 8:00 am we start
driving slowly in Astronautical suits to balance a body pressure.
We could see itgetting darker as we got closeto the triangle.

I carried the emergency start wire slowly.
It became very dark and we were slowly
starting to get pulledby the triangle.
We strengthened our life timer which connected
us to a sub and I held timer which connected
us to the sub and I held on the emergency
start wire. To our horror a strong force pulled
out of the darkness shook us downward and
we stopped suddenly. In that jerk I accidently
lost my grip on the start wire. We knew we were
all doomed. We suddenlyshow a light from the
top. Cyprus pulled wire. We reduced
our drowning speed and we were being pulled out.
Thanks to Cyprus we safely reached the island and
our Navy officerwere waiting for us. They congratulated
us on our bravery. There were still one thing I wanted to
know.
Where did that light comes out of darkness? How are we ever
going to find out?



.....

WHY NOT 'A ROCKET'



R. K. Kiran
ECE 4th Semester

As Zac and I was returning back home, we found a journal with a toy rocket glued to it. We open and it reads....

I met Aria when I was in 11th standard. We met by accident and from her point of view, it might be a mistake. And the love we had was not 'love at first sight', thing. We don't even have phone numbers... I didn't even understand if we were still dating. So we started like that but days later we grew closer. I became more possessive. I know she hate it but I just can't control it. Unfortunately we broke up after two and half years and those days after the break up, I felt like I've been living in every level of hell. 6 months later, she texted me. We stayed friends but how long can two past lovers be friends? I couldn't stop my heart getting attached to her. So we decided to delete the numbers .But we continued talking. One night she texted me 'I love you but you understand everything right? You thought that I'm living a happy life but I don't. I cried real hard hugging my mom. And when I missed you, I clinch your shirt and cried. I'm sorry for everything. Take care'. I thought "If I can't have her, why am I studying for? Why do I need to be perfect? Well I'll finish my engineering degree in the hope that I'll build a rocket and take her to a place where no one lives.

Then some pages were cut off. So ZAc and I search for Aria. Luckily we found her and she told us that Luke disappeared 5 years back. So we help her finding Luke. We some found clue that Luke is at Romb. So we went to Romb but he was not there. We went home disappointed. That night Luke came to me surprisingly. And he requested me to bring Aria to Romb on 17th. We went and when reached there, they stare each other for a min and they hugged each other like they've never been separated. Then Luke took us to a field, we saw a huge thing covered by a long cloth. Then a gang came out from nowhere and lifted it. We were shocked. It was a ROCKET. It was a gift for Aria for her birthday. 'lets go for a ride', Luke said. 'Where?' Arai asked. 'The first stop is to Mars and the next...you decide', Luke said. 'Are you crazy? Who gave a rocket as a present', Aria laughed and asked. 'This is going to take us to a place where there's no hatred, no jealousy, no society, no restriction...a place where we can be together', Luke answered. 'What brought you this idea?' Aria asked again. 'If Shah Jahan could built the Taj Mahal for his wife so, Why not a rocket? And their rocket was launch into the thin air.

.....

STRESS AND ITS AFFECT!



Tourangbam Derik

E.C.E., Past Student and Former Editor 2015

Any regular college student will tell you the same phrase: “I’m stressed.” Walk into any common study area such as the library or a study lounge, and you can see it on everyone’s face. The mental stress and lack of sleep gets portrayed in physical aches, slouched backs and tense shoulders. Sometimes the stress induced from classes, part time jobs and personal issues can develop into more pressing issues: depression, anxiety, eating disorders and many more. The National Survey on Drug Use and Health (NSDUH) says that at least 8.4 percent of full-time college students aged 18-22 have experienced a major depressive episode. So this leads me to wonder—are there any trends within specific groups in the college demographic which experience more depression and anxiety or mental illnesses than others.

Stress leads students to use drugs

A review of students' responses highlights multiple functions served by smoking, including that smoking:

1. helped clear one's mind when shifting from one subject to another;
2. Served as an aid in alleviating anticipated stress;
3. Helped to refocus one's thoughts during a study session, facilitating greater concentration; and
4. Served as a reward to celebrate the completion of a study session or an examination.

How Your Body Responds to Stress

Your body's central nervous, endocrine, immune, and cardiovascular systems are involved in responding to stress.

The physical responses can vary: Short-term responses can cause a racing heart, sweaty palms, and a pounding head. Long-term responses can cause back pain, high blood pressure, sleeplessness, and an inability to make decisions. Constant stress floods the body with stress hormones, which can increase the risk of serious health problems.

The hormone that initiates the body's response to stress, CRF, is found throughout the brain. Drugs of abuse also stimulate release of CRF. See the diagram above for how this works.

Myth vs. Reality

Myth 1:

Drug abuse is harmful, but it does relieve stress.

Reality: Some drugs of abuse affect your brain the same way stress does. Long-term abuse of drugs makes users more sensitive to everyday stress than non-users.

Myth 2:

All stress is bad for you.

Reality: Stress can help you deal with tough situations. It can also be associated with positive changes, such as a new job. However, long-term stress can lead to physical and emotional health problems.

Myth 3:

Everyone deals with stress in the same way.

Reality: People deal with stress in different ways. How you deal with stress determines how it affects your body.

Modern life is full of frustrations, deadlines and demands. For many people, stress is so common place that it has become a way of life. Stress isn't always bad, though. Stress within our comfort zone can help us perform under pressure; motivate us to do our best even keep us safe when danger looms. But when stress becomes overwhelming, it can damage our health, mood, relationship, and quality of life. So be positive and make stress a useful instrument in life.

.....

OMG CAN'T STOP LAUGHING

Elangbam Chalamba Meitei
8th Semester, ECE



A man meets an accident with his new Ferrari.

Policemen arrive...

Man (cried): Officer! My Brand new Ferrari.

Policeman: You are such a materialistic. You even haven't notice that your left arm has been cut off.

Man (he look at his left arm and yell): OMG! My Rolex watch....

Relationship tips for men...

When a woman says "Correct me if I am wrong",

Don't do it. It's a trap....! Do not, I repeat do not correct that woman.....

78% of engineers don't trust the first answer their calculator gives them. They always check for the second time.

A man married a lady from Moreh. Just few days after the marriage the woman died.

His friend cried (in local dialogue): EinahaidroMorehgi pot keisukuinachatabanena(didn't I told you the stuffs of Moreh do not last for long).....

Boss: Where were you born?

Santa: India.

Boss: Which part?

Santa: What "which part"????? Whole body was born in India....

Once a Japanese visit Manipur for the very first time and he saw many youths sitting together and talking in the evening (leipungfamba). He thought they were having an important discussion.

Japanese: Wow! Manipur is so great. The youths are having many group discussion in every locality, the state will develop very fast (hoping that the youths will invent something new)....

After 6 years, the same Japanese visit Manipur again and saw the same group of youths sitting together and chatting....

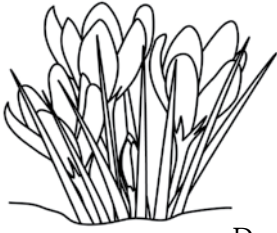
Noticing nothing has been invented, the Japanese cried: NONSENSE.....!!!!

An alcoholic man came to a local drinks vendor on a very old and condemned bicycle. He leaned the bicycle on a wall and went inside the vendor to drink some alcohol saying "what kind of crazy thief will steal this kind of bicycle".

A thief came and took away the bicycle saying "what kind of crazy owner will search for this kind of bicycle".....

.....

Dream !!



I dream a dream
 where dream are not mere dreams
 Dreams becomes life when every breath dies to achieve the dreams
 It might seem impossible but the word itself says I'm possible.
 Dreams want dreamers who perspire for the dreams not who day dreams only.
 The day my dream becomes reality,
 My dream will shout loud and say;
 He dream a dream of dreams and he is living with his dreams.

Written by: Munan kumar Thakur

People



Some people are fighting with their parents,
 Some people are fighting with the pain without getting the love of parent.
 Some people are wasting foods,
 Some people are dying without getting nothing to eat.
 Some people are crying for Iphone,
 Some people are crying for eyes to see the world.
 Some people suicide because of their problems,
 Some people face everything even though they are handicapped or mentally retarded.
 Some people worry about the past,
 Fear about future and lose their precious present,
 Some people won't care about past,
 Won't think about future,
 But enjoy the present happily.



Elangbam Chalamba Meitei
 8th Semester, ECE

True Love



Calling up your name,
For a never ending love,
Love all and all,
That comes upto you.

Love is never los
If not reciprocated
It will flow back and
Software and purity the heart

Love is like a sea,
Where tides nebver stop
Love all into the end,
Without any fear

Life is a flower of which
Love is the honey
Love is a source of courage
Nad is the strongest pursuit in friendship.

The blissful moments of love
Consoles a sobbing heart
Its great to love the one who hates ypu
Than to love the ones who love you.

Love your neighbor as yourself
For God loves you all
This is the a true love that
Jesus taught us.



Micky Akoijam
8th Semester, CSE

Her Lullabies

Her lullabies calm the innocent one
 In the cradle peaceful, helpless, asleep
 She watches over 'till the morning
 Comes

Her protective instinct second to none
 She struggles when the little one weep
 Her lullabies calm the innocent one

She won't forsake, won't leave you
 Alone
 You, her precious, she will forever keep
 She watches over 'till the morning
 Comes

Her embrace will keep you sound and
 Warm
 Love that shall nurture and keep you
 Safe
 Her lullabies calm the innocent one

From noon to dusk until the break of
 Dawn
 She won't take her eyes of you even a
 Minutes
 She watches over 'till the morning
 Comes

You were the innocent one, now have
 Grown
 Do you care to give her, even a bit of respect?

Her lullabies have calmed you,
 The innocent one
 She watched over you, mornings that have gone.



Khwairakpam Kabita
 ECE TRADE, 2nd SEMESTER
 [Courtesy: Tribute to mother blog]



The Square Root 3

I'm sure i will always be
A lonely number like the root 3

Dhanu Chettri
ECE 8th semester

The 3 is always good and right,
Why must my 3 be kept out of sight?
beneath the cruel square root sign,

I wish, i was instad nine
For 9 could twark the evil trick,
With just a small arithmetic

I know i'll never see the sun, as i'm 1.7321
This is my reality, so sad irrationality
Looking closely, what i see?
Another square root of a three

Has quitely come waltzing by,
Togethernow we multiply
To form a number we prefer,
Rejoicing as an integer
We brake free from the mortal tree
And the square root 3 is now being free

Work in Life

Work after work, never ending work,
May be old or young, there are works,
There is nothing, more than work.
May be man or women, there are works;
This is the way of life, for all to work;
Life is like this, to work,
Whatever may be our destiny, there will no end for work.

By: Gaimeilung Gangmei
B.E 8th Semester, Civil Engineering Dept.

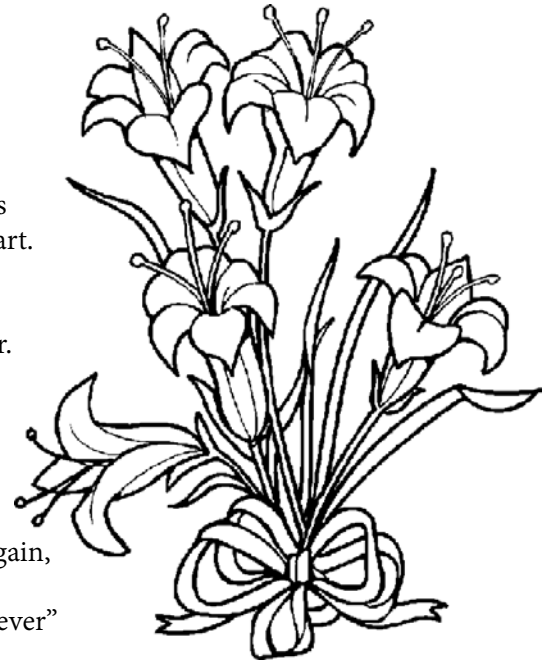
Waiting you forever

On the first day of the school
 I met someone
 Who can overcome my heart.
 I admire on her act-
 Her smiles, her laughs, and her eyes
 Which give a lot of message to my heart.

When my eyes contact with hers
 She smiles and made me love on her.
 But,

Today, she left me away
 Without saying a word.
 Even though I am still waiting
 For the shake of her, that won't come again,
 Without moving single step.
 And I still promised "I will wait you forever"

"I will wait you forever".



By :Thingom Devachandra Singh
 2nd Semester, ECE

Enchantful Richness Land

Know to love the richness of thy land,
 season by season, hearing all different sweet volume of singing,
 The core of human heart much has decline into this.
 Seen a roof type mountain and many sloping hills lay across.
 The valleys in nature serves also to decide the human determination.

When spring approach in its land,
 even birds of all kind seems to appear so clear and wishing.

Will it seen a perfect balances of peace ,harmony as if no more human hypocrits!
 A home for all poor and needy to have rest and to decide .

May be there is still time to keep it proper and safe.
Covering almost all season through which various colourful events.

The human causes of desire and their suffering has naturally made.
May this could tell the true story about the perfect & truly love to all feelings of colour races!
Of what the most importance human life also bears great responsibility.
And worrying still there will be a time?

By : Chandam Thoisana Singh
ECE, 6th Semester,

Changing Technology

Our older brothers and sisters
Were the last to live without technology
Our generation wouldn't last a day
Without a cell phone in their hands
It's too late for most.

Our younger brothers and sisters
Are growing up with technology
A ride in the car requires an iPad
Without a screen life is unbearable
It's too late for most.

Our moms and dads
Are already to technology
There live wouldn't function without their computer
Technology is not a problem
The way are getting used to it is.



By : Banshali Laipubam
2nd Semester, ECE

Athenba Wakhal

Kananachatludrabalambi
Narakmongsonggumsonglaba
Chatlieina kana youdana
Suknamamlabathasigiahingsida

Pandamamanalichingduna
Akibaleitanathamoinungda
Thangjillubaeigikhongthangbu
Waroujeieinaahenbapamluba
Egiwakhal

Nungsirabamarupnanggitatengyoudana
Hingbangamgganikhallubaeigiathenbawakhal
Ahenbapambamiyoibagilichatna
Meikhuoinaeigiwakhaldatilhankhiba
Eiaranbanikhanglakle

Thawanmichakifajabaudraba
Songlabaumangdachatlureei
Mahuchenbalinnathallaba
Guhamanungdatasillureei

Kallakpamihoubanathallaba
Miyoiagiathenbawakhalnapuduna
Kaothokluimarup
Nangginungsibapumnamak
Eiaranbanikhanglakle

Nungsirabamarupnanggitatengyoudana
Hingbangamgganikhallubaeigiathenbawakhal
Ahenbapambamiyoibagilichatna
Meikhuoinaeigiwakhaldatilhankhiba
Eiaranbanikhanglakle



By : A. Tejmani Sharma
B.E. 8th Semester ECE

Lanmi

Chanbiheibanatouutuna
Eibupothahalliba
Awabeicheinapumbasunangna
Eibukouthokhalliba
Nangbukanano

Maithirabalanmioina
Sontharurabaeigiwakhall
Pangalthoktrabaeigihakchang
Ashagipamelsukanghraba
Eigipunsikhongchatsida
Nangbukanano

Mikupasimatangoirabasu
Nanginungsilichingna
Matamkuinaleikanglaoiruraba
Eigipukningbuchothalli
Mamsillurabaeigithamoigiatiyada
Mangalamapiduna
Yeninghulhallieigithouna
Thamoilakanungda

By : A Tejmani Sharma
B.E. 8th Semester ECE



“মদুতনা ওইজগে পেন্জবা”

ইমা

গংগী নতস্বাক্তা চাওরক্লবা নচানা
 নুংশিইজৈ নংগী
 চীংনা কোইনা পনশাবা লমদম অসে ।
 নংগীদমক কৎখরে থরাই কযাসু
 শিংখরে খোমলাং লমন
 পাঙ্গল্লাবা পারী-নমোম কযা কযানা
 চৎলুরেনে নচানা
 গংগী চীংলোন মাপলবু লান্দুনা
 মালেমগী চাওখৎলবা লৈবাক কযাদা
 ঙুমখিদে ঐগী থম্মোযবু জয তৌবা
 অরং-অরাক্লা থল্লাবা মফমশিং অদুনা
 নিংশিংদুনাতা লৈ নংতবু
 মিকুপ খুদিংদা ।
 শাৎহৌদেনে গংগী নমোম
 জুকোগী চীংমাই নিংঙাইদনা
 লৈশাৎ তমলীবী শিরোই লিলিদো
 গংগী লোক্তাক্কী ফুমদিদা
 চেন-চোংদুনা শান্নজনিংবা
 নীংথিবী শঙাইদো ।
 উরক্তেনে চাওখৎলবা মীরৈবাক্কী
 মফম কৈদশু
 তারক্তেনে নুংশিরবা পেনাগী শহেকশু
 লাই হরাওবগী পুংখোনশু
 ঙাওজখিবনি ঐদি মতম চুপ্পদা,
 গংগী বসন্তগী অবের মচুগী কুম্মৈদো
 অঙাঙবা থরোগী পাৎপান্দা লেপ্পদুনা
 গংগী অশংবা ফৌনাগী লৌবুকশিংনা
 মালংগী শাউমদা, লৈনা জগোই শারিবা

অঙাঙবা কূরাও মপান্দা তোংদুনা
 শক্লিবা নুংশিরবা খোইনীংগী ঙ্গৈশৈ
 ওঃ কযাদা নীংখিজখ্রবা
 পূম্মক ওইরিবনি ইমা গংগী নতস্বাক্তা ।।
 লাকসনু ইমা, যেক্লবা লীশিং, লীশিং
 মাযোক্লজগে থরাইনা পোন্তা পীরদুনা
 নংগীদমক পাম্মুবা লৈজদে নচানা ।
 মতমগী কল্লাবা নোংলৈনা
 লমজিংবীরকলি, গংগী খাংপোক্কী মৈরীবু মূথৎনবা
 ঙমলোই কৈদৌঙৈশু, ঙমলোই মূথৎপা
 পূনশিল্লী অমতা ওইবগী লংলানা
 নচাশিংগী থম্মোয ।

যেংজখিগনি পেন্না নংবুদী
 পুন্সিনা নুমিদাংরাইরম যৌশিল্লক্লবা ফাওবা
 ফমলুগনি ঐনা গংগী নাকেস্থাগী উমংদা
 শাৎখিগনি চীংখ্রাওগী চংমাইদা
 চৎলুগনি লোইবী চীংগী উ থয়ালগী মনাক্তা
 লোইবা খম্বা নত্তে
 ইমা গংগী পুইকৈ লনগৈদি
 কল্লক্লফম ওইরিবনি গংগি মালেম্মা
 পোকচগেনে হন্না-হন্না
 গংগী নতস্বাক্তা
 মপোক লাংলোন খুদিংদা
 মদুতনা ওইগে পেন্জবা থম্মোযনা ।।



I. Survastava
 C.S.E 6th Sem
 132008

‘ঐগী পুন্সি’

অমমবনা থল্লাবা ঐগী পুন্সিসিদা,
 নুংশিবা নংবু থেংনরুবদগী
 ঙ্গসিদি নীংঙমদবনা থল্লে ।
 থম্মোযসু মখোল থোৱা কপলক্কে,
 থেহীনবা কনাসু লৈএবা,
 কপলুবগী কাল্লবসু লৈররৌই;
 তাবীনবা লৈএবা ঐগী পুন্সিগী ৱারীনি
 লোযশিনফম খঙদনা মাঙথ্ৰগদবা,
 পলেপফম খঙদনা চৎলিবা
 ঐগী পুন্সিগী লহীনি
 অমমবা মরক্তা লমজীংবীনবা কনাসু যাওদনা;
 অমুক হন্না খল্লুবদা
 ৱাদবসু ঙ্গম্মত্ৰে
 তোল্লাবা ঐগী পুন্সিনা ।
 শাৱবা লৈকংলাদা কাযদোংফম থীৱিবা চেকলাগুম
 কোযপায় পায়রি এগী পুন্সিসু;
 কোকিল চেকলাগী নুংশিৱা খোঞ্জেল
 লৈকংলাদা তাবা ফংলমগদ্রা;
 বসন্তা লাক্করৌইদবা অকংবা উপালগা পাংখক ওইদুনা
 ঙ্গাইরি ঙ্গসিঙ পীৱাংনা থল্লাবা ঐগী পুন্সিনা
 কনাঙমবা অমা
 কপ্পিবা থম্মোযশিবু থেহীনবা,
 মংফাওনরৌইদবা মংলান অমদা.....

Ayekpam Salice
 2nd Sem
 C.S.E



অথেনবা ৱাখল

কনানা চৎলুদ্রবা লম্বি
 নারক মোংশোঙ গুম শোঙলবা
 চৎলি ঐনা কনা যাওদনা
 শূৱা মল্লবা থাশীগী অহিংসিদা

পান্দম অমানা লিচিংদুনা
 অকিবা লৈতনা থমোইনুংদা
 থাংজিল্লুবা ঐগী খোঙথাংবু
 ৱারৌজৈ ঐনা অহেহ্না পামলূবা
 ঐগী ৱাখল

নুংশিৱা মরুপা নঙ্গী মতেং যাওদনা
 হিংবা ঙ্গমগনি খল্লুবা ঐগী অথেনবা ৱাখল
 অহেনবা পাম্বা মীওইবা লিচৎনা
 মৈখু ওইনা ঐগী ৱাখলদা টিলহনখীবা
 ঐ অৱাষনি খঙলক্কে

থারানমিচাক্কি ফজবা উদ্রবা
 শোঙলবা উমংদা চৎলুরে ঐ
 মছ চেহ্না লিন্না থল্লাবা
 গুহা মনুংদা টাশিল্লুরে ঐ

কল্লকপা মীহৌবনা থল্লাবা
 মীওইবগী অথেন্না ৱাখলনা পুদুনা
 কাওথোক্কুই মরুপ
 গংগী নুংশিবা পুন্সমক
 ঐ অৱাষনি খঙলক্কে

নুংশিৰবা মৰুপ্লা নঙ্গী মতেং যাওদনা
 হিংবা ঙমগনি খল্লুবা ঐগী অথেনবা রাখল
 অহেনবা পাম্বা মীওইবা লিচৎনা
 মৈখু ওইনা ঐগী রাখন্দা টিলহনখীবা
 ঐ অরান্ননি খঙলক্লে

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 B.E. 8th Sem ECE



লান্মী

চান্নী হৈবা নটৌ উতুনা
 ঐবু পোখাহল্লিবা
 অরাবে চৈনা পৃষসু নঙনা
 ঐবু কৌথোকহল্লিবা
 নংবু কনানো

মাইথীৰবা লান্মী ওইনা
 সোন্তুৰুৱা ঐগী রাখল
 পাঙগল থোকএবা ঐগী হকচাং
 অশাগী পামেলসু খংত্রবা
 ঐগী পুলি খোংচৎশিদা
 নংবু কনানো

মিকূপ অসিমতং ওইৰবসু
 নংগী নুংশি লীচিংনা
 মতম কুইনা লৈকংলা ওইৰুবা
 ঐগী পূক্ৰিংবু চোংহল্লি
 মমশিল্লুৱবা ঐগী থম্মোইগী অতিযাদা
 মংঙাল অমা পিদুনা
 যেনিং হুলহল্লি ঐগী থৌনা
 থম্মোই লকা নুংদা ॥

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