Edition II

Autumn 2014

SCRIPTURE

PREMIER E-MAGAZINE OF THE SCHOOL OF ENGINEERING, TEZPUR UNIVERSITY

In conversation with
Dr. Suman Chakraborty

Bio-inspired Silicon Neuron

ACHEIVEMENTS OF
SCHOOL OF ENGINEERING

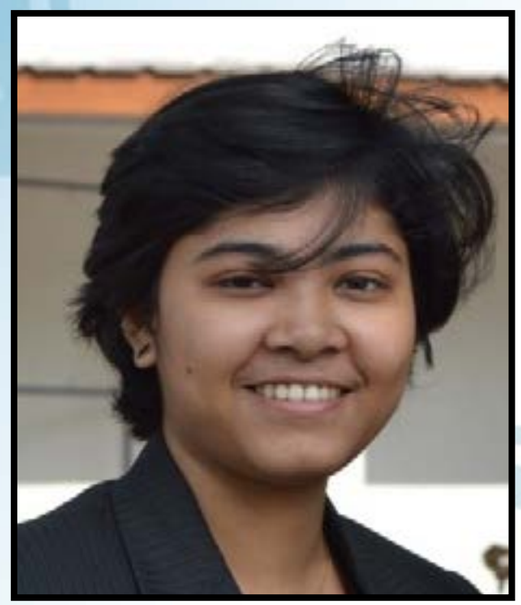
ACOUSTIC CRYPTANALYSIS

The Story of
Make In India

SCRIPTURE 1.0

Getting Started with
Web Design

Trivia Corner | Coding | Internship Experiences | Engineering in Motion | Eminence | Events & Activities



From the Faculty Advisor

MS. ANANYA BONJYOTSNA
ASSISTANT PROFESSOR, DEPT. OF ECE
TEZPUR UNIVERSITY

"Best Wishes"

It gives me immense pleasure to announce the launch of "Scripture" once again. I am extremely happy that Scripture is continuing with its 2nd edition this time. After the successful launch of the First Edition and encouragement from the readers, the magazine has promisingly come up with this Second Edition. The E-magazine has proven to be very informative in regards to academic and research developments of the School of Engineering. The E-magazine strives to benefit the readers by trying to provide current technological advancements and moreover it tries to motivate the younger students into building basic practical applications.

I am happy with the team scripture for being able to continue with producing the E-magazine and I congratulate the team members for their successful completion of the job done with so much hardwork and sincerity despite their busy class schedule. I wish "Scripture" all the success.

MESSAGE FROM

TEAM SCRIPTURE

Dear readers,

We are highly elated to present before you the 2nd edition of 'Scripture', the Technical E-Magazine of the School of Engineering, Tezpur University. This edition comes loaded with articles from different technical arenas in addition to a DIY project, an exclusive interaction with an eminent personality and a lot more. This edition also comes with an added guidance forum Scripture 101. We have also put in our best efforts in this edition to present a detailed account of the internship experiences of various students so as to give our readers an insight into the first hand experience in Applied Sciences.

We would like to extend our heartfelt gratitude to all the contributors of our magazine, our faculty members for their valuable guidance, students of the first semester for their immense help and support and our well-wishers. We also apologise for all the inadvertent errors that might have crept in this edition despite our best efforts. We thank our readers for their constant valuable suggestions and feedback that has greatly enhanced this new edition of the magazine. We would like to hear more from you in this regard. We hope that we live up to your expectations in this new edition.

Happy Reading!

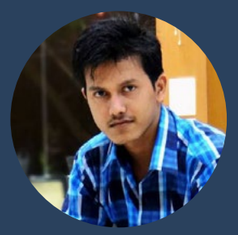
TEAM SCRIPTURE

STUDENT ADVISOR

Puneet Sharma
B.Tech 7th Sem ECE

DESIGN

Kumar Utkarsh
B.Tech 3rd Sem CSE



Farooq Ansari
B.Tech 3rd Sem ME

Aniruddha Sinha
B.Tech 3rd Sem ECE

Koushik Kiran Kumar
B.Tech 3rd Sem ECE

EDITING

Nazmin Ahmed
B.Tech 3rd Sem ME

Shuvam Das Choudhury
B.Tech 3rd Sem ME

Kalyani Kaushik
B.Tech 3rd Sem ME

Annie Borah
B.Tech 3rd Sem CSE

IMAGE EDITING

Udit Arunav
B.Tech 3rd Sem ME

TECHNICAL ASSISTANCE

Shubham Sharma
B.Tech 3rd Sem ECE

TEAM SCRIPTURE ACKNOWLEDGES THE FRESHERS FOR THEIR SUPPORT AND HARDWORK

PC :ANIRUDDHA SINHA

STANDING (L-R) : Pallab Borah (CSE), Tanna Choudhury (CSE), Prakash Gupta (CSE), Sukanya Goswami (CE), Pulakesh Hazarika(EE), Nitushmita Barman (ME), Bhaskar Sarkar (CSE)

SITTING (L-R) : Nikhil Dixit (CSE), Sangeet Patawari (CSE), Arnab Chakraborty (CE), Amborish Bordoloi (EE)

YOU WILL ALWAYS BE IN OUR MIDST

Zaman

They say, God likes to keep His most beloved ones near Him & maybe that was why He decided to take away Kamruz Zaman from our midst & keep him safe under His safe wings.

Kamruz Zaman was a student of B.Tech (CSE), 3rd semester, Tezpur University. Zaman, as we called him, left for his heavenly abode on the night of 9th October 2014 after succumbing to his injuries in a car accident, leaving us all tearful & grief-stricken. Words fall short to describe how we miss the good-natured, kind-hearted, helpful & soft-spoken person that he was, always sporting a wide smile on his face. Zaman, a brilliant student in academics was also an avid cricket player as evident from being in the University cricket team.

As Marcus Tullius Cicero quotes-"The life of the dead is placed in the memory of the living", Zaman is still alive in our memories because death does not erase away the memories, memories that keep a person alive long after he is gone. Zaman, you may have gone to some place unknown, unseen by us but we still remember your smiling face & the innocent eyes that created a magical ambience around everyone who knew you.

MAY YOUR SOUL REST IN PEACE.

ABOUT THE LOGO

The logo depicts the enlightenment of mind with knowledge and understanding. 'Scripture' literally implies religious texts from which mankind has drawn divine enlightenment. The premier technical e-magazine which represents the engineering community of Tezpur University is committed to dissipating ideas, share the research activities taking place within the School of Engineering, students' achievements and some ground breaking engineering in recent times that reshaped our way of living and thinking. The magazine also aims at uniting the SOE fraternity through a common goal of engineering excellence. All in all the magazine can be considered as a Scripture to budding engineers for inspiration and growth. Therefore in this context, enlightenment with tech feed has been portrayed in the logo.

CONTENTS

Edition 02 | Autumn Semester | 2014

REGULARS

CONTENTS

Edition II | Autumn Semester | 2014

INVITED GUEST

DR. SUMAN CHAKRABORTY

PROFESSOR, DEPT. OF MECHANICAL ENGINEERING
IIT - KHARAGPUR

"**Dr.Suman Chakraborty** is a **Shanti Swaroop Bhatnagar** awardee (in the year 2013) in the category of engineering science. It is the highest award in the field of Science in India. His areas of research are microfluidics and nanofluidics, interfacial phenomena and phase change, and computational fluid dynamics. He is also a **fellow of the Indian National Science Academy** and a **fellow of the Indian National Academy of Engineering**. He is a recipient of the Scopus Young Scientist Award for high citation of his research in scientific/ technical Journals, and Young Scientist/Young Engineer Awards from various National Academies of Science and Engineering. He has over 230 research publications and co-author of "Introduction to Fluid Mechanics and Fluid Machines"

The students of SoE, Tezpur University had a great deal of leaning experience from the lecture delivered by him on "Application of microfluidics in healthcare" at the department of Mechanical Engineering, Tezpur University. Team Scripture had a short interactive session with him and here are the answers he gave to the questions asked."

Where did you get the inspiration to go for research?

"My interest in research has not been very structured. It is not that I have been interested in research since childhood but what I was always interested was new things. One of the best things in research is its unstructured nature. My father who was a professor in physics was the first person to introduce me to research. But the very first time when I actually got addicted to research was when I was in IISc Bangalore."

Being one of the youngest recipients of the 'Shanti Swaroop Bhatnagar' award, how do you feel?

"I feel honoured. It is the most prestigious science award. The best that this award can do to me is to inspire me for doing better research."

Whom would you like to owe your success to?

"My parents and my research advisor at IISc Bangalore, Professor Pradeep Dutta and several others have a great role in making me what I'm today."

Tell us something about the phase of your life which you consider as your milestone.

"It starts with my student life at IISc Bangalore and continues with my teaching career at IIT Kharagpur and my activities as a visiting professor at Stanford University US, my work at IIT Kharagpur, my activities in collaboration with professors in Japan and Canada."

What do you have to say about brain drain?

"For me, brain drain doesn't imply leaving the country and seeking education abroad. Real brain drain for me is when students pursuing engineering do not build up a career in their respective fields and rather go for jobs in other fields. When government spends lakhs of money on every student pursuing engineering in a government funded institute, I believe that it is the student's duty to contribute their bit to the country. I do not disapprove of the idea of leaving one's country for some period of time to pursue better education or to avail better exposure. But they should come back to serve their country after they have gained enough experience and knowledge."

What do you think about the existing norms of engineering education in India? Where do you think are the loopholes?

"In India there is a huge disparity in the quality of education in the premier and not so premier engineering institutes. Engineering education in India is perhaps not geared to some of the industries of our own country. Even the students from IIT are educated to serve the western countries better than our own country. In our country engineering education is very structured because of which the creative element has been missing. What I strongly feel is that we need to encourage more of a project based education and encourage term projects atleast from the second year of the engineering courses. Projects will always add immense value to the engineering understanding of a student. On the other hand, I also agree that our huge population is one of the major factors that is killing us for it becomes very difficult for a course instructor to address the various individual projects in a class of so many students."

Can we expand the horizons of your research to fields other than medical diagnostics?

"It is not necessary that we stop with medical diagnostics using this kind of research on micro fluidics. We can also use this research to understand various biophysical processes. For example: progress of cancer. We can also devise new technologies for medical treatment. We have devised a painless micro needle for diabetes management. We can also use these techniques in dental surgeries and other surgical treatments."

What has been your experience in Tezpur University so far?

"Although I haven't looked into the academics of this institute, I did take a look at the campus. I must admit that you have a very beautiful campus with a great ambience. Even the areas around the hostels seemed much disciplined. I believe that the academics of this institute must also be very good given the fact that your Vice Chancellor is one of the leading academicians of the country. I must say that I'm proud that he is an alumnus of our institute IIT Kharagpur."

Finally, what message would you like to give to our readers?

"I would like to say that just enjoy whatever you do. Be it creative writing, sports or academics – make sure you enjoy it. Because enjoying what you do is one of the best ways of doing well in your field."

ACOUSTIC CRYPTANALYSIS

THE SCIENCE OF CRACKING ENCRYPTION BY ANALYSING SOUND GENERATED BY A COMPUTER

KUMAR UTKARSH B.TECH 3RD SEMESTER COMPUTER SCIENCE & ENGINEERING

Computer scientists **Daniel Genkin, Eran Tromer from Tel Aviv University, Israel, and Adi Shamir from Weizmann Institute of Science, Israel** have devised an attack that reliably extracts secret cryptographic keys by capturing the high-pitched sounds coming from a computer while it displays an encrypted message.

In Cryptography, Encryption is the process of encoding messages or information in such a way that nobody except the authorized person can read it.

While using internet, we engage ourselves in activities that require passing our personal information over the web. Ordering something online, filling up an online application or signing into a social network, requires entering in a lot of sensitive personal information. It includes not only our names, e-mail addresses and physical address and phone number, but also passwords. Security is a major concern on the Internet, especially when we're using it to send sensitive information. The most popular forms of security all rely on encryption.

We encrypt anything using an encryption key. The encryption key is like a password, shared between the sender and the receiver only. This key must remain secret so that anyone else may not read or modify the file. However, the scientists have extracted the secret keys by analyzing the sounds coming from a computer while it decrypts a message.

The technique has been shown to successfully recover a key used to decrypt e-mails by GNU Privacy Guard (GnuPG), a popular open source software for encrypting e-mail. The email was encrypted with a 4096-bit RSA key, one of the most secure methods of encryption available. But the scientists warned that apart from e-mail, a variety of other applications are also susceptible to the same attack. In many cases, the sound leaking the keys can be captured by a standard smartphone positioned close to a targeted computer as it decrypts an e-mail known to the attackers.

"We devise and demonstrate a key extraction attack that can reveal 4096-bit RSA secret keys when used by GnuPG running on a

laptop computer within an hour by analyzing the sound generated by the computer during decryption of chosen encrypted files," the researchers wrote. "We demonstrate the attack on various targets and by various methods, including the internal microphone of a plain mobile phone placed next to the computer and using a sensitive microphone from a distance of four meters".

This however has its own limitation. Most obviously, the attackers must have a smartphone with a small microphone, or other microphone-enabled device in close proximity to a computer at the precise moment it's decrypting a message that was sent by, or otherwise known to, the attackers. Still, the technique represents a solid advance in the field of side-channel attacks, which target cryptographic systems that leak secret information through power consumption, electromagnetic emanations, timing differences, or other indirect channels.

Side-channel attacks only target implementations of cryptographic algorithms which, while perhaps secure at the mathematical level, inadvertently leak secret information through indirect channels as described above. It's certainly feasible to know the contents of an encrypted message on a target's computer as long as the attacker knows the target's public key and succeeds in getting the target to decrypt the message. What's more, the researchers proposed several techniques and scenarios that could help attackers overcome the limitations of the acoustic cryptanalysis technique. One is to develop a smartphone app that automates the process of capturing and processing the acoustic emanations coming from the targeted computer.

"An attacker would install this software, reach physical proximity to the target computer under some pretext, and place

A POSSIBLE ATTACK SCENARIO CAN BE INSTALLING THE ANALYSIS SOFTWARE AS AN APP ON ANY SMARTPHONE, REACH PHYSICAL PROXIMITY TO THE TARGET COMPUTER AND PLACE THAT PHONE FOR THE ATTACK. FULL KEY EXTRACTION IS POSSIBLE IN THIS CONFIGURATION.

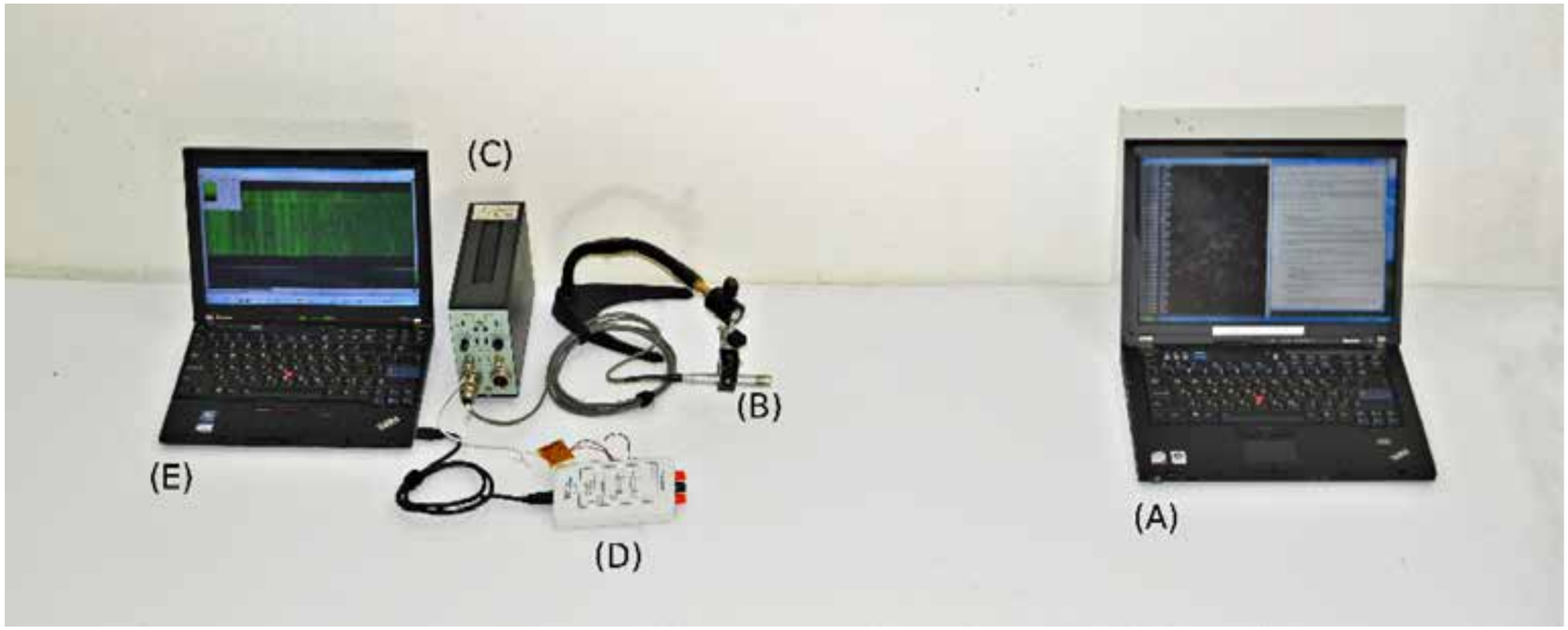
the phone appropriately for the duration of the attack," the researchers wrote. Other proposed attack scenarios include infecting a target's smartphone with sound-monitoring malware; placing a bug or infected computer or mobile device in a charging station, presentation podium, or other location where PCs are often placed; or keeping a listening device in a server room.

HOW IT WORKS?

For demonstrating the attack, the scientists used a Lenovo ThinkPad T61 computer as a target and a Bruel&Kjaer™ high frequency microphone equipped with a preamplifier for capturing the acoustic signals. The microphone was connected to a power supply and amplifier which interfaced with another Lenovo ThinkPad™ T61 computer for analysis.

The attack works by monitoring sounds emanating from the CPU of a targeted computer. Since the attack involves analysis of these acoustic emanations, so it is called "Acoustic Cryptanalysis".

Mechanical noise from fans and hard disks are obviously indicative of system activity, but seem to carry very coarse information that is apparently of little use for cryptanalysis. The scientists focused on a different source of computer noise: vibration of electronic components in the computer. These acoustic emanations, typically caused by voltage regulation circuits, are correlated with system activity since CPUs drastically change their power draw according to the type of operations they perform. However, the strength of these signals is very low, and loss of intensity due to air makes it undetectable if microphone is kept at a substantial distance from the computer.



THE SETUP

(A) is a ThinkPad T61 target,
(B) is a Brüel&Kjær 4190 microphone
(C) is a microphone power supply and amplifier,
(D) is a 10 kHz RC low-pass filter cascaded with a 150 kHz RC high-pass filter on its input, and
(E) is a laptop computer performing the attack.

Despite these difficulties, the scientists demonstrated full key recovery using common software and hardware. They focused on the popular, open-source and freely available GnuPG (GNU Privacy Guard) software used for encryption. They observed that GnuPG's RSA signaling (or decryption) operations are readily identified by their acoustic frequency spectrum. Moreover, the spectrum is often key-dependent, so that secret keys can be distinguished by the sound made when they are used. The same applies to most popular ways of encryption, other than the RSA.

The attack was demonstrated on various targets (laptops) and by various methods, including the internal microphone of a plain mobile phone placed next to the computer, and using a sensitive microphone from a distance of 4 meters.

The biggest challenge was to distinguish the sound emanating from the CPU from other sounds, moreover, distinguishing various CPU operations. The detected sound may also not purely be acoustic but electromagnetic. To ascertain that the obtained signal is truly acoustic, the scientists simply placed a sheet of non-conductive sound-absorbing material (in this case, a sheet of cork) in front of the microphone. The cork sheet absorbs only the acoustic signals and not the electromagnetic signals, pretty cool.

The exploited acoustic emanations are clearly not caused by fan rotation, hard disk activity or audio speakers as readily verified by disabling these. Rather, it is caused by vibrations of electrical components in the power supply circuitry, familiar to many as the faint high-pitched whine produced by some devices and power adapters , commonly called "coil whine", though not always emanating from coils.

The precise physical source of the relevant emanations is difficult to characterize precisely, since it varies between target machines, and is typically located in the hard-to-reach innards. Moreover, acoustic localization is difficult due to mechanical coupling of soldered components, and due to acoustic reflections.

Nonetheless, the scientists' experimentation with the microphone placement located the strongest useful signals near the on-board voltage regulation circuit of the CPU. Indeed, modern CPUs change their power consumption dramatically (by many watts, and by orders of magnitude) depending on software load. The change in power consumption created the acoustic emanations required for the attack.

To confirm this observation, the scientists opened up a desktop PC and pointed the high-frequency microphone at the components of the motherboard. The strongest acoustic signal was observed around a group of 1500 µF electrolytic capacitors, part of the CPU's voltage regulator. Then, they cooled down these capacitors, one at a time, by locally spraying them with Quik-Freeze (an aerosol-based component cooling liquid). The cooling down dramatically decreased the acoustic signal. They concluded that the capacitors, or more generally the voltage regulation circuit of which they are part, is likely the source of the acoustic emanation.

Signal strength of acoustic emanations was found to be different in different computer systems differing in age of operation. Older computers emanated higher acoustic signals. Moreover, on inspection of the motherboard, one of the capacitors was found bulging, a common problem in old

computers, and it emanated the strongest signal. So, the attack becomes highly feasible when target system is fairly old.

The placement of the microphone also has a large influence on the obtained signal. Ideally, the attacker would like to measure acoustic emanations as close as possible to the CPU's on-board power supply located on the laptop's motherboard. This requires major physical tampering with the laptop such as taking it completely apart or at least removing its keyboard. Such blunt tampering is immediately detected and is thus impractical.

However, almost all laptop computers have a substantial cooling system for heat dissipation, with a fan that requires large air intake and exhaust holes. In addition, there are typically numerous holes and gaps for various ports (USB, SD card reader and Ethernet port).

While the fan exhaust vent typically offers good acoustic access to the culprit power supply components, placing the microphone in the exhaust air flow creates strong noise.

Also, electromagnetic interference, caused by the fan motor and other circuits, can disrupt the acoustic leakage. This can be mitigated by placing the microphone at sufficient distance from the vent, placing the microphone at the edge of the vent outside the air stream, or (as the scientists implemented) recognizing the fan disturbance in the signal and pausing the attack until the machine cools down and turns off its fan.

By repeated experimentation, the scientists found a way to distinguish the RSA key signal from the rest of the part. They recorded a pattern which was created by repeatedly decrypting files using the software.

REAL-WORLD APPLICATIONS OF THE ATTACK

The most ubiquitous compact hardware that is readily available to every potential attacker is a mobile phone. The small size and low cost come at the cost of low quality microphones and amplifiers, that are not designed for the signal frequencies and amplitudes sought by the attack.

The scientists used several Android phones, with similar results: HTC Sensation, Samsung Galaxy S II and Samsung Galaxy Note II. Recording was done by a custom Android app, accessing the internal microphone. It was observed that sensitivity is lower, and noise is higher than in the laptop-based setups. However, adding a parabolic reflector to the microphone setup or by using laser microphones instead of conventional ones greatly increased the effectiveness of the attacks, given an optical line of sight to a reflecting surface on, or near, the target computer.

It is a real challenge for an attacker to perform such an attack, since it involves getting prior information about target system, the type of encryption involved, and physical access for placement of microphone. The attack may not be effective, owing to noise and other physical factors. Still, it can prove to be effective under the right conditions.

One way to prevent such eavesdropping is to use acoustic or electromagnetic shielding, but this may hinder cooling and heat dispersion. An attacker may make use of a microphone disguised as a USB Drive attached to one of the USB ports of the target computer.

Beyond acoustics, it has been demonstrated that a similar attack can be performed by measuring the electric potential of a computer chassis. A suitably-equipped attacker need merely touch the target computer with his bare hand, or get the required leakage information from the ground wires at the remote end of VGA, USB or Ethernet cables.

If the scientists are able to further increase the effectiveness of the attack so it becomes strong enough under normal and usual conditions, it can bring a revolution in the field of computer engineering and hardware design.

ABOUT THE RESEARCH

Daniel Genkin (from Israel Institute of Technology), Eran Tromer, (from Tel Aviv University, Tel Aviv, Israel) and Adi Shamir have published a paper titled "RSA Key Extraction via Low-Bandwidth Acoustic Cryptanalysis".

Daniel Genkin is a masters student of Technion, Israel Institute of Technology.

Eran Tromer is Senior Lecturer at Blavatnik Institute of Computer Science, Tel Aviv University.

Adi Shamir is an Isreali cryptographer and co-inventor of the RSA algorithm along with Uriel Feige and Amos Fiat. He won the ACM Turing Award in 2002 for his contribution to the field of Computer Science and Cryptography.

The paper is available at Eran Tromer's homepage

http://www.tau.ac.il/~tromer/papers/acoustic-20131218.pdf

BIO- INSPIRED SILICON NEURON

Dr. Soumik Roy, Associate Professor, ECE Dept.

Bio-neuro-engineering, one of the major areas of biomorphic engineering is considered to be multidisciplinary. Neurons are the basic unit of communication in the nervous system and studies in neuroengineering revolves around it.

The primary mode of communication between two neurons is a biochemical process that occurs at synapse. Synapse is essentially a junction called synaptic cleft between two neurons namely presynaptic and postsynaptic neurons. Signal from presynaptic neuron to postsynaptic neuron is transmitted through neurotransmitters released by presynaptic neuronal terminals in to the synaptic cleft. Neurotransmitters diffuse through the cleft and then bind with the specific receptor sites of the membrane of postsynaptic neuron. This binding mechanism initiates the opening of transmitter gated ion channels resulting in the flow of ions into the cell or out of the post synaptic cell.

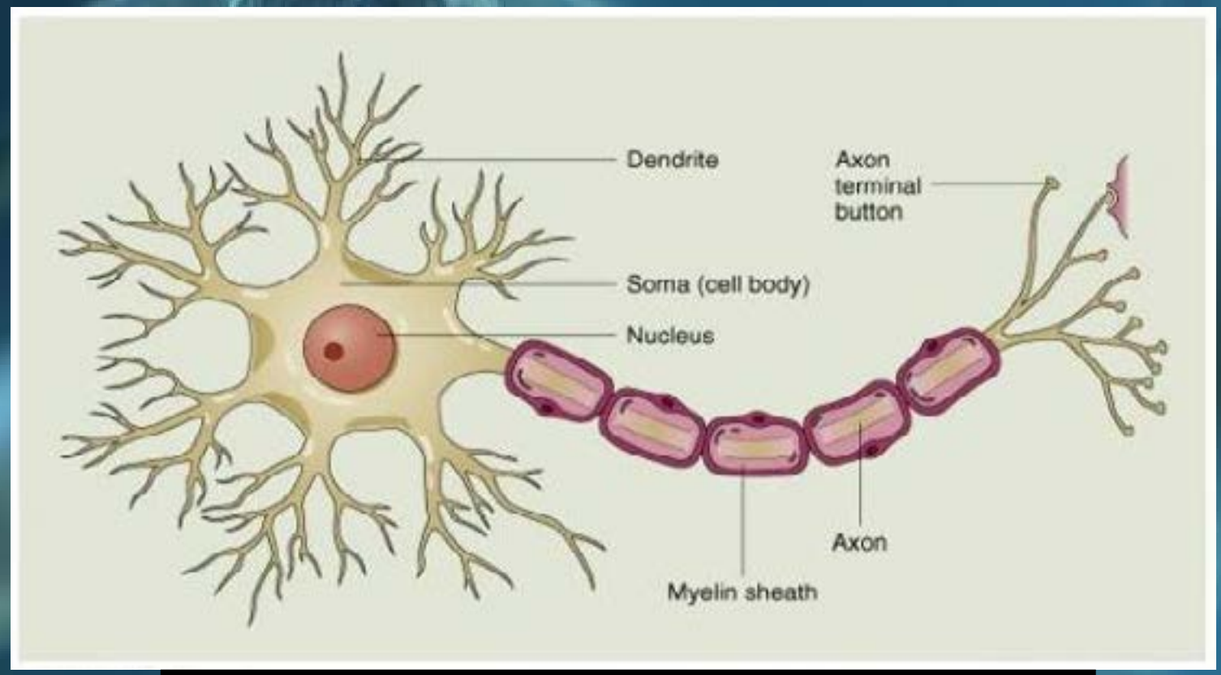


Fig.: A neuron

The communication between neuron is one directional communication. The function of postsynaptic neuron may therefore, be considered to be an input to the next neuron. Modeling of neuron is, therefore, performed for postsynaptic neuron. The overall effect of all presynaptic terminals is integrated and then reduced to a single point. The single point value is compared with threshold to produce an output. Silicon models of neuron demonstrate the basic mechanism of neuron namely the effects of excitation and inhibition.

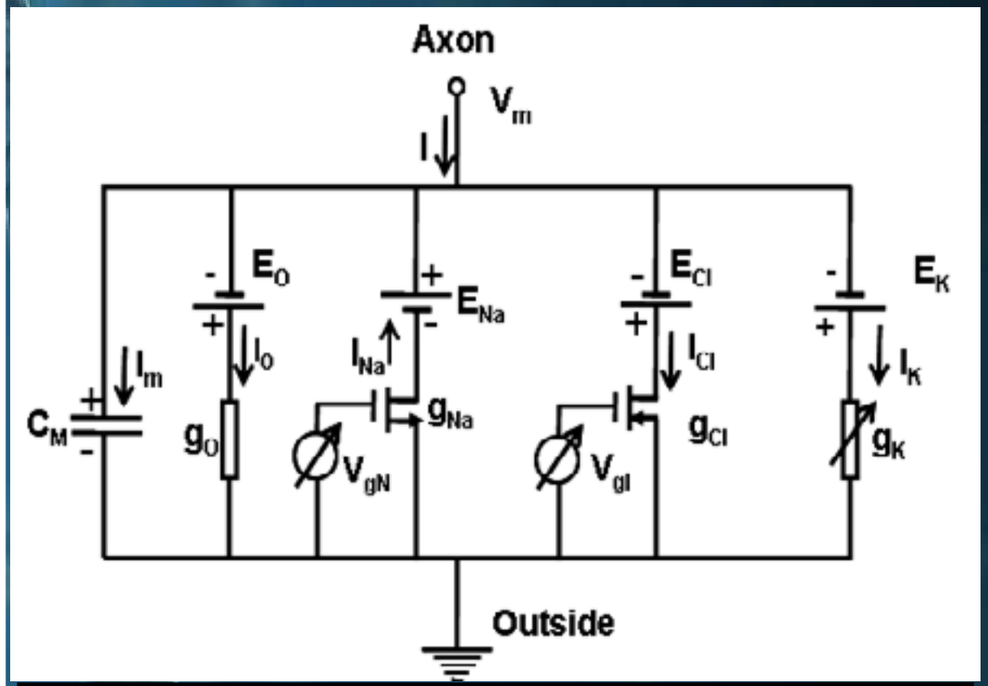


Fig.: Circuit model for Postsynaptic membrane

The first electrical behavior or model of neuron was given by A. L. Hodgkin and A. Huxley in 1952 that eventually won them the Nobel Prize in 1963. The electrical equivalent model they had developed is popularly known as H-H model. They showed that two types of channels are essential to generate an action potential, developing an electrical model to describe them. This model has become the canonical circuit model. Much work has been accomplished in the field of neuroscience since the early 1950's with the pioneering work of Hodgkin and Huxley. Advances have also been made in the field of semiconductors.

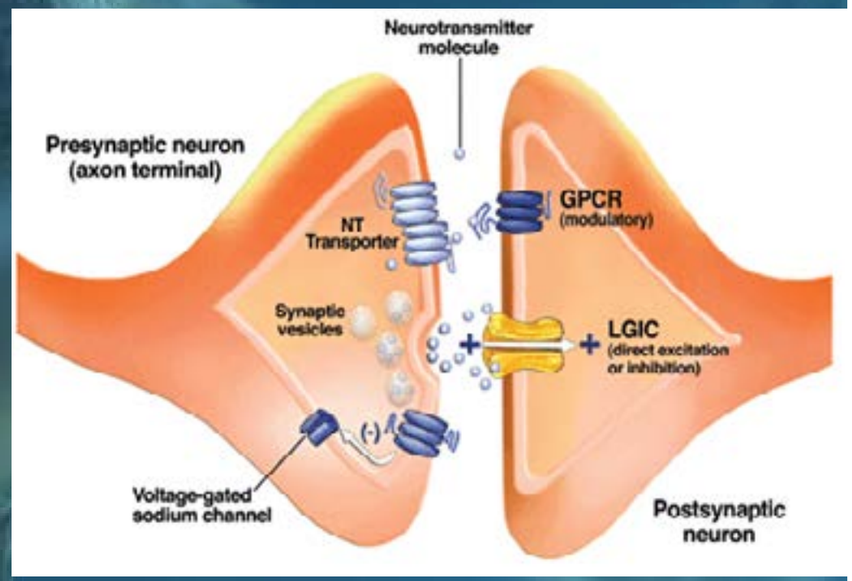


Fig : Electrical mechanism of synapse

Silicon neurons can emulate the electro-physiological behavior of biological neurons. The emulation may be done at different levels, from simple neuron models to models emulating complex morphology of biological neurons. Neuron models are used in neuromorphic engineering aiming at understanding of real neural systems and are gaining better, possibly brain like performance for systems being built.

Neuromorphic engineering takes inspiration from biology, physics, mathematics, computer science and engineering to design artificial neural systems, such as vision systems, head-eye systems, auditory processors, and autonomous robots, whose physical architecture anddesign principles are based on those of biological nervous systems.

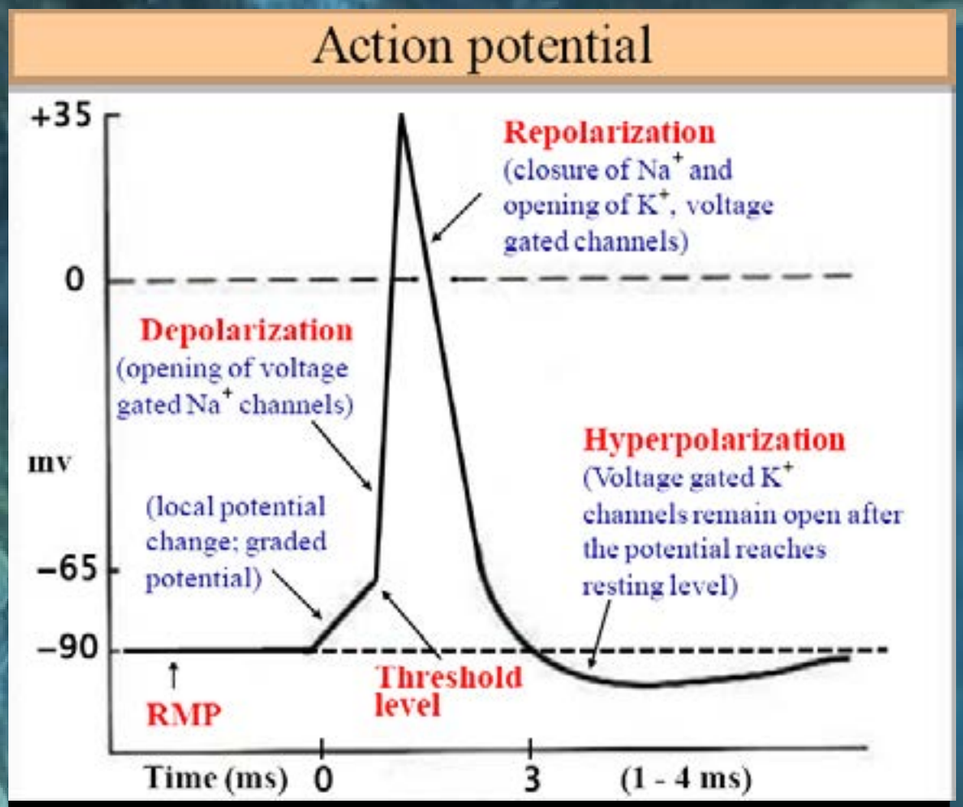


Fig : Action potential mechanism

Also modeling and simulation of neuron provides important tools for prediction of function of neurons at excitatory and inhibitory states. Such a model has important applications in the field of neurobioengineering for simulation of receptor function and electrical activity of the postsynaptic cell. The conceptual basis of Hodgkin-Huxley (H-H) equation is generally used by biomedical engineers and neuroscientists to model analog circuits for axonal membrane.

There is a clear analogy between operation of FET and biological neuron. Thus the basic operation principle of MOSFET can be used in the design of neuron/synapse models. MOSFET/ ISFET based model can be used in neurobiology area for simulation of neurotransmitter-receptor binding activity and electrical activity of the postsynaptic neuron. The future of silicon neurons lies in the design and simulation of more complex physiological activities of biological neurons.

MAGICAL POWER OF FERMENTED FOOD

PARVINDER SINGH
INTEGRATED MTECH 2nd YEAR ,FOOD ENGINEERING AND TECHNOLOGY

Throughout history, people have enjoyed the sour, tangy taste of fermented foods, attributing health and longevity to foods such as kefir, sauerkraut, and miso. Centuries later scientists began to identify beneficial bacteria in these foods as the main health-giving component.

Certainly fermented foods should be a mainstay of our diets – in fact, our health is dramatically impacted depending on the balance of these good bacteria.

1. Increase gut flora: This will strengthen digestion for better elimination of toxic waste through the bowels. Get clean from the inside out, and cleanse yourself of the old!

2. Clearer, smarter, sharper thinking mind: Any dysfunction of the brain is usually connected to what's going on in the digestive system. Many highly-regarded healers have cured mental problems through addressing the gut. It is well established that the gut serves as our second brain. Hence the phrases, "What's your gut feeling?," "Have you got the guts?" and "Trust your gut instincts."

3. Massively boost and heal your immune system: If the bad bacteria overwhelm the friendly bacteria, the maldigested food particles and fungus start to spread around the body.

This is often called leaky gut syndrome. This sets off a firestorm of inflammation, which can lead to autoimmune disorders - including Addison's disease, Celiac, Multiple sclerosis, Rheumatoid arthritis, Type I diabetes, Lupus, etc.

4. Detox: Fermented foods are some of the most potent detoxifiers, capable of drawing out a wide range of heavy metals. The beneficial bacteria grab hold of mercury, lead, aluminium, arsenate, and anything else toxic, holding on to them until they're removed through stool.

5. Beautiful skin: Every day you will see your skin improve. When you decrease the toxic load, and the bad bacterial load, this alleviates pressure on the body to do other things. Connective tissue is able to repair and heal. Acne, psoriasis, eczema, and other chronic skin conditions can clear, and the beautiful subtle coloring in face radiates from inner health.

6. Essential for nutrition: If you eat one meal with fermented foods every day, your gut will be dominated by beneficial probiotic species of microbes, and they will start to build and make all kinds of essential nutrients like B12, vitamin B6, vitamin K2, and biotin.

7. Biological enrichment of protein: essential amino acids, essential fatty acids, and vitamins. As we ferment the vegetables, we break down their cellulose structure, and they become more nourishing and mineral dense. The protein structure of foods is unravelled through fermentation, and becomes much easier to digest.

8. Food lasts longer: Fermenting has been a way of preserving foods since ancient times. Fermented foods generally do not need refrigeration, and certainly don't require artificial chemicals for preservation. Quite on the contrary: time actually assists the fermentation process.

9. Promote weight loss: Fermented foods are stabilizing for blood sugar, which means two things. First, they will balance appetite, leaving you feeling more satiated and less hungry. And secondly, they create an even more and steady release of insulin so the body doesn't store fat.

10. pH balance: Acetic acid and alkaline fermentations bring the blood and vital fluids back to a correct hydrogen level of pH7.35. In an acidic world, this is very important.

11. Elimination of antinutrients: Foods that would normally be unhealthy because of phytic acid get transformed (like soy).

12. Great taste! You can enrich your diet through a more diverse range of flavours, aromas, and textures in food substrates. Expanding your cuisine into new food goes against the health trend of denying and cutting out. Delicious and nutritious.

How can we include more of these beneficial probiotics in our diet?

In the past fermented foods – including meats, grains, legumes and vegetables - were consumed daily. Generally these foods were homemade and of course, organic. Now, commercial processing techniques resulted in poor quality fermented foods which are not beneficial to health, such as yogurt made with low levels beneficial bacteria. Fortunately, there are many healthy fermented products that people with a busy schedule can easily include in their daily diet, such as kambucha tea (a fermented tea), aged cheese, olives and pickles cured in brine (not vinegar), tempeh, or kimchi (A Korean dish made with fermented cabbage). Remember to add fermented foods after using antibiotics to promote a healthy balance of organisms. By incorporating these foods on a daily basis we can create a garden of health that will sustain us for a lifetime.Eating cultured foods on a regular basis is the most effective way to heal a leaky gut, a condition that exists due to a weakened and often inflamed permeable intestinal membrane, which allows undigested food particles to enter the blood stream. Crohn's Disease, colitis, irritable bowel syndrome, chronic allergies and immune system disorders are all ultimately caused by this problem. In fact most of the population has this condition due to diet and lifestyle. By including fermented foods in our diet, we can reestablish a healthy inner ecosystem which protects us from harmful pathogens and environmental toxins. We can then eat foods such as raw eggs and raw meat (as our ancestors did) without fear of getting salmonella, E. Coli or parasites. Even if we did pick up these things we might have some slight discomfort, but we wouldn't become seriously ill as we do now.

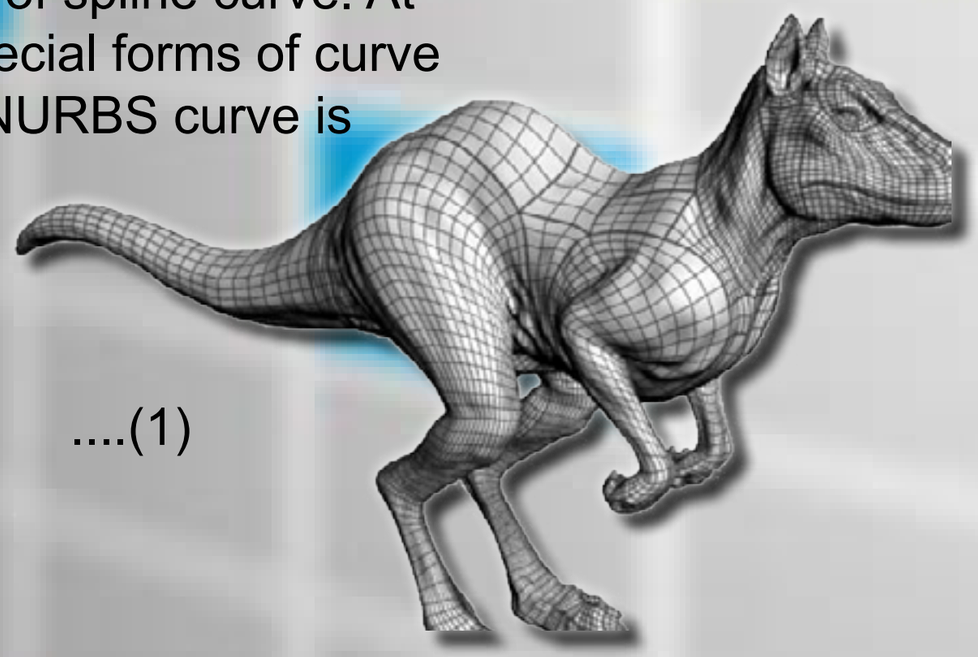
THE NURBS

BUILDING BLOCKS OF ENGINEERING DESIGN

Sazid Zamal Hoque
B.Tech, 7th sem, M.E.

Non-uniform rational basis spline or NURBS are the standard for describing and modelling any design. It has been used extensively in engineering design and animation industry. Almost all the designing software like Alias, Rhinos, Solidworks, Catia, Pro-E etc. uses NURBS curves and surfaces. My discussion is limited to spline curve only. NURBS is the more general form of spline curve. At first, a formal definition of NURBS is presented. The other special forms of curve that can be derived from NURBS curve is discussed later. A NURBS curve is defined as:

$$c(u) = \frac{\sum_{i=0}^{n} N_{i,p}(u) w_i p_i}{\sum_{i=0}^{n} N_{i,p}(u) w_i}, a \le u \le b \qquad \text{....(1)}$$



where the P_i are the control points, the w_i are the weights, and the $N_{i,p}(u)$ are the p^{th}-degree B-spline basis functions defined non-uniform knot vector. The meaning of the word rational can be understood easily looking at the equation (1).

Let us first define the basis functions by a recurrence formula proposed by deBoor, Cox, and Manseld. After that the concept of knot vector can be understood. Let $U = \{u_0, u_1, ..., u_m\}$ be a sequence of real numbers. But we need to emphasize one condition that the sequence is non decreasing. As an example, for m = 8, $U = \{u_0 = 0, u_1 = 0, u_2 = 0, u_3 = 1, u_4 = 2, u_5 = 3, u_6 = 4, u_7 = 4, u_8 = 4\}$ is a non-decreasing sequence of real numbers. The u_i are called knots and U is known as knot vector. The basis function is defined as:

$$N_{i,0}(u) = \begin{cases} 1 & \text{if } u_i \le u \le u_{i+1} \\ 0 & \text{if otherwise} \end{cases}$$

$$n_{i,p}(u) = \frac{u - u_i}{u_{i+p} - u_i} N_{i-1,p}(u) + \frac{u_{i+p+1} - u}{u_{i+p+1} - u_{i+1}} N_{i+1,p-1}(u) \qquad \text{....(2)}$$

A general non-uniform knot vector U have the form:

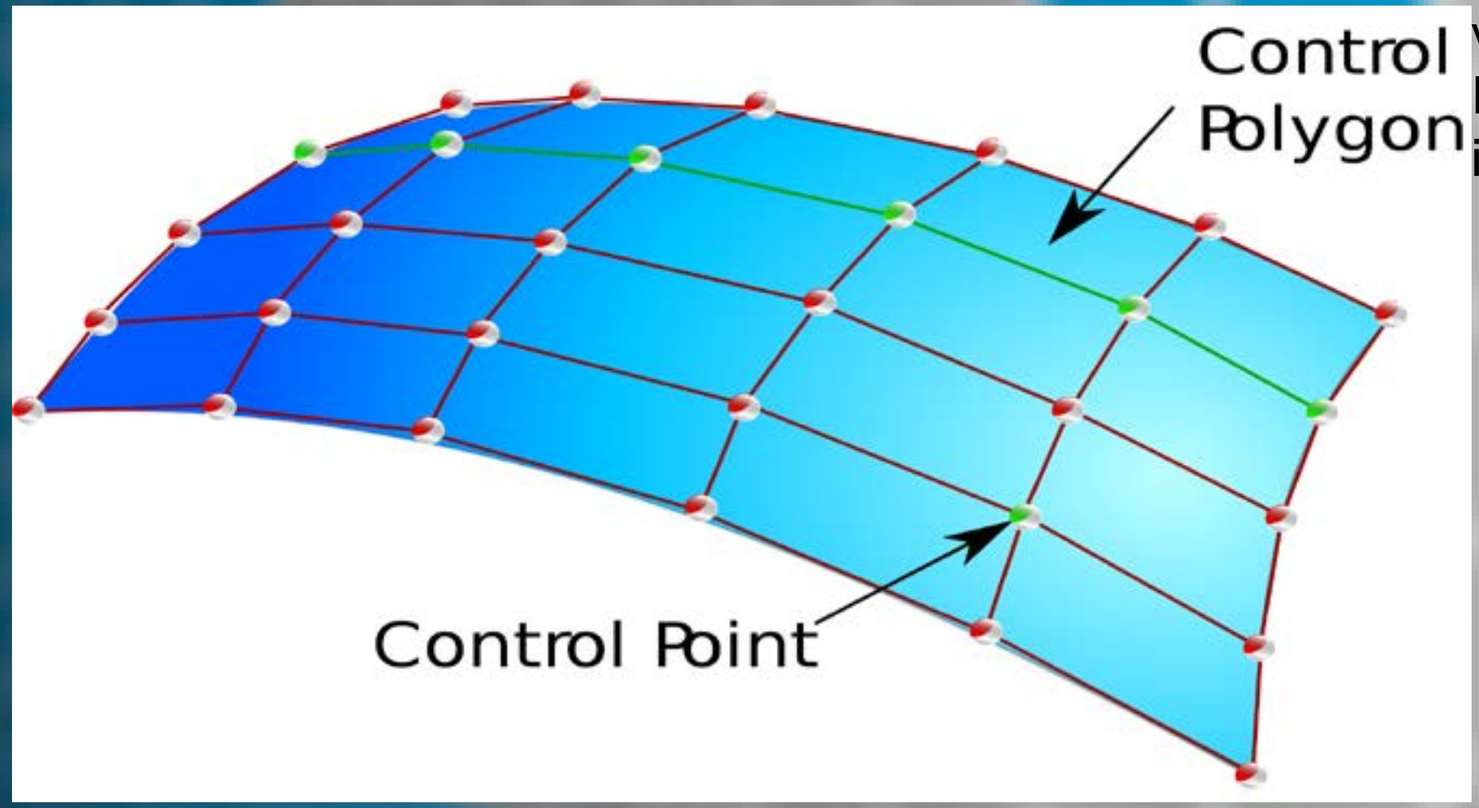
$$U = \{\underbrace{a, \ldots, a}_{p+1}, u_{p+1}, \ldots, u_{u-p-1}, \underbrace{b, \ldots b}_{p+1}\}$$

That is, the first and last term have knot multiplicity (p + 1).That means a and b are repeated for (p + 1)th times. It is convenient to take a = 0 and b = 1 in the above equation. We can write:

$$R_{i,p}(u) = \frac{N_{i,p}(u)w_i}{\sum_{j=0}^{n} N_{j,p}(u)w_j} \qquad .....(3)$$

Therefore equation (1) can be rewritten as:

$$c(u) = \sum_{i=0}^{n} R_{i,p}(u)P_i \qquad .....(4)$$

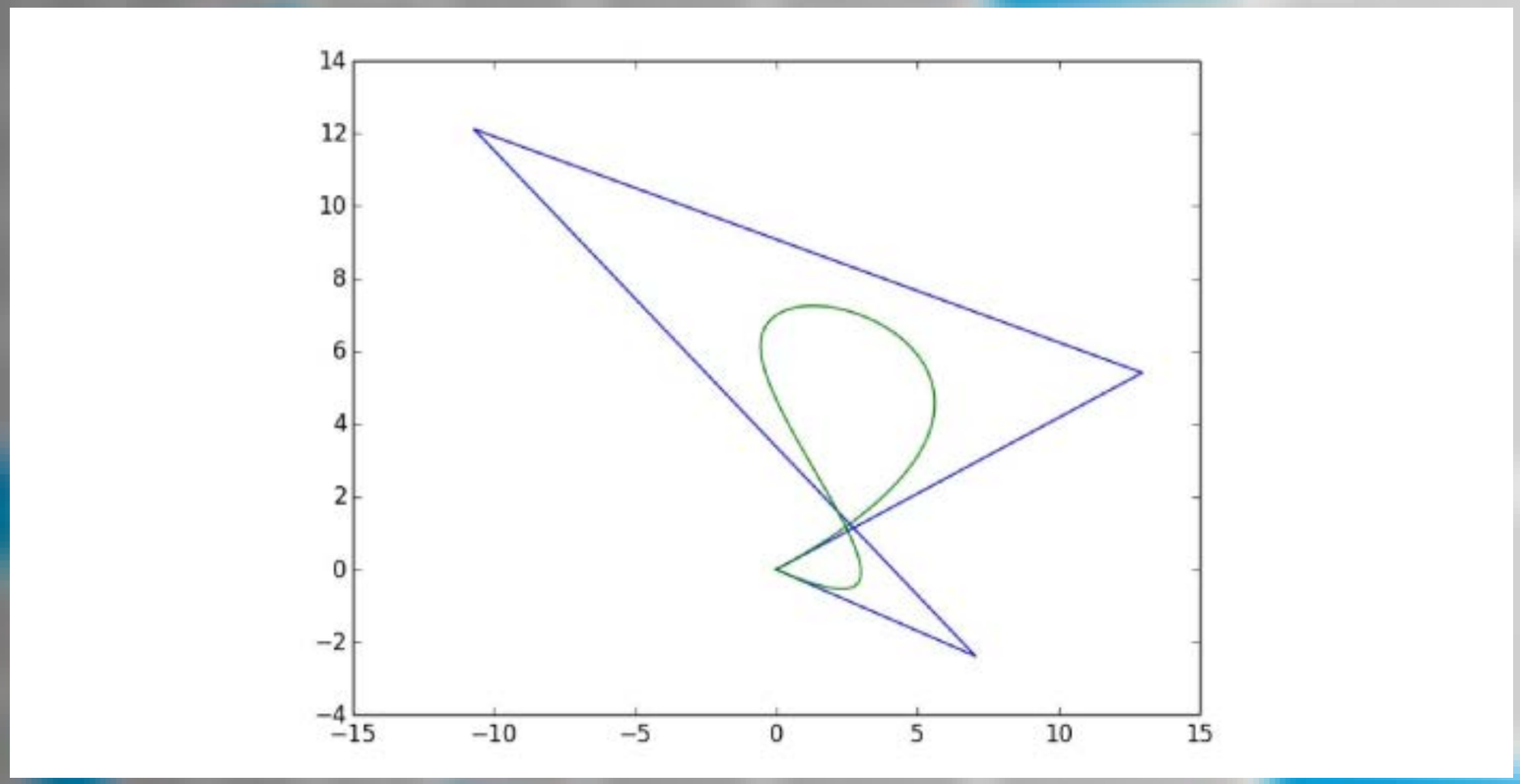


The weight function wi gives the local support to the curve. The curve can be easily changed by changing the weight value for any i which is more desired. If $w_i = 1$ for all i then $R_{i,p} = N_{i,p}$, which implies

$$c(u) = \sum_{i=0}^{n} N_{i,p}(u)P_i \qquad .....(5)$$

Equation (5) defines a p^{th} degree B spline. That means, we can easily convert a rational B-spline curve to a B-spline curve by taking all the weights value equal to 1. Figure below shows a cubic B-spline curve. The blue line indicates the convex hull and the green line B-spline curve. The knot vector corresponding to the cubic B-spline curve is

$$U = \{0, 0, 0, 0, 0.4275327844734131, 1, 1, 1, 1\}$$



As can be seen from the figure, the B-spline curve is within the convex hull. This is known as convex hull property of basis spline function. Now for n = p and U={0,....0,1,....,1} yields a n-th degree bezier curve with Bernstein basis polynomial $B_{i,n}(u)$ defined as:

$$c(u) = \sum_{i=0}^{n} B_{i,n}(u) P_i \qquad \text{.....(6)}$$

The Bernstein basis function is given as:

$$B_{i,n}(u) = \frac{n!}{i!(n-i)!} u^i (1-u)^{n-1} \qquad \text{.....(7)}$$

The recursive definition of Bernstein basis function shows the similarity to that of B-spline basis function. As n = p, rewriting the equation (7) as

$$B_{i,p}(u) = (1-u) B_{i,p-1}(u) + u B_{i-1,p-1}(u) \qquad \text{.....(8)}$$

Now for n = 2, it can be shown as:

$$\begin{aligned} \sum_{i=0}^{2} B_{i,2}(u) &= B_{0,2}(u) + B_{1,2}(u) + B_{2,2}(u) \\ &= \frac{2!}{0!2!} u^0 (1-u)^2 + \frac{2!}{1!1!} u^1 (1-u)^1 + \frac{2!}{2!0!} u^2 (1-u)^0 \\ &= (1-u)^2 + u(1-u) + u^2 \\ &= 1 \end{aligned}$$

Thus we conclude that $\sum_{i=0}^{n} B_{1,n}(u) = 1$ for all $0 \le u \le 1$. This property holds good for $N_{i,p}(u)$ and $R_{i,p}(u)$ i.e., $\sum_{i=0}^{n} N_{i,p}(u) = 1$ and $\sum_{i=0}^{n} R_{i,p}(u) = 1$

Till now, I have not discussed about the fitting of spline curve. A curve may be correct mathematically, but it is not in the shape what a designer may be interested in. we can fit a NURBS curve from the given input data points. There are two categories of fitting algorithms : global or local. Out of which the global curve interpolation is discussed in detail with the help of an example.

Let Q_k = {(0; 0); (3; 0); (0; 7); (3; 7); (0; 0)} be the given set of data points. We need to interpolate Q_k with a cubic basis spline.

Now,

$$|Q_1 - Q_0| = 3, |Q_2 - Q_1| = \sqrt{58}, |Q_3 - Q_2| = 3, |Q_4 - Q_3| = \sqrt{58}$$

$$\begin{aligned} d &= \sum_{k=1}^{4} |Q_k - Q_{k-1}| \\ &= 3 + \sqrt{58} + 3 + \sqrt{58} \\ &= 21.2315 \end{aligned}$$

Where, d is known as chord length and the method is called chord length parametrization method. Thus,

$$\bar{u}_0 = 0, \bar{u}_1 = \frac{3}{21.2315}, \bar{u}_2 = \frac{10.6157}{21.2315}, \bar{u}_3 = \frac{13.6157}{21.2315}, \bar{u}_4 = 1$$

By using technique of averaging, we get,

$$\begin{aligned} u_4 &= \frac{1}{3}\left(\frac{3}{21.2315} + \frac{10.6157}{21.2315} + \frac{13.6157}{21.2315}\right) \\ &= 0.4275 \end{aligned}$$

Hence, the knot vector is, U = {0, 0, 0, 0, 0.4275, 1, 1, 1, 1}. Knowing the knot vector, we can calculate the basis function for all u belongs to U. After that, the system of linear equations are set and solved to find the control points (P_i) as follows

$$\begin{bmatrix} 1 & 0 & 0 & 0 & 0 \\ N_{0,3}(\frac{3}{21.2315}) & N_{1,3}(\frac{3}{21.2315}) & N_{2,3}(\frac{3}{21.2315}) & N_{3,3}(\frac{3}{21.2315}) & 0 \\ N_{0,3}(\frac{10.6157}{21.2315}) & N_{1,3}(\frac{10.6157}{21.2315}) & N_{2,3}(\frac{10.6157}{21.2315}) & N_{3,3}(\frac{10.6157}{21.2315}) & 0 \\ 0 & N_{1,3}(\frac{13.6157}{21.2315}) & N_{2,3}(\frac{13.6157}{21.2315}) & N_{3,3}(\frac{13.6157}{21.2315}) & N_{4,3}(\frac{13.6157}{21.2315}) \\ 0 & 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} P_0 \\ P_1 \\ P_2 \\ P_3 \\ P_4 \end{bmatrix} = \begin{bmatrix} Q_0 \\ Q_1 \\ Q_2 \\ Q_3 \\ Q_4 \end{bmatrix}$$

Therefore, P_i are calculated by solving above system of equations. For this example P_i is found to be, P_i = {(0, 0), (7.0612,-2:383), (-10:712, 12.119), (12.9622, 5.4152), (0, 0)}. To get a point in the curve for all 0 <= u <= 1, we just need to multiply the control points with the corresponding knot vector value at u given by the equation (5). If the corresponding weights are also given, then the points on the NURBS curve can be found using equation (1). Also, using the Bernstein basis polynomial, any point in the Bezier curve can be calculated by the same procedure.

The basic concept related to NURBS curve along with some property are discussed. NURBS is widely used for design and manufacturing industry. As an example, in casting technology, at first,the mould cavity is created using a shape known as pattern. If the shape is quite complicated,one have to use any software to make the design of the pattern.As, previously told NURBS is inbuilt in many of this software. So, it will be easy to use those software, if you know the basic concepts and properties on NURBS curve. Also, sometimes it is necessary to make the design with the help of computer programming. Therefore, NURBS plays a vital role in design engineering.

Aniruddha Sinha,
3rd Sem B.Tech ECE

Everything around us 'CONDUCTS'

I am sure all of us have studied the definition of a conductor. Yes, we all know it. On hearing the word 'conductor', we mostly think of metals and to some extent few semiconductors. But, can you imagine the situation where most of our everyday objects can resemble a conductor? Difficult task?.. Not really. To specify, we may say that these objects can have an application as a conductor. But that application is futile without the presence of human or animal body.

What I am talking about here is 'Makey Makey', a revolutionary gadget or precisely an electronic kit developed by Jay Silver and his colleague Eric Rosenbaum at MIT in the year 2012.

We might have never teased our brains to visualise if a banana could control a computer or if we could even play a piano with bananas. Folks, with the help of this invention kit, such 'out of the box' jobs are easily achievable.

L-R : Jay Silver and Eric Rosenbaum
[Img Courtesy : Kickstarter]

- SIMPLE ELECTRONIC CIRCUIT.
- PLAY PIANO WITH BANANAS.
- CLICK PHOTOGRAPHS BY THE ACTION OF A CAT DRINKING MILK.
- PLAY COMPUTER GAMES USING GRAPHITE.
- PLUG AND PLAY.

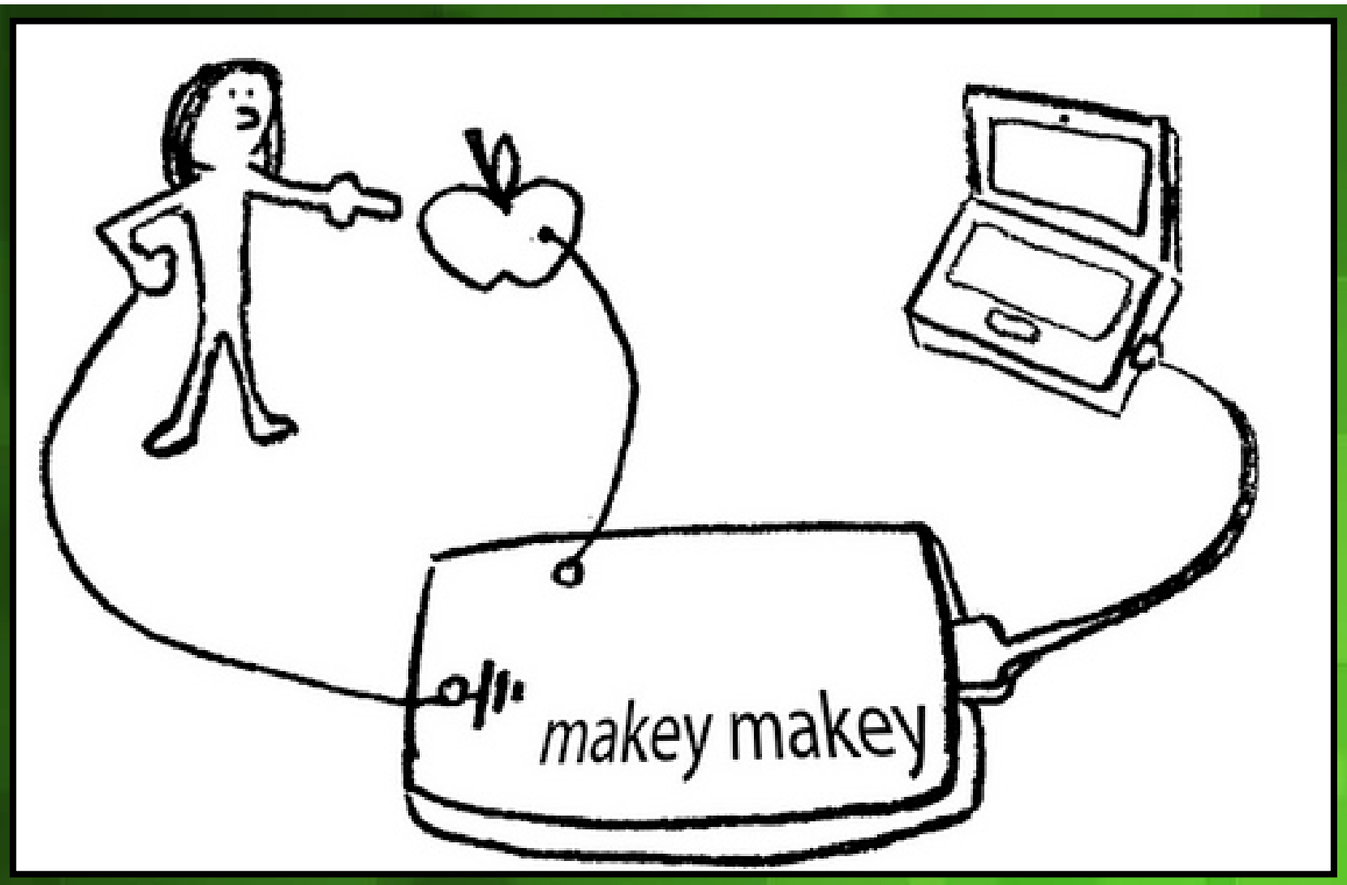


Fig : Makey- Makey's Working

Funded by Kickstarter (they set a goal of $25,000 and raised $568,000), the simple electronic kit contains a circuit board, alligator clips and USB cables and helps anyone turn everyday objects into touchpads that can be used to interact with a computer.

What's Makey Makey?

MaKey MaKey is an invention kit for the 21st century that turns everyday objects into touchpads and combines them with the internet. It's a simple Invention Kit for beginners and experts doing art, engineering, and everything in-between.

The name Makey-Makey comes from the combination of the two words, 'Make' and 'Key':

MAKE+KEY=MAKEY MAKEY!

The Makey Makey kit :

The kit includes the Makey Makey circuit board (a Printed Circuit Board, PCB), alligator clips and a USB cable, and costs around 49.99 USD. People clamp the alligator clips to an object and then connect them through the kit to their computer. Touching the object produces a tiny electrical connection, which the computer interprets as a keystroke (i.e. a keyboard message) or the movement of a mouse.

Materials that work with Makey Makey

Any material that can conduct at least a tiny bit of electricity will work. To name a few, Ketchup, Pencil Graphite, Finger Paint, Lemons, etc. Other materials that work great: Plants, Coins, Your Grandma, Silverware, Anything that is Wet, Most Foods, Cats and Dogs, Aluminium Foil, Rain, and hundreds more...

The back of the board has hookups for 6 keyboard keys (although 8 are shown in this version), and mouse control. It also has the open hardware logo, a link for help getting started, and an area for using the board to control outputs. [image on next page]

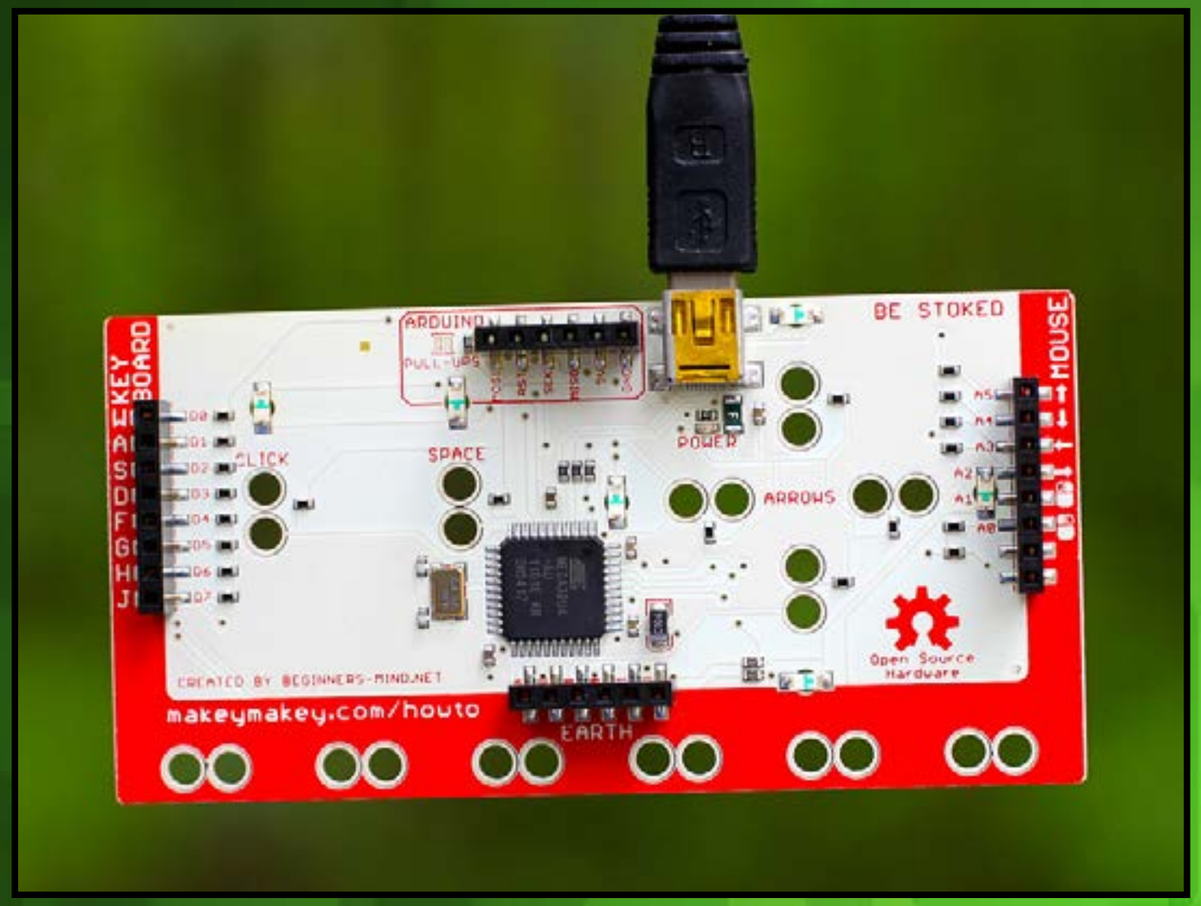


Fig : Back view of the Makey- Makey' board

Ok, a lot has been said and done. But, I'm sure what everyone must be looking for is the technical architecture behind this kit.

Let's discuss that too.

Architecture and Tech Stuff about Makey Makey :

MaKey MaKey is a printed circuit board (PCB) with an ATMega32u4 microcontroller running Arduino Leonardo firmware. It uses the Human Interface Device (HID) protocol to communicate with your computer, and it can send keypresses, mouse clicks, and mouse movements. For sensing closed switches on the digital input pins, it uses high resistance switching to make it so we can close a switch even through materials like our skin, leaves, and play-doh. It uses a pull-up resistor of 22 mega ohms. This technique attracts noise on the input, so it uses a moving window averager to lowpass the noise in software, saving money on hardware filtering. There are six inputs on the front of the board, which can be attached to via alligator clipping, soldering to the pads, or any other method you can think of.

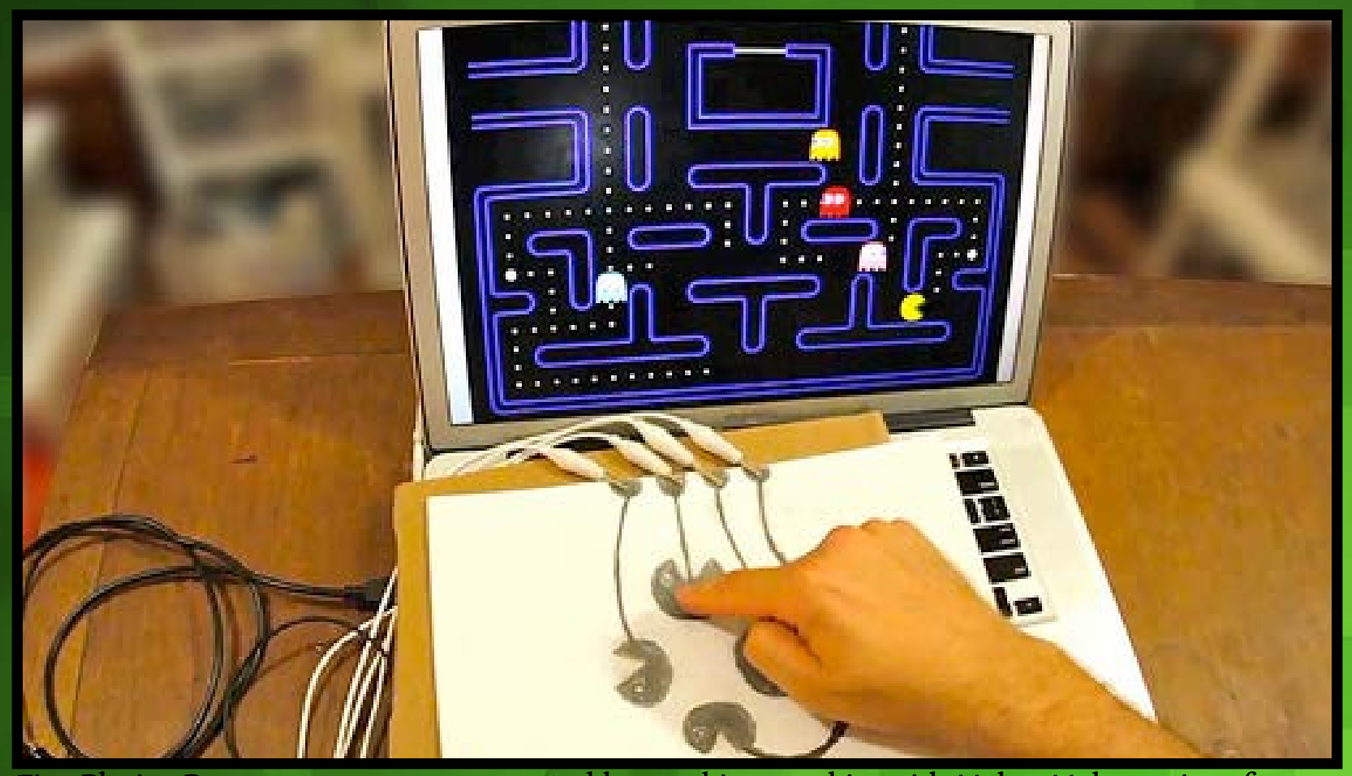


Fig : Playing Pacman on computer operated by touching graphite with Makey Makey as interface.

Fig : Playing piano with bananas.

There are another 12 inputs on the back, 6 for keyboard keys, and 6 for mouse motion, which we can access with jumpers via the female headers, paper clips, or by alligator clipping creatively around the headers. If we wish to use a different set of keys, or otherwise change the behavior of our MaKey MaKey, we can simply reprogram it using the Arduino environment. By cutting a trace on the back of the board, we can disconnect the large pull-up resistors if we want to, which would be necessary in a small minority of Arduino projects.

Wait... Is this thing an Arduino?

No, but we can use it like one. MaKey MaKey runs on top of Arduino. But, you can start using your MaKey MaKey board in “Arduino mode” at any time. This would allow us to spin motors, turn on LEDs, or anything else that an Arduino can do. MaKey MaKey is a good starting point if we wish to learn to use Arduino or other electronics, but want to start without any programming or breadboarding.

MaKey MaKey can be used with Arduino though, in various applications.

To get a deeper understanding of what Makey Makey is, I suggest you to kindly visit the website www.makeymakey.com or go through its video on YouTube.

[Source : www.makeymakey.com]

PLASMA TECHNOLOGY

NIKHIL DIXIT B.TECH 1ST SEM - COMPUTER SCIENCE & ENGINEERING

It is amazing that most of us don't know about what is present around us and even then don't want to know about it. How many people actually know that the state of matter that is the most abundant in the universe is not one of the three (Solid, Liquid, Gas) that we are so accustomed to. It is actually the fourth state - Plasma!

Now the question that arises is 'What is Plasma?' Plasma as I like to call it is an 'excited' gaseous state. Actually the plasma state shares it properties mostly with the gaseous state. It fills up the entire space of the container it is kept in, in fact plasma can be generated by 'exciting' the gaseous state. 'Excitement' can be done by heating to very high temperatures or applying an electro-magnetic field. Actually what is happening is that the electron is getting knocked out of its orbit. This extra energy required is being provided by the heating or the application of the field. So, the plasma is an electrically neutral medium having electrons and positive ions.

Because of this unique property, Plasma not only creates but also responds to magnetic fields. This is the reason why I call plasma an 'excited' gaseous state. This 'excitement' has very interesting applications, some of them are so very common and yet, we don't know about them. The term 'plasma' was first used by Langmuir in 1927 and derives its name from Greek. It means to shape or to mould. The science of plasma encompasses space plasmas, kinetic plasmas and technological plasmas and ranges over enormous variations of parameters such as pressure, distance and energy. Of course, I don't mean to go into the complexities of the topic, since the topic has

developed a mystique which has given it a reputation of being complex and impenetrable.

So where do you hear the word ‘Plasma’ most often? Yes! ‘Plasma’ Televisions. And of course, the name hasn’t been given just to make it appear fancy. It actually uses Plasma technology. Low- pressure non-equilibrium plasma to be exact. But again, not going into finesse details, let us think of more examples. Lightning is such a terrifyingly beautiful natural phenomenon. But think of it, what is lightning? Charge, right? And loads and loads of it too. So when lightning strikes, the charge is travelling through air. Or electricity is being discharged in the atmosphere. If you haven’t got it by now, then Yes! Of course, lightning also produces plasma! So now you must be beginning to get a grip on what exactly is plasma and how it can be produced. Ever heard of neon lamps? Neon lamps make use of cold plasma for their functioning. Of course, it should not be considered that achieving Plasma is such an easy task. There is a reason why we never hear about the subject much, despite it being so gripping. The complexity of the topic has limited its study to just a small number of Research Scholars. The subject itself has been regarded as opaque.

The most fundamental challenge is the need to couple energy into a plasma. Coupling energy into a plasma, particularly at high frequencies and low gas pressures, has become a critical area of research. The stars (Sun included) have Plasma as their major state of matter. I, for one, had this question that where did the energy required for the formation of such Plasma come from? The temperature of the stars is sustaining this plasma but then again, where did THAT energy come from? It all comes down to the Big Bang then, the moment of creation. Never fully understood obviously, but what grips me is the energy factor/dimension of theories about the big bang.

But not diverting from the topic, let us continue our talk about the applications of plasma. My personal favourite is its application in space and weapon technology. But there are so many applications of it already in use, or proposed, across such a variety of fields.

If we are to understand more of the Universe, then like the universe, we have to keep expanding our horizons and know more about such topics. Plasma, right now has great practical uses like electric arc melting or manufacture of ozone. But for me, plasma could be used to understand some of the mysteries of the universe and like I mentioned, the energy factor.

It is certainly a vast unexplored topic and hence, very complex to begin with. But once you get interested in it, like I have, it has the capability to fascinate you, amaze you and be something that might get you where you wanted to be! It is certainly a ‘road not taken’, but for those brave enough to take the challenge, well Plasma technology is the thing for you!

MEGASTRUCTURES OF INDIA

Susmit Boruah, 5th Semester
Civil Engineering Department

The construction industry is the second largest industry of India after agriculture. It makes a significant contribution to the country's economy .The use of new technologies and development strategies has made it possible to carry out mega projects at large scale. In the recent times India has stepped up on its development agenda. One of the explicit indicator is the aggressive construction going on all around the country.

The following are some great or must-say-coolest buildings designed and constructed by the civil engineers of the country:

i-Flex solutions, Bangalore

Located at C.V Raman Nagar Bangalore, i-Flex building has a peculiar design, architecture and superb infrastructure which distinguishes it from the other buildings. i- Flex solutions is a world leader when it comes to provide solutions for Financial Sector.

Signature Towers, Gurgaon

Signature Towers have become the best designed office complexes in India due to its unique identity. It has a neat design and is equipped with the latest state of the art technology and this is the prime reason that most of the leading multinational and Indian companies have chosen to operate their businesses from Signature Towers.

HSBC Building, Pune

HSBC in Pune has a team of 1400+ professionals operating from a state-of-the-art building in Kalyani Nagar, which has become a landmark in Pune due to its surroundings, ambience and international work culture.GLT is expanding its infrastructure with an adjacent building to cater to the expected growth in the current year

Adobe-India's Headquarters

Adobe-India’s Headquarters is located at NOIDA, a suburb of New Delhi. It is on an independent plot with a total carpet area of 2, 00,000 square feet. In keeping with the spirit of Adobe the innovative design and bright colours characterize the new complex reflecting the vibrant and fun filled work environment. The building has ultramodern system for engineering services which effectively combines the latest in technology with simple, no- fussy, comfortable and conveniently designed work spaces.

Infosys Multiplex, Mysore

A key highlight of the Mysore campus is the multiplex and auditorium complex which has a capacity of 1,300.The complex also houses 3 multiplex theatres with a capacity of 150 seats each.

Gateway Tower, Gurgaon

Gateway Tower as is appropriately coined, acts as the gateway to the 3000-acre landmark city of DLF. This 12-storey complex is spread across an area of 1.15 acres. With its ship-like shape, Gateway Tower presents futuristic architecture, which is also reflected in its interiors with floor plates measuring to 85,000 sq.ft. The unique feature of this complex is its high visibility and compact office space. The tenants comprises of Ariba, Planet Sports, Corning, Cargill, Innodata, Korn and Ferry, GE Plastics to name a few.

Statesman House, Delhi

Statesman House is located in Barakhamba Road in the middle of Connaught Place and is one of the most imposing structures in Delhi.It’s a huge circular building and is quite majestic. Statesman House recently received occupation certificate and has found takers from the banking, finance and insurance sectors.

Gigaspace IT park, Pune

Gigaspace IT Park in Pune comprises brand new Intelligent Buildings that incorporate up-to-date technology, which creates a healthy, more productive and energy conserving work environment, critical factors in a 24x7x365 work scenario. The buildings also conform to Vaastu Shastra norms. A key feature is a great number of buildings, each with and optimum plate area. The buildings vary from 60,000 sq.ft to 150,000 sq.ft. with floor plates of 12,000 to 30,000 sq.ft.

Infinity Towers, Kolkata

Located at Rajarhat in New Town, Kolkata; DLF IT Park is designed by the renowned architect Hafeez Contractor. With a super area of 1.3 million sq.ft, this complex of three independent towers and a retail complex is built around a large landscaped garden. It has large, efficient floor plates, wide column span and high floor-to-floor clearances. The design ensures that while the retail complex provides the facilities for the office area, it does not impinge on the office area by virtue of its clearly separated traffic flow.

RESEARCH

PRODUCTION AND CONFIRMATION OF POLYCLONAL ANTIBODIES AGAINST TAMM HORSFALL PROTEIN

SANGITA SAIKIA, M.tech (1st SEM, FET dept.)

Isolation and purification of Tamm horsfall protein from human urine samples and production of polyclonal antibodies against the THP.

BACKGROUND

Tamm horsfall protein (THP) in human urine has a role in kidney stone formation. It is one of the major inhibitors of stone formation (crystal growth) in normal urine but due to its abnormality its inhibitory effect is lost and growth of stone is promoted.

METHOD

The human urine samples are collected and different methods of isolation are done viz. Polyethylene glycol (PEG), Acetone, Sodium chloride and Ammonium sulphate methods. Then purification is done through column chromatography kit (Concavalin A sepharose 4B) and is kept for desiccation. SDS page is done and gel was stained by both methods namely CBB and silver nitrate. After getting the purified protein sample it is injected into the mice models for polyclonal antibody production and confirmation is done with the help Ouchterlony Double Diffusion method.

RESULTS

THP was isolated and purified from human urine samples, migrated as 97KDa band in SDS PAGE. Decreased excretion of THP was found in case of stone patients, also aggregation of THP was more in stone patients than compared to normal. Polyclonal antibodies against purified THP protein (antigen) was produced and confirmed.

SCOPE

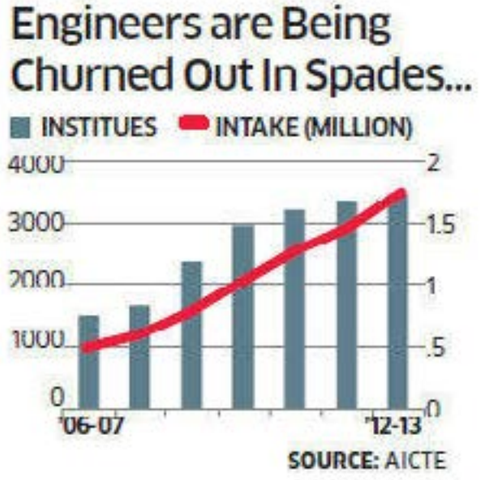
In future monoclonal antibodies can be produced against THP and a diagnostic kit can be designed.

The Engineers of India in making – the knowledge and employability

It is a known fact that our country carries its name for being the second most populous country of the world having nearly 120 million citizens. Another fact worth noting about this country is that it has a huge production of engineers each year. Comprising of odd 5500 government and privately run engineering institutes, India generates a sizeable task force of nearly 7,00,000 engineering graduates available in the Indian society with B.Tech. or B.E. degree each year. Equally alarming is the status of these engineers particularly with respect to their employability. The global picture of the employability of these Indian products is not very exciting. A few get jobs in some reputed organizations with a decent pay package, with the job satisfaction intact. But this is not same for all. Many holders of the engineering degree remain jobless for atleast a couple of years. With time the frustration and anguish of non-employment enhances which compels such engineering graduates to realize that they are not worth and saleable in the market. Who is responsible for such fate of theirs? Only the graduates themselves?

The Prime Minister, Mr Modi has already made a call especially to all the NRI's settled in USA and the European countries to come forward to invest

in India and believe in the policy of '***Make in India***'. The motive and objective of this call of the P.M. is very clear – to increase the employment in India for all kinds of educated and skilled youths, to enhance the scope and market of export from India and thus to develop the country. The policy of the government is quite promising but how practical and close to reality is it in times to come?



Exactly the same is the present burning issue of the budding engineers of India who happily opt for the education of Engineering or Technology with all speculations of getting a decent job immediately after their graduation, but the reality is quite painful. Yet, I feel this is achievable to quite an extent in near future.

Making the dream of the budding engineers true and the vision and mission of the Prime Minister successful, requires a few major steps to be taken at various levels in the country in the education, the administration and the corporate sector. There is a need to design a road map for making our engineering graduates employable.

The demand of the time today is that the education of engineering has to necessarily have one major component job oriented education.

THE DEMAND OF THE TIME TODAY IS THAT THE EDUCATION OF ENGINEERING HAS TO NECESSARILY HAVE ONE MAJOR COMPONENT JOB ORIENTED EDUCATION. FOR THIS, THE CURRICULUM NEEDS TO INCORPORATE A MANDATORY COURSE THROUGH WHICH THESE ENGINEERING GRADUATES GET EXPOSED TO THE JOB ENVIRONMENT & WORK CULTURE TO LEARN AND UNDERSTAND VARIOUS ASPECTS OF THE REAL MEANING OF THE RESPONSIBILITY AND FUN ASSOCIATED WITH A JOB OF AN ENGINEER OR TECHNOLOGIST.

THERE IS NO DEARTH OF TALENT AMONG OUR ENGINEERING GRADUATES TODAY, ONLY THIS NEEDS TO BE GIVEN A RIGHT DIRECTION AND SHAPED FOR A PARTICULAR TARGET AS PER THE ABILITY OF THE STUDENT. SHAPING THE STUDENTS IS SHAPING THE COUNTRY.

For this, the curriculum needs to incorporate a mandatory course through which these engineering graduates get exposed to the job environment work culture to learn and understand various aspects of the real meaning of the responsibility and fun associated with a job of an engineer or technologist. The public and private sector organisation dealing with engineers in their employment are also required to move closer to the education system of the country to constantly assist and guide the institute in shaping their students towards the definite job prospects. Thus the market demand of various kinds of engineers and their employability scope in every five years time, at the national and global level, should be the focus of any engineering curriculum of an institute. The 'campus connect' type of concept should be visualised and practised by each good technical institute of the country. The P.M. of the country has asked his each co-MP to adopt one village in his/her constituency for the assured and faster development. I think, under the similar objective, each reputed private sector unit or government organisation should also adopt at least one major or reputed institute in its state with an objective of increasing the employability of its engineering graduates every year.

At the same time each such technology or engineering institute needs to ensure adequate infrastucture facility and able and capable human resource to impart quality education leading the students towards assured job prospects of quality and satisfaction.

Four to six years of rigorous education and training exposure under this road map of assured employability to the engineering students would certainly make the vision and mission of our Prime Minister, Mr. Modi translated in to reality and the youth of the country will not be a mere educated waste of the society. The teachers associated with

such noble mission for the development of the country would certainly attain a different recognition of respect and honour in the Indian society. Mr Modi has said that mere degrees would not be sufficient if one is short of a skill. A knowledge achieved through education converted into a skill is always in demand. So our engineering graduates need to mould themselves in that direction through the able guidance and encouragement of their teachers.

There is no dearth of talent among our engineering graduates today, only this needs to be given a right direction and shaped for a particular target as per the ability of the student. Shaping the students is shaping the country.

Production of the spaceship, Mangalyaan and its extremely successful mission to Mars is one befitting example of tremendous talent of engineers and technologists of India. The time has come when India will no more be dependent on the age-old culture and trend of technology-transfer from developed countries of the world. India is gradually progressing in the concept of in-India or indigenous technology system and becoming self-reliant.

So, I conclude with a positive note that the country needs development which is possible through larger human resource contribution and that is possible when larger number of engineers of the country are assured of employment. This would be possible with focused job oriented education.

India will shine and the talents of Indian engineers will outshine the stars !

MAKE IN INDIA

Shuvam Das Choudhury
B.Tech, 3rd Sem, M.E.

A campaign that had created headlines and has reached even the ruralites through periodicals, which remained a much debated about in the Indian Parliament and closely followed by world's leading entrepreneurs and tech-maestros is the "Make in India" campaign launched by the government led by Narendra Modi. The main Idea behind is to attract businesses around the world to invest and manufacture in India. Besides eliminating unnecessary laws and regulations making bureaucratic processes shorter and easier for those willing to invest, generating employment is among the objectives laid out by the present government. Quality education besides skill development has also been stressed upon. The campaign was launched at a mega gathering attended by leading industralists of India. A galaxy of global corporate leaders has pledged to invest and manufacture in India in response to Modi's call for "Make In India", Mukesh Ambani of Reliance Industries Ltd., Cyrus Mistry of Tata Group, Phil Shaw of Lockheed Martin India are among the many to show their interest. Currently India's chronic infrastructure and logistics deficit with inefficient transport place a hurdle for manufacturing companies to bring about just-in-time production. Thus Modi's government has to ensure quick action on the ground from a mere statement of intent. India has been importing drastically from its neighbours, more so during the festivals when "made in china" seals in furniture and gadgets dominate our homes and offices. However all hope is not

lost, recent reports of the International Monetary Fund (IMF) suggest China's fall in the economic sector, this is where India has to tap in. India boasts of having the biggest workforce in the form of labourers, researchers, engineers making it a hub for cost effective and development oriented manufacturing and research. A number of companies have moved their manufacturing and outsourcing from China to India owing to labour and cost advantage.

The benefits of the campaign would be unfathomable if the government delivers in the manner they have portrayed before the world. In conclusion, one can say that the goal of putting India among the top 50 nations in World Bank's Business Index ranking would be met only with the togetherness of smart entrepeneurs and employees and thus the know how could overtime become a durable advantage.

"COME MAKE IN INDIA"

INVENTION V/S INNOVATION

BHASKAR SARKAR, B.TECH CSE 1ST SEM

"Innovation distinguishes between a leader and a follower"
- Steve Jobs

Here are few of the extraordinary inventons of 2014 clearly where innovation is at its pinnacle.

1. Seal Combat Wounds In 15 Seconds

When bullets or shrapnel strike a soldier, standard first aid calls for stuffing gauze as deep as five inches into a wound and applying pressure. If bleeding doesn't stop after three minutes, the old gauze is pulled out—and new gauze shoved in. There's room for improvement. Military doctors estimate that, during the most violent years of the wars in Afghanistan and Iraq, blood loss killed about 90 percent of the wounded that might have otherwise survived with better emergency care. To save more lives, a group of veterans, scientists, and engineers known as RevMedx has created a pocket-sized

Fig : (L-R) X-Stat being used at battle and a X-Stat syringe.

device called XStat: a faster, more effective way to plug wounds. The polycarbonate syringe slides

deep into a wound, such as a bullet track. When a user pushes down on the handle, it deposits dozens of pill-size sponges that expand to stem bleeding. Meanwhile, a substance in the sponges fights infection while clotting blood.

On April 3 ,the FDA announced it had approved XStat as a first-of-its-kind medical dressing. But the battlefield isn't the only place the device could make an impact. Law enforcement, ambulances, and other emergency responders have shown interest in carrying the device as well. And, with help from Oregon Health and Science University, RevMedx is even developing a version to stop postpartum bleeding.

2.Charge Gadgets With Your Footsteps

Each thud of a hiker's heel releases enough energy to illuminate a light bulb. Rather than waste that power, Matt Stanton and Hahna Alexander created a shoe insole that stores it as electricity. The device promises to be an improvement over traditional, hefty power walks as well as solar chargers, which work slowly or not at all, depending on the weather. Instead of using piezoelectric and other inefficient, bulky methods of generating electricity, the pair shrunk down components similar to those found in hand-cranked flashlights. The result is a near standard–size removable insole that weighs less than five ounces, including a battery pack, and charges electronics via USB.

Sole Power's current version, to be released later this year, requires a lengthy 15-mile walk to charge a smartphone. But Stanton says the company is working toward a design that can charge an iPhone after less than five miles of hiking and withstand about 100 million footsteps of wear and tear.

<u>How It Works:</u>

1) A drive train converts the energy of heel strikes into rotational energy, spinning magnetic rotors.
2) The motion of the rotors induces an electrical current within coils of wire.
3) Electricity travels along a wire and into a lithium-ion polymer battery pack on a wearer's shoelaces.

Fig : Sole Power.

3. A Cryogenic Engine Powered By Heat

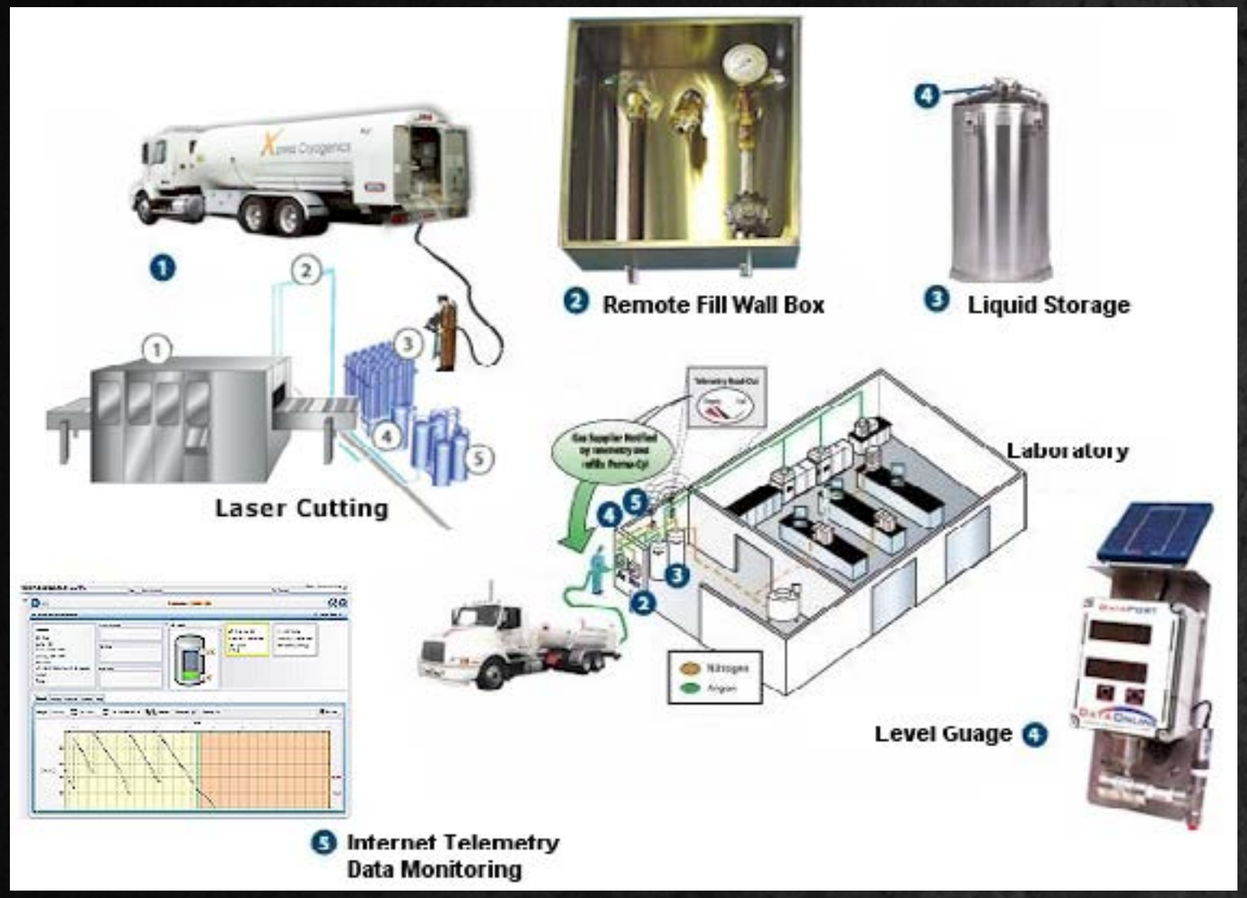


Fig : Cryogenic System in a truck

Right now, as many as 250,000 semi-trucks are hauling refrigerated trailers full of frozen foods, fresh vegetables, and other perishable goods and such vehicles burn about 25 percent more fuel than unrefrigerated trucks. In attempt to curb fuel consumption and reduce pollution—especially in developing countries, where consumer demand is driving a rapid increase in the number of refrigerated vehicles hitting roads—inventor Peter Dearman has developed a cryogenic engine system. *Dearman's contraption absorbs the heat of goods inside a trailer with liquid nitrogen, boiling the liquid, and then uses the expanding gas to power devices that further chill cargo*. A fully functional prototype is scheduled for road testing in the United Kingdom this July.

4. An Electronic Studio At Guitarists' Fingertips

Mixing synthetic effects with traditional guitar work can make for ground breaking music, but even with musical instrument digital interface (MIDI) — which helps coordinate multiple electronic instruments — guitarists often hunch over and fiddle with gear during a set.

To untether frustrated guitarists, a group of musicians invented a low-profile and wireless MIDI controller called Guitar Wing. It clamps onto any guitar in seconds for near-effortless control over effects, software, digital audio workstations, and even stage lights between strums. Jay Smith and his colleagues recently redesigned the buttons for better ergonomics and response in a new version, which will hit the market this spring for $199.

How it works:

Tapping:

Pressure-sensitive pads transform tapping into sound effects; for example, dynamic percussion.

Sliding:

Three sliders enable the player to pan audio, bend notes, dim stage lights, and much more.

Motion:

A three-axis accelerometer permits control over devices simply by moving the guitar around.

Fig : A Guitar Wing

5. 360-Degree Infrared Vision

Video surveillance trailers for industrial parks required up to seven thermal infrared cameras and cost more than 60 lakhs.

So Dortch and Larry Price spent four years developing a cheaper, more capable alternative a 360-Degree Infrared Vision, which costs about nine lakhs. Their Thermal Radar system provides 360-degree infrared coverage that can spot people, fires, vehicles, and more.

The heart of the invention is a single, spinning thermal sensor. Onboard processors constantly stitch images together for a refreshing panoramic video feed, and intelligent software finds threats. The first and biggest market will be corporate security.

How It Works:

Warm objects like people, car engines,tires, etc. emit infrared light.

A spinning camera takes up to 16 thermal images per second, eliminating the need for multiple, expensive cameras. Software stitches the images together and heat signatures are triangulated with GPS to show their location as a blip on a radar-like applet.

Fig : A radar using 360 degree infrared vision

Source: www.popsci.com

Kausthav Pratim Kalita

M.TECH(IT), Passed out

What is a valley?.... a very obvious scenario exhibits a beautiful landscape with delightful mountains on both sides of a running river and if we take the pain of imagining the river to have a flow of silicon, it would look splendid indeed and take our observations to a new dimension. Exactly..... such a source of silicon in a geographic scene would fuel the surrounding trees in the form of companies to grow and prosper. Such a valley actually does exist in the South Bay portion of the Bay Area in North California, United States. Here, the forestation is manifested by the substituted largest technology corporations in the world and thousands of small statups. So, it's practical enough to appreciate the fact that such a high-technology sector must be termed with the such a nomenclature. But, if we walk in the lane of history, it can be found that the region constitute of a large number of silicon chip innovators and manufactures. So, we need to congratulate Ralph Vaerst and IBM for coming up with the term and making it widely known during early 1980s respectively.

Silicon Valley has witnessed great innovations in the field of technology and more importantly, has seen companies growing in a fairly small amount of time with the help of necessary ingredients developed and presented to the people and then, the consumers can't live without.

This understanding of the valley about the present needs have made it create innovative products that have been widely accepted by the mass. There are many instances when a company with little investment and marketing have been able to connect to billion people around the world and have achieved to become million dollar companies. But, there is serious concern observed by many that the valley has lost the prime role it used to play in the initial years of its existence and that is, developing technology that we use everyday, unlike the messaging apps and social networking sites that do not cover the deeply technical areas like in-memory databases, advanced wireless technologies or genetic analytical tools.

Facebook, Watsapp, Twitter, Tumblr, Instagram, Viber and many others represent the forestation in the valley that have grown tremendously in the recent years, thanks to their understanding of the erg of the people to remain socially active in the web. Facebook remain the largest technology IPO of all time, and watsapp is the largest venture-backed acquisition of all time. Here, a point to notice is the increase in the number of so many social networking startups. Reasons for such a growth may be due to the comparatively less amount of management requirement and recruitment of less engineers as compared to other technology oriented companies. Plus, it attracts people who are always striving to discover the most sophisticated app for communication, which if free, would always add as an awesome bonus. So, this easy money exploration is distracting the new engineers in Silicon Valley from focusing their careers towards more essential industries that concentrate on medical science, next-generation databases, inventing 3D-printing tools, improving recombinant technology, and develop fault-tolerant computer. If Silicon Valley can manage to deviate a little from the present interest in social media to more necessary technological innovations, the valley will continue to remain evergreen!

nest THERMOSTAT

Google acquired Nest Labs in January for whooping $3.2 billion. Just a few weeks after Apple launched its own HomeKit for developers to act as a software hub for web-connected products. Google Launched its Nest Developer Program which aimed at facilitating the customers' nest experience by allowing them to connect smart products together in house . Its early launch partners included Mercedes-Benz, Whirlpool, Jawbone and Logitech.

It seems that Google's increased interest in home Automation has yield good results. As per Mashable Tech, the company on Friday claimed that it had more than 4,000 developers as a part of its Works with Nest platform, which connects smart products with Nest's offerings.

The "Works with Nest" developer program announced earlier this year has involved five new partners, whose products are compatible with the Nest products:

The video explains more : HTTP://GOO.GL/KEUFCR

Also check Nest's Website : HTTP://GOO.GL/S6ABXN

Ivee — Announced originally as the Ivee Sleek, the Ivee device is a Linux-based, voice-activated home assistant that "lets you know when a Nest energy rush hour is about to start or finish," according to Nest. The Ivee, which is equipped with a 4.3-inch display and looks and acts like a clock radio, can control a variety of third-party devices via voice. A Siri-like voice assistant answers basic questions about things like weather or stock prices.

Life360 — This family-focused, mobile scheduling app will "let Nest know once everyone's gone for the day so you don't waste energy heating an empty home," says Nest.

Pebble — This popular smartwatch now lets you "change the temperature and set your Nest Thermostat to Home or Away," says Nest.

Rachio — The Rachio sprinkler controller controls sprinklers inside and outside of the house. "If Nest Protect senses smoke, the Rachio controller can automatically turn on sprinklers around the house," says Nest.

SNUPI Technologies — SNUPI's WallyHome is a wireless sensor system that does things like detect leaks and mold. With the WallyHome, "your Nest Thermostat knows not to heat or cool an unused room," says Nest.Though we are quite a few years away from fully automated homes, Nest surely is trying to speed up the process.

Cookie: Nest has Recently Purchased Home automation Companies like Dropcam and Revolv .Their experience connecting devices around the home will help Nest continue to grow Works with Nest and bring the conscious home to life.

SOURCES: MASHABLE TECH, NEST LABS BLOG.

EMINENCE

SATYA NADELLA

From a star cricketer at school to Microsoft's CEO

Sukanya Goswami, B.TECH 1st Sem CE

“Always keep learning, you stop doing useful things if you don’t learn.”

Hyderabad born Satya Nadella succeeded Steve Ballmer as head of the world’s most iconic technology company - Microsoft. It has been a long journey for this Hyderabad boy, who now has the job of turning around Microsoft. Born on 6th January, 1967 to the family of a civil servant, Nadella did his schooling from Hyderabad itself. He graduated from the University of Mangalore with a bachelor’s degree in Electrical Engineering before continuing his education in the United States. Nadella always wanted to build things and so Electronics Engineering was a great way for him to go discover what turned out to become a passion. A well-known fact about Satya Nadella is that he has a Master’s degree in Management in addition to his Masters in Engineering. This gives him insight into the workings of consumer behaviour and helps him take decisions that will be appreciated by the end-users.

Nadella never hesitated to change career options or companies. He was bold enough to change companies to pursue his dreams and not stagnate in one single job. Before joining Microsoft, Nadella was a member of the technology staff at Sun Microsystems Inc. If he had continued his career at Sun, he may have made it to the top as well, but he decided to shift to Microsoft in 1992 and has not looked back since. Nadella also seemed to take on a role where the odds were stacked against him. When he was appointed to the Search Division at Microsoft, it ranked a distant third behind Google and Yahoo. Today Bing is ranked second behind Google and has made rapid strides.

In 2008, when Satya Nadella was appointed to head the Microsoft's search, portal and advertising platform group, he was perceived as a greenhorn, even though he was with the company for 15 years! Nadella sent out a memo to employees laying out objectives for the year that gave analysts a glimpse into his plans. His goals outlined in the note included developing a strong "destination search experience," reinventing the MSN portal, scaling the company's ad platform and emphasizing innovation and agility at the group. In his role in the Online Services Division, he led the overall R&D efforts for some of the largest online services and drove the technical vision and strategy for several important milestones, including the critical launch of Bing, new releases of MSN, Yahoo! integration across Bing and adCenter, and much more.

In 2011, Nadella was moved away from the search division at Microsoft and thrust into Server and Tools Business with Windows Azure at the forefront. Despite spending 4 years in the search division and doing quite well there, he was thrust back in to a key position in the Server and Tools business at Microsoft. In this role over the past couple of years, he has demonstrated the ability to cultivate talent and build a world-class engineering organization, attracting some of the brightest technical minds from within Microsoft and across the industry.

At Microsoft Nadella has led major projects including the company's move to cloud computing and the development of one of the largest cloud infrastructures in the world. Nadella's work led him to his most recent role as executive vice president of the Cloud and Enterprise group. His official biography lists him as in charge of "building and running the company's computing platforms, developer

tools and cloud services. “In this position, he’s been credited with shaping Microsoft’s Cloud OS Strategy, the backend system for its online services. Cloud OS helps run Microsoft services like Bing, SkyDrive, Xbox Live, Windows Server, and Visual Studio. These services, especially Office, rank among Microsoft’s strongest. He has been credited for helping bring Microsoft’s database, Windows Server and developer tools to its Azure cloud. The revenue from Cloud Services grew to $20.3 billion in June 2013 from $16.6 billion when he took over in 2011.

Nadella has a tough task ahead. Microsoft is struggling to match the commercial success of rivals like Apple, Google and Amazon. But analysts point out that Nadella knows his technology, which could give him the edge in bringing Microsoft back as a technology power house.

Apart from this, Nadella is a family man. He married Anupama and they have three children. Also, Nadella is an avid reader of American and Indian poetry and is fond of cricket, his passion growing up, having played for his school team. He mentioned learning leadership and teamwork from cricket.

Src : Wikipedia, The Times of India, Manipal Blog, ITPRO, IBN, International Business Times, India Today.

DO IT YOURSELF

How to build an EL-wire decoration to put under a T-shirt and how to drive it with electronics to make it move in beat with ambient music.

Saurav Dutta, B.TECH 5th Sem ECE

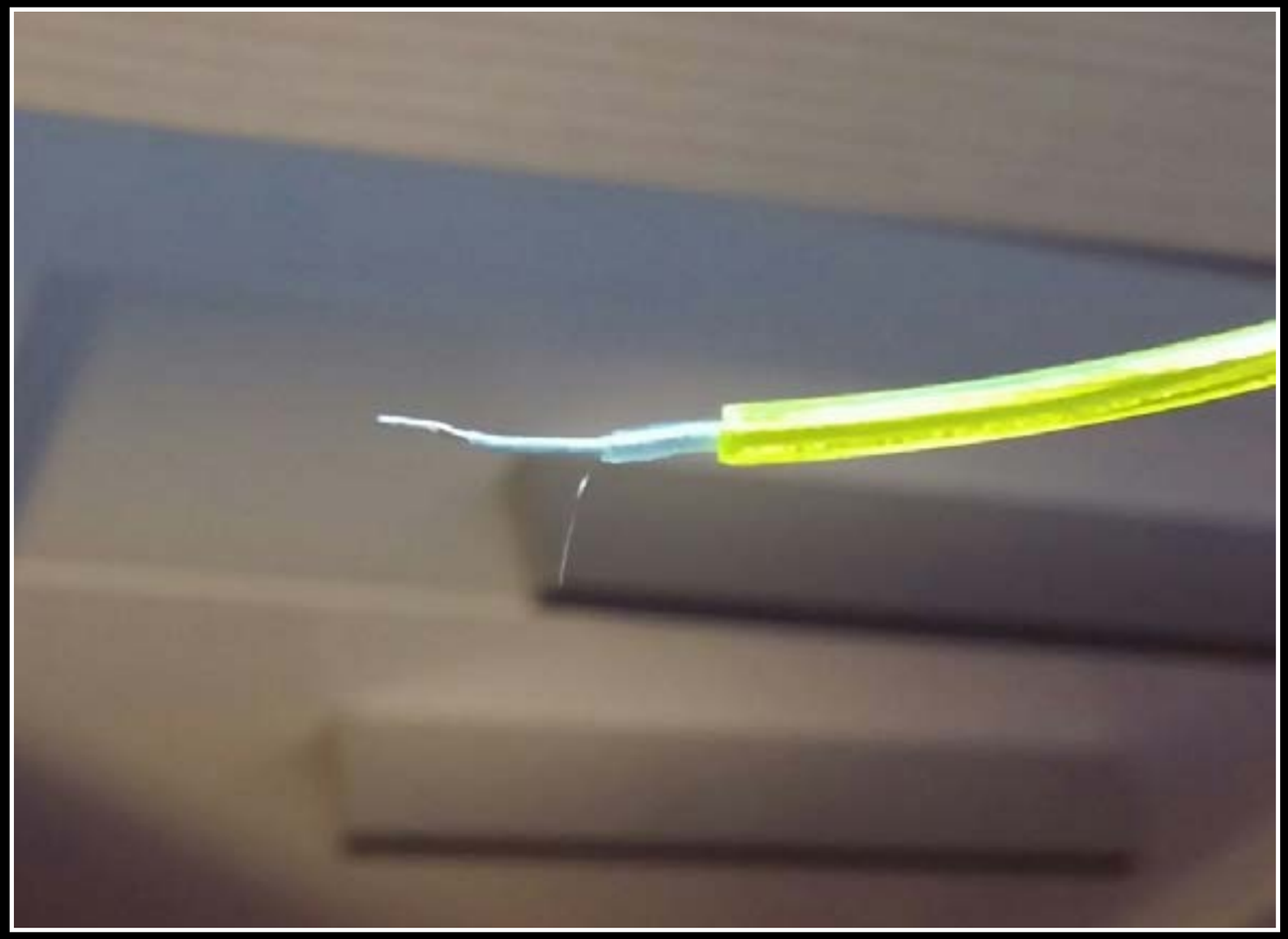
THIS IS THE ULTIMATE WEARABLE DECORATION TO WEAR IN ELECTRONIC MUSIC FESTIVALS OR CLUBS.

The idea is to hide felt panels under a t-shirt and drive the lights using a microcontroller that analyzes ambient music with a microphone.

For this project, you will need :

1. Two simple white T-shirts
2. EL-wire.
3. Depending on the length of EL-wire you need, you have to choose between two power inverters. If length of wire is less than 3 metres, then use a 3V inverter otherwise use a 12V inverter.
4. So a 12V inverter, since they used wires longer than 3 metres.
5. 12V batteries, they chose 8 NiMH AA type batteries of 1.2V each. It’s not exactly 12V but it’s sufficient.
6. Some electronics (EL Sequencer with an integrated microcontroller to analyse the microphone and drive the lights)
7. A microphone
8. A small switch
9. Felt sheets approximately the color of the T-shirt to be able to sew logos on it (the T-shirt would not be resistant enough.)

Step 1: Draw your shapes and solder the EL-wire

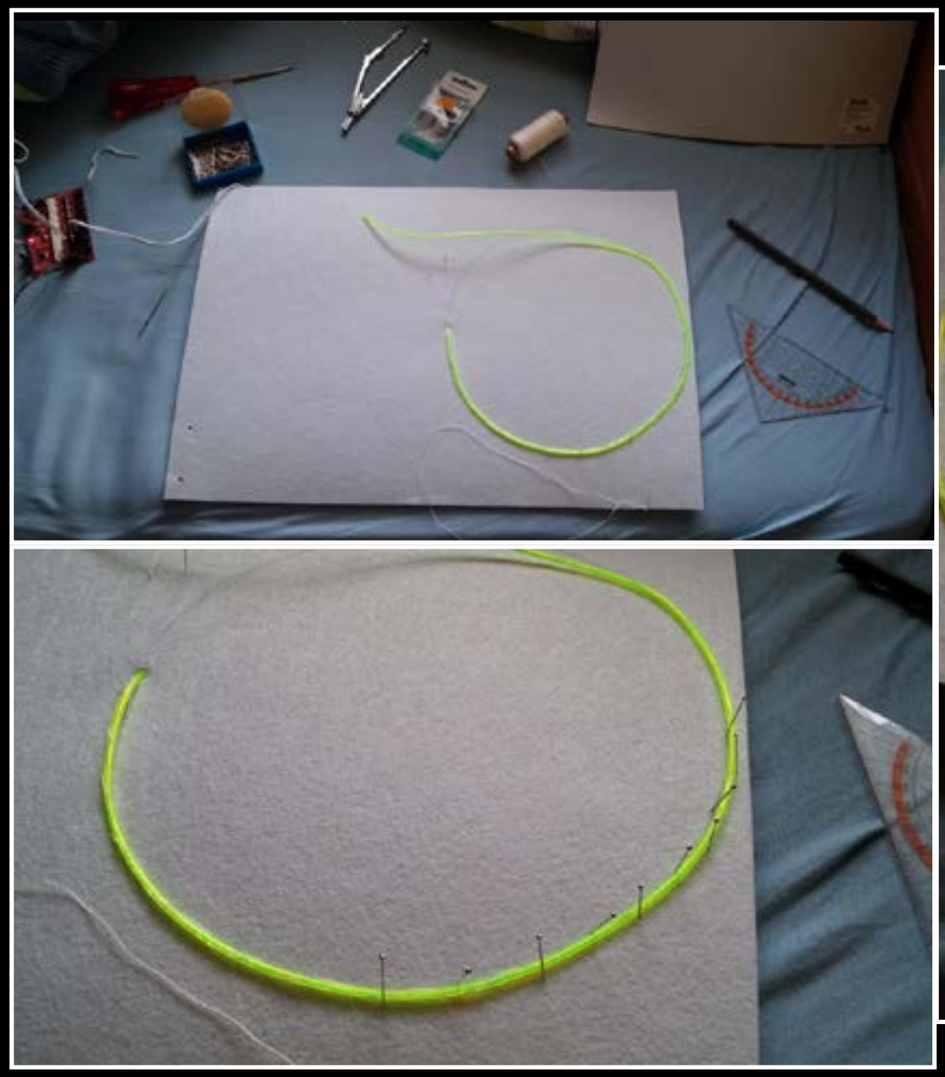


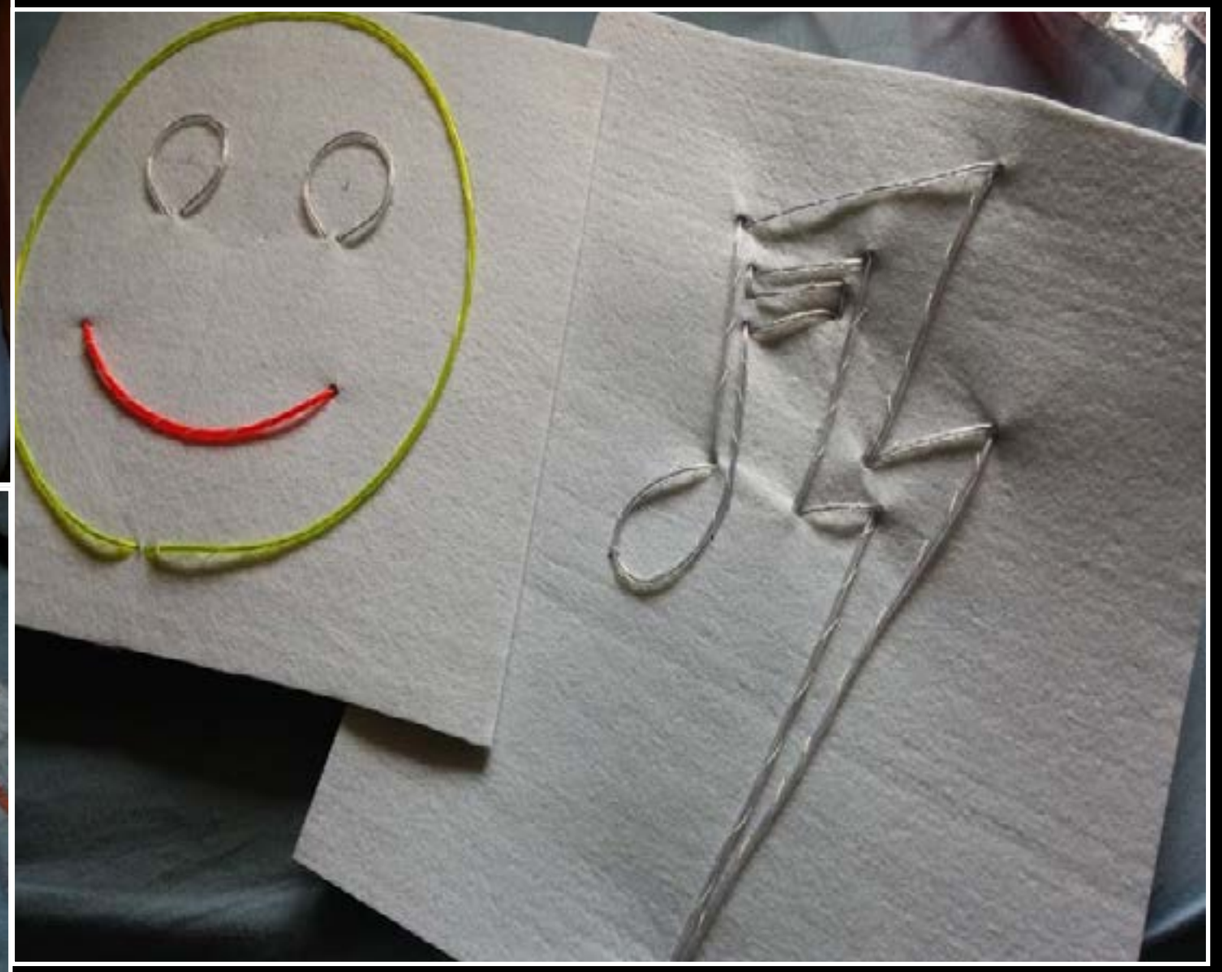
First you need to have an idea of the shapes you want to have with your EL-wire. Then you approximately select the length of wire you need and cut it (with some more length just in case).

EL-wire comes without electrical connections and can be cut where you want. But each time you cut it, you have to connect it to the power source. That's one of the hardest part of the project, you have to denude very small wire, solder them without breaking them, put shrink tubing around them to secure them.

Now you should have EL-wire strips with electrical connections. You can check them by connecting the cables to the inverter and see if it glows.

Step 2: Sew the EL-wire on the felt



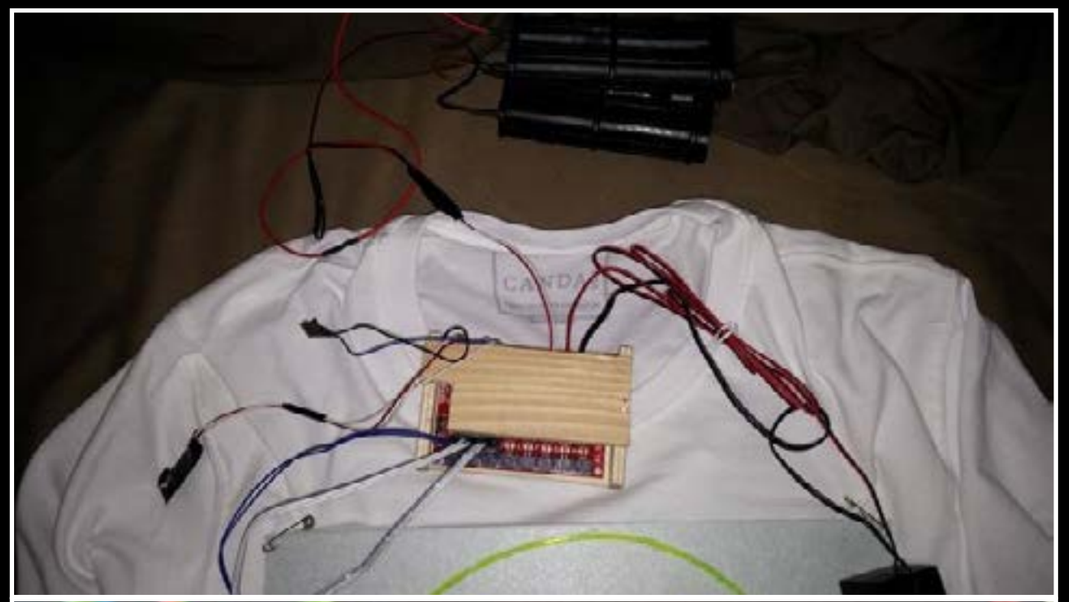


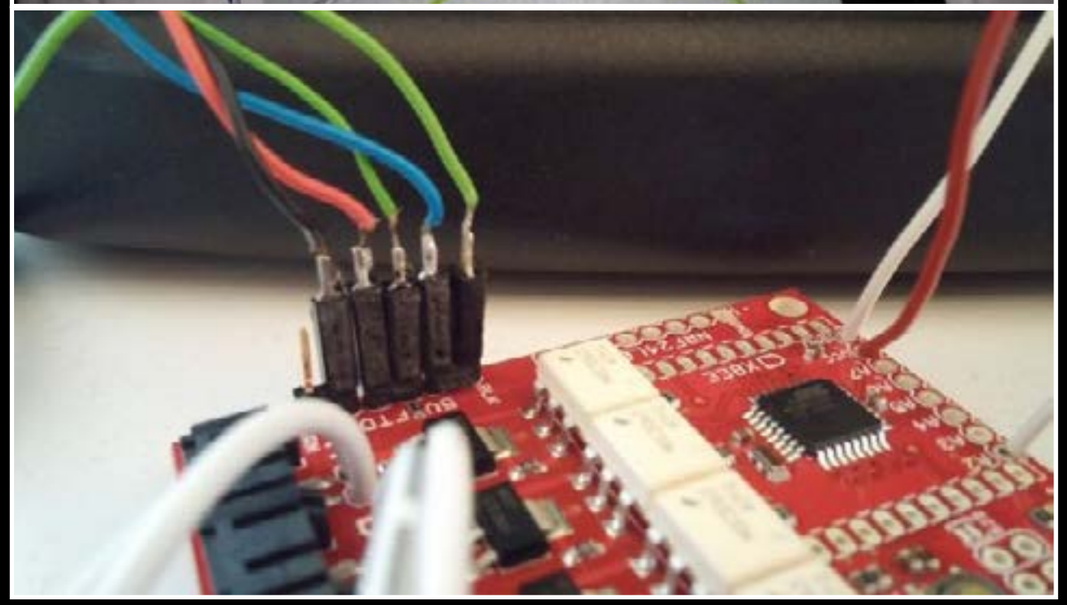
They drew the pattern on the felt and then sewed it to give the shape to the wire. they made holes to pass the wire at the beginning and at the end. As the EL-wire is very hard to solder, they tried to minimize the number of times they cut it. they also simplified the patterns they wanted to draw.

Another idea is to hide the wire behind the felt in the places you want to hide it. As an example, on their smiley, they used one segment to make both eyes. If there’s a corner or a sharp edge to draw, make a hole in the felt,

and do the turn behind the felt before going out of the hole in another direction.

Step 3: Connect the electronics





When the wire is connected, you can plug it on an output port of the EL-Sequencer. There are nice male plugs on the board but they didn't have any corresponding female plugs lying around so they made myself connectors on the board. You can also solder the wires directly on the board.
The battery connector goes on DC IN, the inverter goes on DC OUT and AC IN. They put a plug on DC IN to be able to turn everything off easily. If everything is well done they can power it on and with the default program loaded on the microcontroller the wire should blink.
You can connect the microphone OUT to the pin A2 of the microcontroller, also V_{dd} to 5V and the ground of the microphone on a ground pin.

Step 4: Program it

Get the bass from the microphone

In many engineering domains, analyzing frequencies is very important. It’s often achieved by applying the Fourier Transform Theory. It’s very powerful but the mathematical description of it needs integrals, complex calculus and only works for perfect signals. We are in the real world, and the microcontroller doesn’t know how to evaluate complex integrals. Hopefully, there’s an applied version of this theory called Fast Fourier Transform (FFT) that is a very well known method to do an analysis like that with a computer. Still, it requires some calculating power that my microcontroller doesn’t have. They found another algorithm called the Fast Hartley Transform (FHT) that is simple to use and works well too.

So, go ahead and **DO IT YOURSELF**

Source: www.instructables.com

CODE TO TEASE YOUR BRAIN

HERE ARE FEW CODING PROBLEMS TO TEASE YOUR BRAIN WITH IT GUYS !

ARINDAM KARMAKAR, Assistant Professor,
Dept. of Computer Science & Engineering

** The Guessing Game

This is a very interesting problem.
The user thinks of three different numbers (n_1, n_2 and n_3) in the range say 1-n; now you have to write a program that can identify the above three numbers with fewest guesses. The computer guesses three numbers (x_1, x_2, x_3) and prints it on the screen. After each such guess, user will either answer “yes” or tell that if the sum and product of the computer generated numbers are less than or greater than the sum and product of actual numbers. If the user does not say “yes” then depending on whether the sum and product are greater or lesser the computer makes another guess.

** Challenge : Instead of three numbers, do the same for 4 or more numbers

** The Domino Effect

Dominoes are dice-like rectangular blocks made of ivory. One of the best uses of dominoes is the demonstration known as “The Domino Effect”, which involves keeping them standing in a long queue so that when the first dominoe is toppled, it topples the second, which topples the third, etc., resulting in all of the tiles falling. By analogy, the phenomenon of small events causing similar events leading to eventual catastrophe is called the Domino Effect.
Suppose you have ‘n’ dominoes of different heights lined up from left to right. Distance between each domino is fixed. A dominoe can be pushed to either right or left. If the first tile is pushed to the right, all the tiles may not fall. You have to write a computer program that determines the minimum number of pushes required to drop all the dominoes.

Input : The number of tiles ‘n’ followed by heights of each tile and the separation ‘x’.
Output : A number ‘k’<=n that denotes the minimum number of pushes to bring down all the dominoes.

mail your answers at tu.soe.mag@gmail.com

Trivia Corner

By Anubhav Joshi
B.Tech 7th SEM Mechanical Engineering

1

He is an Engineer from MIT and has worked on building a prototype for toilets in space. He has also been for a brief time an astronaut and has worked on the Mars rover. His wife works in a pharmaceutical industry. Who is he?

2

Richard Arkwright built the first spinning frame which could produce strong cotton threads. He was also the 1st person to use steam engines to drive machines for spinning and weaving, in a cotton mill. This machine could spin hundreds of threads at a time. As a result, a European city became to be known as

Cottonopolis

because of lucrative cotton industries. Which city?

3

A Dutchman,
Hans Lippershy
in 1608 invented what for the first time?

4

What is the name of a
credit-card sized computer
developed in UK for making computer education accessible to school students?

5

Who told that he would recruit anyone who has read

The Art of Computer Programming

without asking any questions ?

6

Which movie character is inspired from the **Guy Fawkes** ?

7

On 26 January 1988, a post office at ‘X’ under the Goa Post Office circle. As all congratulated each other, a certain Mr. Sudhakar was made the Honorary Postmaster although he did not have any expertise in this field. What is ‘X’?

8

Who is the person credited to having introduced the **Rugmark?**

9

Who is the youngest **Nobel Prize** winner till date ?

10 Which world-famous company's logo is influenced by the **Golden Gate Bridge**?

Which company's name in Latin means
I Roll?

11

12 Who is the only person to win both a **Nobel** and an **Oscar**?

13 Which Chinese company recently listed in the NYSE is the world's largest ecommerce site?

ENGINEERING IN MOTION

SHUBHAM SHARMA. B.TECH ECE 3rd SEM

"B" is a revolutionary new remote controlled hybrid car-quad copter with a patent pending design. On flat surfaces B can reach high speeds using its rear wheel drive. Due to its large wheel diameter of 210 mm it achieves outstanding performance in driving across difficult terrain. B is virtually unstoppable, capable of transitioning between ground and air allowing the development of tricks otherwise impossible to achieve.

HTTP://GOO.GL/WEFD72

HTTP://GOO.GL/OKJZQK

Sand Flea is a robot that drives like an RC car on flat terrain, but can jump 30 ft into the air to overcome obstacles. The robot uses gyro stabilization to stay level during flight, to provide a clear view from the onboard camera, and to ensure a smooth landing. It can jump about 25 times on one charge.

HTTP://GOO.GL/XH6PFM

HTTP://GOO.GL/GVSIDA

Cheetah is the latest invention of MIT. MIT researchers have developed an algorithm for bounding that they've successfully implemented in a robotic cheetah — a sleek, four-legged assemblage of gears, batteries, and electric motors that weighs about as much as its feline counterpart.

HTTP://GOO.GL/EJ8TOK

Phones manufactured these days are not made to last. For a small defect in a single component, we have to dispose off the whole device.
Phonebloks is a new concept set to revolutionize the way phones are made. Each individual component (camera, speaker, screen etc.) is detachable and upgradable. Such a design ensures a drastic reduction in e-waste and so is very beneficial for the environment.

HTTP://GOO.GL/JOOUCI

THE TANGIBLE MEDIA GROUP AT MIT'S MEDIA LAB HAS UNVEILED A FUTURISTIC DISPLAY MADE OF ATOMS, NOT PIXELS.
At the MIT Media Lab, the Tangible Media Group believes the future of computing is tactile. Unveiled today, the inFORM is MIT's new scrying pool for imagining the interfaces of tomorrow. Almost like a table of living clay, the inFORM is a surface that three-dimensionally changes shape, allowing users to not only interact with digital content in meatspace, but even hold hands with a person hundreds of miles away.

WHTTP://GOO.GL/BU5TZG

Having multiple bank accounts means having to manage lots of credit or debit cards. A company Plastc is set to change the scene of traditional electronic payment. Plastc manufactures cards equipped with an eInk display and bluetooth that can store information of upto 8 bank accounts. You can carry a single card for all your accounts.

HTTP://GOO.GL/TQYHDU

SCRIPTURE

GETTING STARTED WITH

WEB DESIGN & DEVELOPMENT

Almost everyone uses the internet. Internet is the medium for exchanging information, to connect with people, to learn and to impart knowledge. Web Designers and Developers are the people who create the flow of information, who present information in such a way that it reaches the right audience in the best way possible. But people who have very good skills in both web design and writing are very hard to find. Hence, a career in this field surely promises a bright future.

WEB DESIGN

Web Designers are architects of the web. They focus on the look and feel of the website; and so, they should be visual arts' experts, who are skilled in color scheming, graphic design and information flow. They utilize their creativity, intuition and imagination, to design amazing user experiences.

WEB DEVELOPMENT

If web designers are the architects of the web then developers are the builders. Without coders, the plans would never come to life. Typically, they are skilled in programming languages such as PHP, ASP, Ruby on Rails, Python, HTML, CSS and more depending on what they specialize in and their experience level.

SCRIPTURE 101

THE BASICS

MARKUP

HTML, the structure of the page is the foundation of websites, vital to place the document with the right hooks that will provide the style and the interaction that the reader will ultimately use.

STYLE

CSS, Cascading Style Sheets, a core functionality of web designing, provides a platform for styles that layout the page and give it both its unique visual flair and a clear, user-friendly view.

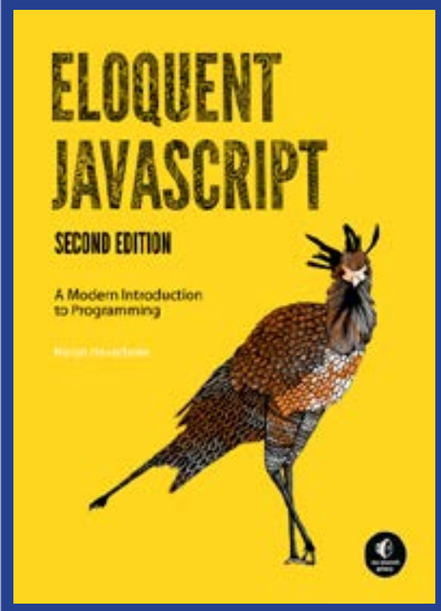
CODE

Code mostly refers to JavaScript, but this could apply to ActionScript, PHP or any other popular web languages developed for the front-end. The widespread usage of JavaScript has produced a plethora of visual effects.

codecademy

HTML - CSS : CODEACADEMY.COM

Codeacademy.com provides tutorials on HTML and CSS for the absolute beginners.



ELOQUENT JAVASCRIPT

One of the best free resources providing an introduction to the JavaScript programming language.

eloquentjavascript.net

RESOURCES FOR THE NOVICE

DON'T FEAR THE INTERNET

This website contains a series of video tutorials, that teaches basic HTML, CSS, Typography, etc. A must for the beginner.

http://www.dontfeartheinternet.com/

W3SCHOOLS

One of the most popular and beginner-friendly resource on HTML, CSS and JavaScript. Can be used as a reference.

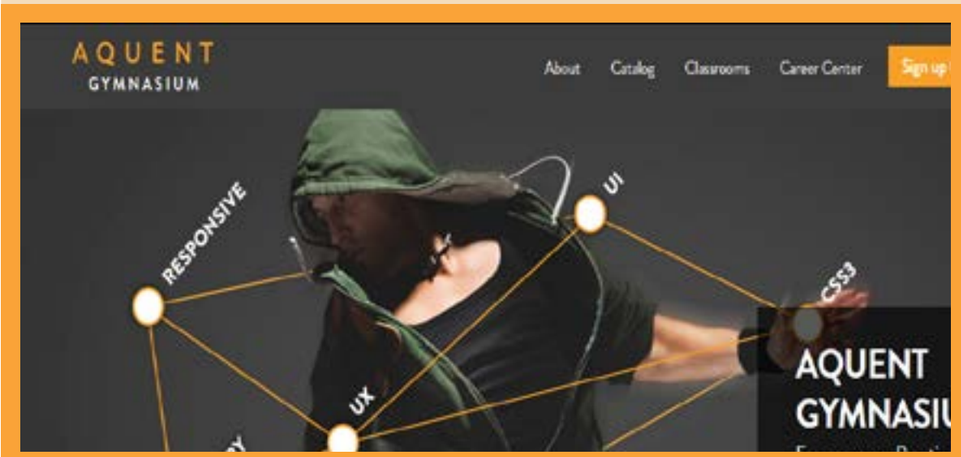
http://www.w3schools.com/

SHAY HOWE

This site has both basic and advanced tutorials on HTML and CSS. Recommended for beginners and advanced users alike.

http://learn.shayhowe.com/

RESOURCES FOR INTERMEDIATE USERS



AQUENT GYMNASIUM

This website teaches all types of coding required for designers. It also teaches responsive web-development, UX fundamentals and jQuery.

http://gymnasium.aquent.com/

CROCKFORD ON JAVASCRIPT

Crockford on Javascript is a video-series on Javascript intended for intermediate users. It is one of the best resources on Javascript available on the internet.

http://yuiblog.com/crockford/

School Of Engineering

Joytirmoy Rabha

B. Tech 7th Sem Computer Science Engineering
Interned at IIT Guwahati

Where did you do your internship from ?

I did my internship from IIT Guwahati, Department of Mathematics.

How did you apply?

I applied for my internship through the online application put up in the IIT Guwahati website.

What help did your institute extend when you were applying for this internship?

One of my teachers, Dr. Arindam Karmakar wrote a reference letter for me in my application which was very helpful in my selection for the programme. Apart from that the HOD of my department in Tezpur University had to approve my application which was done easily.

How was your experience?

The two months during my internship was a learning experience. The stay in the IIT campus was an experience all together. To meet and interact with students from all across the country was a joy as I learned a lot from them. I did my internship in a subject called “Computational geometry” and I was given an insight into the life of a research student and it was quite interesting as I was not bound to a set of rules but was open to ideas. My guide during the internship was Dr. Gautam K. Das and his guidance on the subject matter and career prospects have given me a different outlook on education. So all in all, my two months were very fruitful and I would be happy if some of my interested juniors could apply for the same programme.

What are the prerequisites for an internship?

Most internship programmes do not have any such prerequisites but students with good CGPA and rank in class are preferred. As I mentioned before, a strong reference letter from a faculty is very helpful. There are also programmes where students with published papers and good projects are preferred. Every internship programme in an educational institute will ask you for the work you want to carry out during the internship, so be ready with the topics and name a few in the application.

How much did you learn from the internship programme? Was it helpful in giving you a better insight into your field?

I learned a great deal as the subject I worked with was completely new to me. The internship was so effective that I was able to learn a completely new subject and start working on a subject related problem in a period of just two months. It not only gave me a better insight in my field but also opened up a new horizon which I did not know about until then.

Did you receive any stipend?

My internship programme did not have any stipend.

Internship in which sector according to you is a better learning experience- public sector or private?

It depends on one's interests. If an internship in the private sector is more in accordance to someone's interests and requirements, I see no reason for that someone to take up an internship in the public sector, not matching his interest. Both sectors provide you with great opportunities and one should try to get in the best internship programme in either of the two sectors depending on his or her field of interest.

What are the prospects for students like us to do an internship abroad? How feasible is it?

It is hard to get in a good internship programme even within the country. For an internship abroad one should be knowledgeable in his or her subject. There are various opportunities that are open to all Indian students. One needs to keep an eye on the internet for upcoming updates about such programmes and just follow the procedure and interviews required for the internship.

Few lines for the readers

"For me an internship is not a period to advance my existing skills, but a period to acquire new ones. That is my perspective. Each one of you will have your own. Do not just take up any internship that comes your way. Try to grasp the one which is the one you want to do. As I believe that if you like something, working on that becomes a walk in the park. I wish u all the very best for your future endeavours."

Arindam Khan

B. Tech 7th sem Civil Engineering
Interned at Power Grid Corp, Tezpur

Where did you do your internship from ?

Power Grid Corporation of India Ltd., Tezpur.

How did you apply? What help did your institute extend when you were applying for this internship?

The faulty in-charge of training and placement of the Department of Civil Engineering (Dr. Briti Sundar Sil) takes the responsibility of getting an internship for all the students of the department. He sends mail to the head offices both the government and non-government organizations.

How was your experience ?

Well, it was a new experience. I was working under Mr. B Boro, he was really a very experienced person. He was dealing with pile foundation work at Lakhimpur and Bishwanath Chariyali, Tezpur. So I got to interact with the local people of these regions, I learnt about the working condition in Assam, which is a very important for a Civil Engineer to know. Regarding technical aspects I had to work at office deriving out the foundation design and also I got a chance to see them implemented in the field and follow up the supervision part at the site.

What are the prerequisites for an internship?

Since the internships are arranged by the Department itself, so CGPA is the only criteria of selection.

How much did you learn from the internship programme? Was it helpful in giving you a better insight into your field?

While in office I used to work with Mr. B Boro regarding the technical aspects and Mr. S K Dutta guided me through the managerial role. Apart from the technical aspects and field work the toughest job was to solve the public

grievances. Well now I can say that I can deal with pile foundation work; may it be the design part or its construction work. At field I was able to interact with the site engineers, who were basically the contractors who were given the work; L&T, KEC Internationals, BSPCL and C&C Constructions in this case. They taught me the procedure of fulfilling the terms and conditions of a contract and also about project scheduling and report. So over all it was a great experience where I got to interact with many technical and non-technical person

Did you receive any stipend ? If yes , how much? Is it applicable for all ?

No, there wasn't any sort of stipend available but they took care of my travel allowances and food.

Internship in which sector according to you is a better learning experience- public sector or private?

Working as an Intern really varies from place to place. According to me partially it depends upon the intern about who keen he or she is and how capable are they in learning things from other people.

What are the prospects for students like us to do an internship abroad? How feasible is it?

Internship at foreign institutes and companies is no longer a tough job, but yes the candidate must have a good profile for getting selected. Every year there are many openings in some of the globalized organization who provide internship and also provide all the expenses along with some stipend for example Mitacs Global provides a great opportunity in Canada. Our university also provides a great deal of help through its collaboration program with various institutes worldwide. All you have to do is keep yourself updated.

Few lines for the Readers

"Well as a final year student I want to share some of my experiences which I gained through all these seven semesters. We have seen dawn here in TU, the good will record and achievement of students is really taking a pace, students are getting fame and competing in international competitions, they are clearing GRE or Gate and getting their destined institutes for further study and also the placement scenario has improved a lot. At this point of time, when opportunities are not far from the upcoming batches, I wish you good luck and want you to work hard."

Chaitanya Borah

B. Tech 7th sem Electronics & Communication Engineering
Interned at DRDO, Bangalore

Where did you do your internship from ?

I did my internship from LRDE, Electronics and Radar Development Establishment, Bangalore. It is one of the oldest divisions of DRDO, Defence Research Development Organisation, the country's elite defence research organization. Don't get confused with the 'L' in LRDE, it is just to distinguish between "Electrical" and "Electronic", the latter is abbreviated with the first letter of its Latin root (lektra).

How did you apply?

The internship program of LRDE is actually funded by the 'Sarva Shiksha Abhiyan', so the entry is on first come first serve basis; they have about 200 seats. The 'funda' is to send the applications (requesting acceptance of students in the summer training programme) as fast as you can, preferably in late February or early March. You can consider this period to be safe. A little later than that and it hangs in the balance, like it did in our case. We couldn't send out the letters till mid March due to one reason or the other, but speed post came to our rescue. I got lucky considering the reply to the application was drafted by LRDE on 4th April, my birthday!

What help did your institute extend when you were applying for this internship?

The Department of Electronics and Communication was no doubt helpful. The drafting of the application was done in a time span of two days. The office staff was kind enough to get us the university envelope (which gives a sense of authenticity at the first glance.)

How was your experience ?

It was a learning experience. It is really overwhelming to realise that things that you are studying are applicable

to real-life issues as important as national security. It gives a sense of purpose to one's curriculum.

In addition to it, I had the opportunity to interact with a lot of people, scientists and students alike. Talking about fellow interns, its always nice to meet people who are at the same stage of life as you are. There is always a lot to learn from one another.

What are the prerequisites for an internship?

The training program for which I was selected didn't have any prerequisites, nor did any others which were applied for through the university. However maintaining a good CGPA always helps.

How much did you learn from the internship programme ? Was it helpful in giving you a better insight into your field?

I learnt a whole new programming language! To put it simply, FPGAs (Field Programmable Gate Array, imagine them as a group of isolated logical gates like "AND", "OR" etc. which you can program to connect to one another to get your desired output) can be programmed using two languages-one is called "verilog" and the other "VHDL". Though I was acquainted with verilog, I had never coded in VHDL, which was the standard for DRDO. So, I had to learn VHDL right from the scratch.

It was definitely helpful as I got to see the field of embedded systems with an application point of view.

Did you receive any stipend ? If yes , how much? Is it applicable for all ?

No, LRDE does not offer any stipend for UG trainees but you get access to cheap canteen facilities. The quality of food? Well that's a topic for another day!

Internship in which sector according to you is a better learning experience- public sector or private?

As far as learning is concerned, now that I have done an internship in the public sector myself, I would rather recommend the private sector, and even more so if a stipend is involved. The government machinery, unfortunately, is sluggish, so the amount of learning is highly dependent on the guide that you are under. I was lucky enough to be working under a diligent guide (Mr. Sibil Kumar TB.), but there were others who had to work under not-so-helpful guides! The problem is, there are no fixed guidelines on how to deal with the trainees or even if there are, they are far from following them.

In the private sector you need to work! There are no two ways about it. I talk about the
stipend because if you are being given one they are treating you no different from an employee and they would do their best to get the worth of that stipend out of you. Yes, it means working hard but then again without that you are going nowhere in life.

What are the prospects for students like us to do an internship abroad? How feasible is it?

Its not as unachievable as many would presume. There were instances where my batch-mates had the opportunity to go abroad but due to some unavoidable circumstances it didn't work out. Though I wouldn't be the best person to be asked for advice on the matter, I will suggest you to be well informed. In today's age, Information is Power! Also be ready with your passport, you never know when an opportunity might knock at your door.

Few lines for the Readers

"There will definitely be a day when India's education system will be less about books and more about skill development. Until then internships are the best way to test your existing skills and garner new ones. Choose wisely and remember that the brand of the institution where you do your internship matters but not as much as the work you do there."

Shwetabh Singh

B.Tech 7th Sem Mechanical Engineering
Interned at IIT Kharagpur

Where did you do your internship from? How did you apply?

I did my internship at Mechanical Engineering Department, IIT Kharagpur under the guidance of Professor P. K. Das.

How did you apply? What help did your institute extend when you were applying for this internship?

I contacted Professor Das personally for project work and he agreed to guide me. My department issued a no objection certificate for the internship.

How was your experience?

It was a great learning experience. My project was regarding Heat Exchanger. It gave me much idea about latest research and technology in Two Phase flow.

What were the prerequisites for the internship?

Prerequisites for my project work is just basic of heat transfer and thermodynamics along with some programming skills.

How much did you learn from your internship? Was it helpful in giving you a better insight into your field?

I learnt a lot from my internship and it was quite useful in giving an insight into the latest research work in my field.

Did you receive any stipend?

No, I did not receive any stipend.

Internship in which sector according to you is a better learning experience- public sector or private?

If one opts for project work or research internship then IITs and IISc is a good learning experience. But if one opts for industrial training experiences then private sectors are better.

What are the prospects for students like us to do an internship abroad? How feasible is it?

It is quite feasible. But for that you have to start preparing very early. You should have good GPA and also should have some earlier project work.

Few lines for the readers

"For an average student like me, I want to suggest that "there is always a way, you just have to find it". So don't get upset just because you don't have very good GPA. Show your interest in your subjects and you will get projects work. Also try to learn as much as possible."

Nitin Kumar

B.Tech 7th Sem Computer Science and Engineering
Interned at Chennai Mathematical Institute

Where did you do your internship from?

Chennai Mathematical Institute. Chennai, India.

How did you apply? What help did your institute extend when you were applying for this internship?

I was made aware of the internship opportunity at CMI by a professor in the Computer Science and Engineering Department. I followed the link to their website and filled up the details required.

The application form required the details of two referrers (from Tezpur University), who would be later contacted by the CMI Internship coordinating team. The professors I had listed as my referrers were benevolent with their recommendations, which played a vital role in helping me bag the intern position.

How was your experience?

The internship at CMI was by far the most exuberating intellectual experience I have had in the course of my undergraduate studies. The structure and process of imparting education there is quite unlike anything I have previously experienced. The guides are very much involved with the project material, and at the same time very jovial and relaxed. The institute had a variety of personalities ranging from ACM ICPC world finalists to the recent Indian silver medalist of the UN IOI (International Olympiad in Informatics). We had made a small group for ourselves, including interns and full time students. Trips to various places in and around Chennai were made, late night hangouts and movies were commonplace. There was game in particular – “Mafia” that we enjoyed playing a lot, the game was very new to me, and I found it really fun and interesting.

What are the prerequisites for an internship?

There are no hard and fast prerequisites for the internship program at CMI. However a profile that reflects acumen in mathematics and good performance in undergraduate courses along with strong recommendations make the possibility of getting the position much more likely.

How much did you learn from the internship programme?
Was it helpful in giving you a better insight into your field?

The project material I was working with was concerned with Art Gallery Problems, with a case study of “Guarding a Set of Segments” (GSS). It involved the design and analysis of approximation algorithms for a special case of GSS. There were several new concepts that needed understanding. It was much like an extension of the course “Graph Theory” that we had completed in the 5th semester, just prior to the internship. This helped immensely and also gave better insight into the span and importance of the subject and potential research areas.

Internship in which sector according to you is a better learning experience- public sector or private?

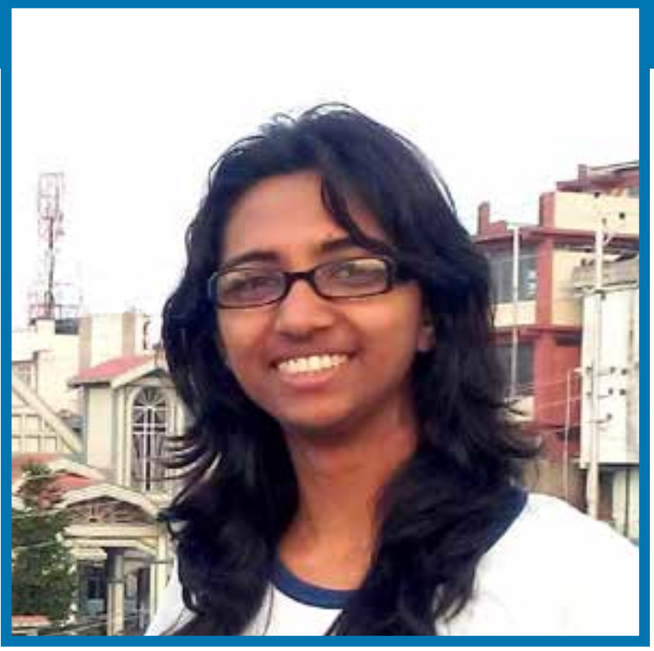
Depends on the candidate’s interest. An internship should be viewed as an opportunity to learn new things or build on concepts learnt earlier. Public and private sector industries are more or less alike. The difference materializes in the reputation of the internship program. Summer school programs offered by premier institutes/top-level companies I believe, are much more productive and worthwhile.

What are the prospects for students like us to do an internship abroad? How feasible is it?

Acquiring internship positions abroad are a very good way of building a strong profile for higher studies and placements. Opportunities are amply available and I strongly encourage students to consider such opportunities. If the opportunity is offered through the university channel then it is very likely that most (if not all) of the expenses would be covered.

Few lines for the Readers

"Internships are a great way to break the monotony of academic life. It's a combination of a vacation and a project experience. I would suggest students to look for internship opportunities away from the northeast. It serves the purpose of giving you the opportunity to visit a place that you have not been before which in turn facilitates in making the learning experience much more interesting. It's an experience all students should look forward to!"



Surabhi Agarwal

B. Tech 7th Sem Electronics & Communications Engineering
Interned at NIT Meghalaya

Where did you do your internship from ?

I did my internship from NIT Meghalaya, Shillong.

How did you apply?

I applied as per the process outlined in the NITM website for their Summer Internship Programme and got selected.

What help did your institute extend when you were applying for this internship?

We were advised to apply for this Internship Programme by some faculties of our department when we approached them for guidance and were helped by them in the application process as well.

How was your experience?

I had a very good experience there. Since my project was about computational VLSI circuits, I came to know how VLSI circuits could be used for complex number and decimal arithmetic which was quite fascinating and new to me. It also helped me clear the basics of certain subjects.

I along with my friends also had great fun exploring the places in and around the beautiful city of Shillong whenever we found some free time. That way I had the opportunity to interact with the local people and students from other parts of the country. It was indeed an enriching experience.

What are the prerequisites for an internship?

If you are willing to do a project in an institute, prerequisite would be a good knowledge of the subject/ topic you are doing a project on. It helps to ask your guide

beforehand about what you need to brush up on before joining.

If you are going for industrial training in a company, as far as I can gather, it depends on the organization. They might either assign you a mini-project or just be holding theory and hands-on training classes for you. So, the prerequisites vary. Nevertheless, being thorough with your branch's subjects always helps.

How much did you learn from the internship programme? Was it helpful in giving you a better insight into your field?

As I already mentioned, I learnt quite a lot from the programme academically and otherwise. It indeed gave me a better insight into my field, which was VLSI design and helped clear concepts of other topics as well. They actually made us attend theory classes (which, surprisingly, we did not hate) along with the project. We learnt some new VLSI circuit design softwares as well.

Did you receive any stipend?

No, I did not receive a stipend. However, we were provided with free lodging and internet facilities as a part of the programme.

Internship in which sector according to you is a better learning experience- public sector or private?

As I did not undergo an industrial training per se, I may not be the best person to answer this. However, as I have learnt from my friends, students generally benefit more from private sector internships than public sector ones as more attention is paid to the individual projects in the former than in latter. But then again it depends on which private or public sector organization you are going to.

What are the prospects for students like us to do an internship abroad? How feasible is it?

If you apply with the right mindset and proper guidance and planning, you might as well land an internship abroad provided you have the required skills and the ability to present your ideas well and you have done some substantial projects because the hard truth which I have learnt from my friends who applied is that they usually tend to prefer students from the 'Ivy-League' institutions of India.

Few lines for the readers

"This is for the readers who are looking for internships. I would advise you to apply well in time so that you do not regret and get tensed later which happened to me and many other people from our batch. Talk with your department and initiate the process of sending out the official letters early. At the same time put in your own endeavours. Get your CV ready. Do not hesitate to consult with your teachers and seniors about where and how to apply. It really helps. Keep track of the application submission deadlines of various Internship Programmes. Internships programmes in most IITs and some reputed NITs offer stipends. Do try for them. Also, take care that the internship duration does not exceed the two months' time allotted for it by our university lest you are not allowed to go. (Psst.. that happened to some of our batchmates). Keep in mind that you are just a conscious effort away from grabbing that perfect Internship!"

School Of Engineering

TECHXETRA
BRIDGING THE DIGITAL DIVIDE

COLLAGE CREDITS - SAURAV DUTTA

IN THE COLLAGE :

1. Mr. I.V. Rao, MEO Maruti Suzuki being welcomed for the invited talk.
2. Mazebash Prelims – ROBOPHRONESIS
3. Roboholocaust Prelims – ROBOPHRONESIS
4. RC Plane Show
5. Full Throttle Quiz at KBR Auditorium
6. Constrolix Prelims
7. Invited Talk by Swati Samaddar, Intel Technology India Pvt. Ltd.
8. Talk by Mr. I.V. Rao
9. Welcoming Mr. Alok Mukherjee, DRDO Member for the invited talk
10. A child with an RC plane
11. Interaction with the Indian Army
12. Roboholocaust semifinals
13. The Sunburn cultural night
14. Webinar with Neil Safeer Ghaznavi, Emmy Award Wineer for Game of Thrones
15. Mazebash – semifinals
16. Roboholocaust – finals
17. RC Plane show
18. Roboholocaust
19. 5 on 5 football tournament
20. ROBOPHRONESIS

T.I.J.R.S.

THE FRESH 2014 TURS MEMBERS LEARNING THE SKILLS OF SOLDERING AND MAKING THEIR FIRST MANUAL BOT.

IEEE

Student Branch
Tezpur University Chapter

IEEE STUDENT BRANCH, TU CHAPTER HELD CLASSES ON PYTHON FOR 1ST SEMESTER STUDENTS AND JAVA FOR 3RD SEMESTER STUDENTS.

CLASSES ON CATIA FOR FRESHERS ORGANIZED THIS SEMESTER BY SAE, TU CHAPTER

achievements

- Subhasish Dutta (B.Tech, ECE, 7th Sem), Ashutosh Das (M.Tech, ME) & Anubhav Joshi (B.Tech, ME, 7th Sem) became National champions of the Sweden-India Nobel Memorial Quiz.

- Arindam Khan (B.Tech, CE, 7th Sem) finals,Defi Bouygues Construction Challenge, going to be held at Île-de-France, France.

- Puneet Sharma (B.Tech, ECE, 7th Sem) Selected for Research Assistant Position, CeNSE Lab, IISc Bangalore.

- Umang Agarwal 's (B.Tech, ME, 7th Sem) B-plan got selected for the final round of "NEEC,2014 organised by North East Center for Entrepreneurship."

- Arup Jyoti Chutia (B.Tech, ME, 3rd Sem) has published a paper on "SIMILARITY OF MOMENT OF INERTIA" in "INTERNATIONAL JOURNAL OF PHYSICS AND APPLICATION."

Inventories of SoE, Tezpur University

ELECTRIC VEHICLE

Developed by -
Dept. of Electronics & Communication Engineering
and
Dept. of Mechanical Engineering
Tezpur University

HYBRID TRI-CYCLE

Developed by -
Dept. of Electronics & Communication Engineering
and
Dept. of Mechanical Engineering
Tezpur University

LOW COST MANUAL PADDY THRESHER

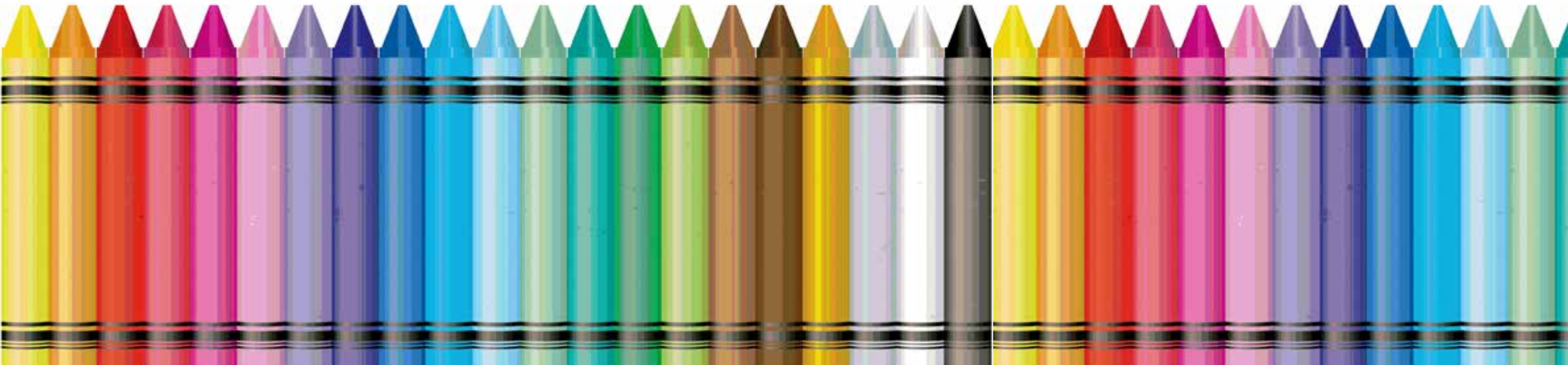
Developed by -
Dept. of Mechanical Engineering
Tezpur University

AUTOMATED FLUSHING OF PUBLIC TOILETS USING E-NOSE

Developed by -
Dept. of Electronics & Communication Engineering
Tezpur University

School Of Engineering

creative section



"The CGPA Fever"

TANNA CHOUDHURY, B.TECH CSE 1ST SEM

The first day of college and like every other fresher I sat in my classroom with a lot of excitement. But then what awaited all of us was a brief lecture on CGPA. Well here are a few reasons rather 'bitter truths' that I'd like to say on CGPAs. If you are an engineering student you'll find it painful, in addition to the grudge you'll develop for me.

PS- you had been warned.

1. In the first semester you'll approach seniors in library. You'll rather be tempted to go to the senior sitting with his cute girlfriend and ask him academic questions. He'll probably say "Chill bhai, engineering life bindaas hai". That's a plain lie. He told it only to avoid you. Rather approach that bespectacled senior with a dozen of books. His advice will begin with "CGPA is important."
2. Once admitted in an engineering college you'll start liking pages like "Engineering jokes v/s Rajnikanth jokes" on facebook that suggests you to bunk classes, sleep and enjoy life. But you forgot the golden line "CGPA is important."
3. You must have been over-the-top engaged in science projects in school. By the time you are struggling in an engineering college you must have invented many little things and got that 'superman' feel. But remember 'CGPA is important.'
4. You might have even dreamt of the smartest outfit you'll wear on your interview. But the first question you'll be asked is "What is your CGPA?", because "CGPA is important".
5. Your fellow 'geek and boring' classmate who asked you " What is the difference between C and C++?" two months before exam might even be refused by a BPO office because "CGPA is important."
6. You might be visiting and participating in all possible techfests in your state, trying every bit to make your CV look like Aishwarya Rai's drop-dead gorgeous face, but most importantly your CGPA needs to be perfect because 'CGPA is important.'
7. You might have even hated me by now and have even ignored the above. But remember CGPA is important. Few months into engineering....these were some very important observations that I have made so far.

PS-(again): you had been warned..... 😉

I'm an Engineer!

Waking up in the morning not believing the time,
Already 8? How is that even possible!
Even the bathrooms not free at time such prime,
Not taking a bath today is much more plausible.

The classes start, and go on and on,
The lectures might bounce but what to do?
After all attendance is still going on,
Of course not that I'd confess it's true!

Coming back to the hostel, so very tired,
Exams lurking around, need to prepare,
Trying to remember about the circuit that we wired,
But first my Facebook status I need to share.

Then friends come along and now roaming around,
Probably eating something at that shop,
Some new batch mates, some 'special' ones found,
And now all study plans I need to drop.

At least need to get the assignments done,
But there is a football match on right now,
I had such a boring day, need to have some fun,
Against such temptation any one would bow.
Dinner time, a supper without taste,
Missing home, the food that mother makes,
Just finishing the food in ultimate haste,
Discussing if we have what it takes.

Maybe would do some gaming tonight,
Or just lay back and listen to a nice song.
Trying to relax and feel a bit light,
And believing that nothing could go wrong.

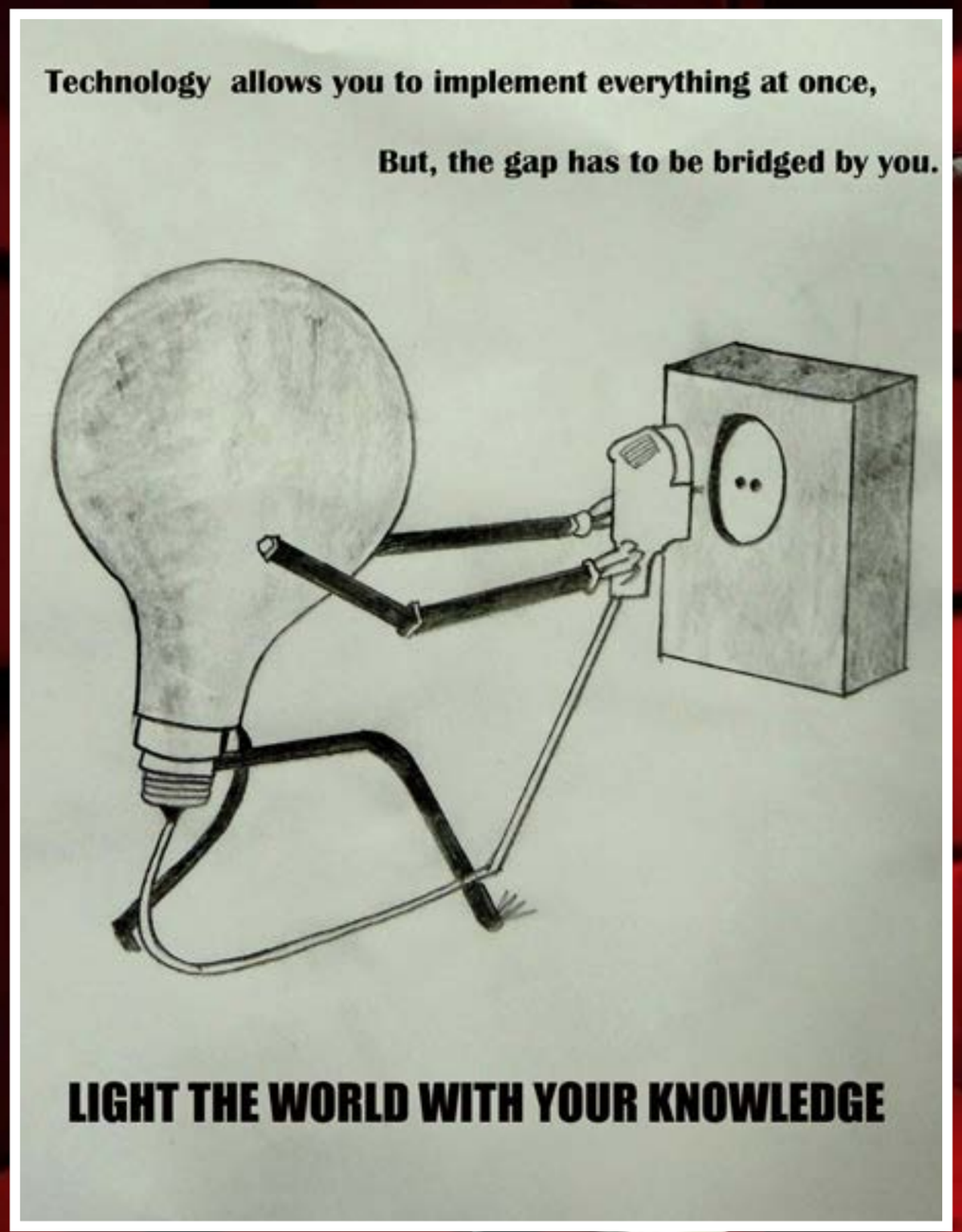
Going to sleep now, work is for the weekend,
I can procrastinate so well after all,
No work done, yet the day well spent,
Indeed, that is story of us all !

-Nikhil Dixit
B.tech CSE Ist Sem

SKETCH YOUR CREATIVITY

A drawing makes you see things clearer, and clearer and clearer still, until your eyes ache.

- David Hockney



Art by

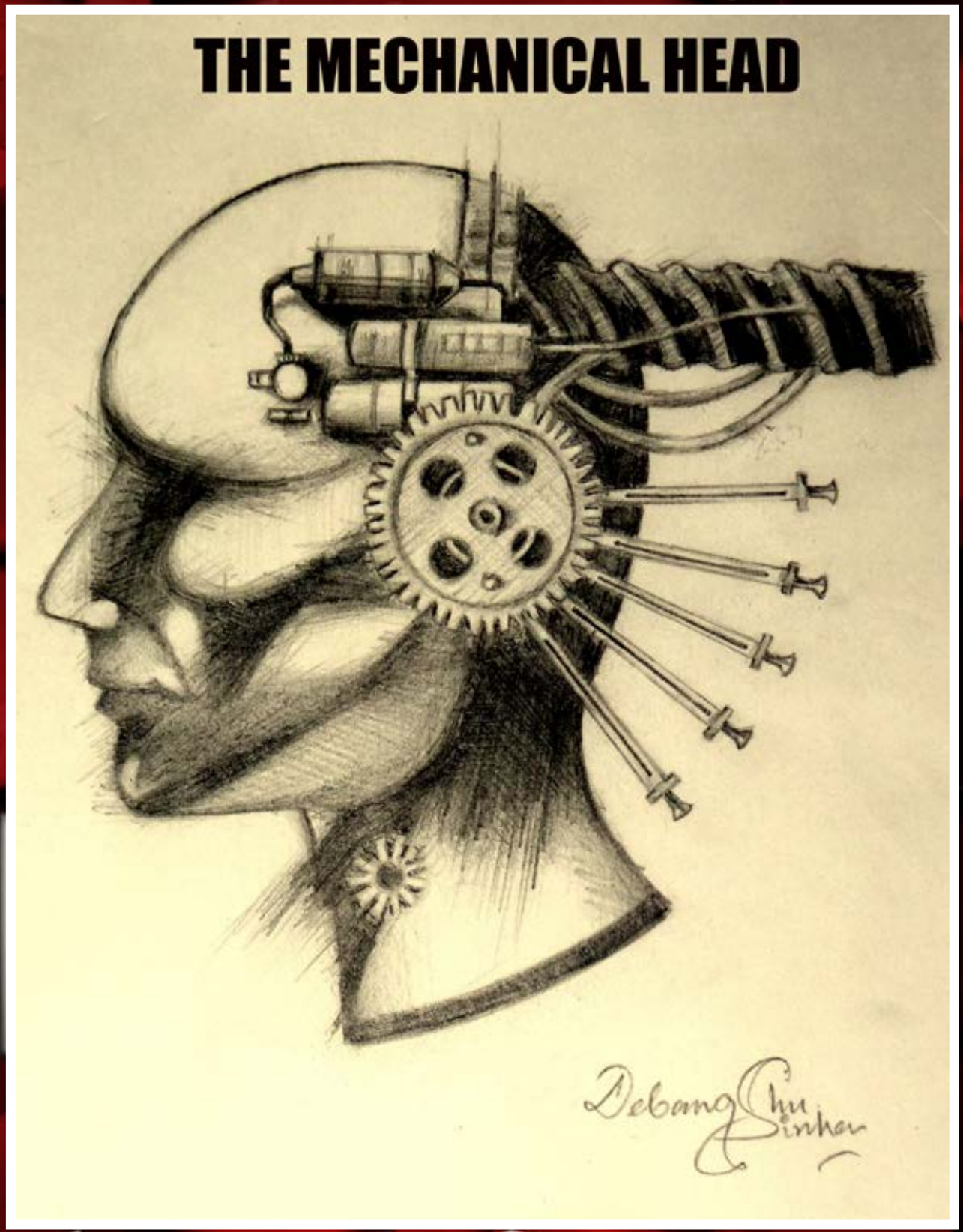
NITUSHMITA BARMAN,

B.TECH 1ST SEM ME

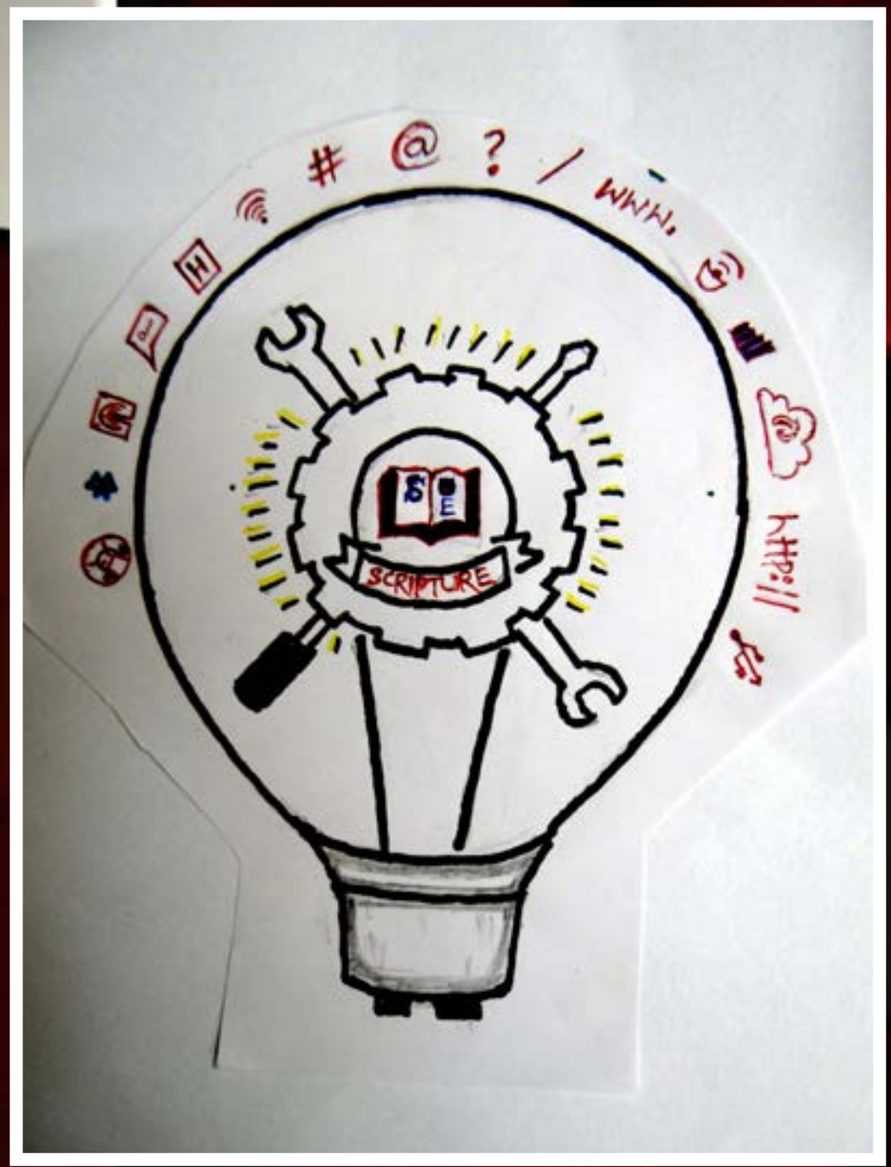
Art by

DEVANGSHU SINHA,

B.TECH 5TH SEM ME

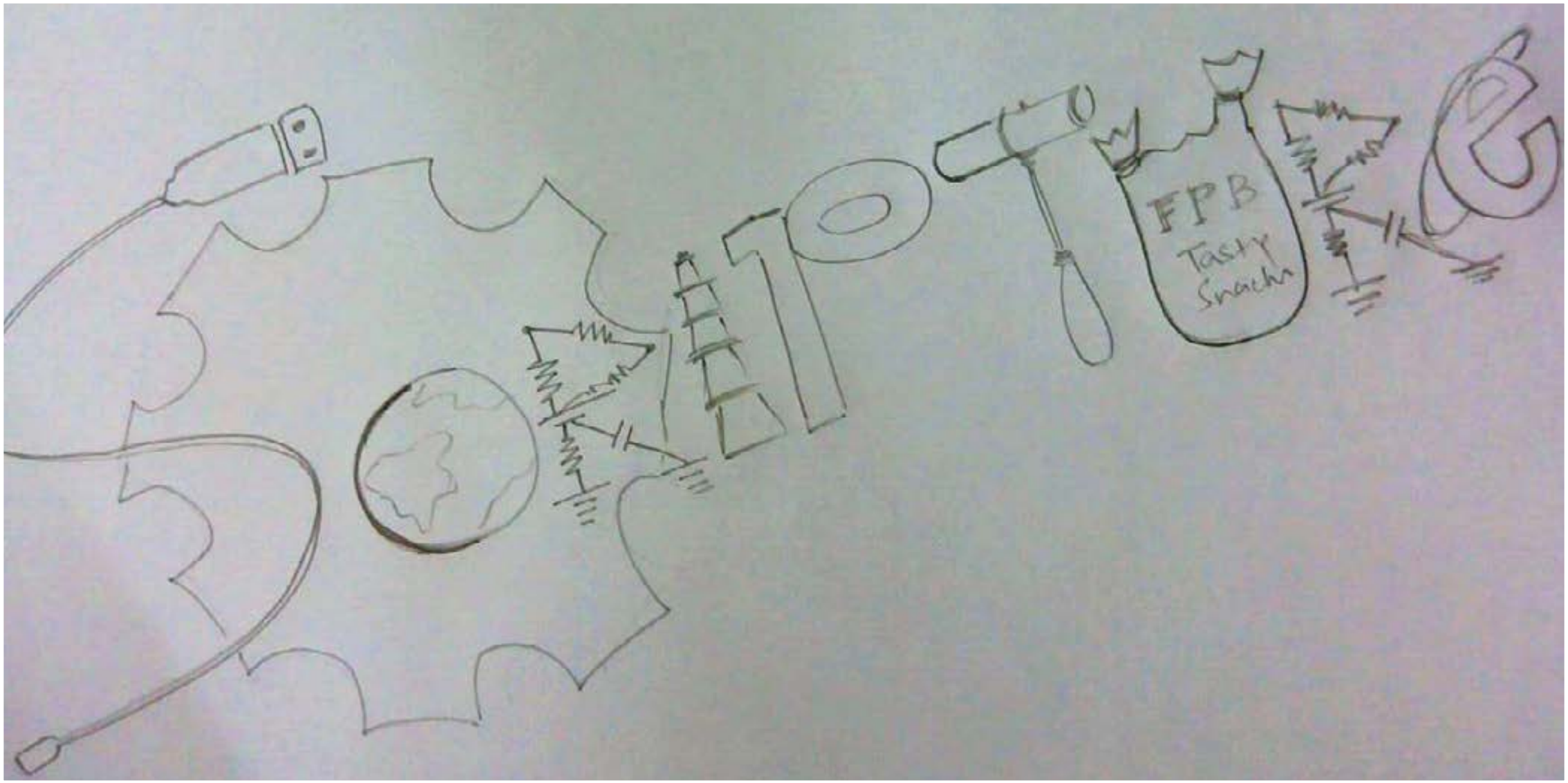


Team Scripture invited the B.Tech freshers 2014 to showcase their creativity by making logos for the magazine. Here are the drawings that we received .



Art by PALLAB BORAH
B.TECH 1ST SEM CSE

Art by NITUSHMITA BARMAN
B.TECH 1ST SEM ME



Art by SUKANYA GOSWAMI

B.TECH 1ST SEM CE

Team Scripture pays tribute to Sir Mokshagundam Visvesvaraya, a world renown engineer known for his contributions in the field of hydel energy utilization.

Art by UDIT ARUNAV
B.TECH 3RD SEM ME

Technology

-a blessing transformed into a curse

In the advent of history, it suddenly occurred,
when the dark night brightened.
Yes, fire was unintentionally discovered,
though mankind was really frightened.

But some brave man approached it,
thus revealing its concealed mystery.
It was the start of a new era-
The beginning of a new age in history.

Ages passed with the flow of time,
Complexities transformed into ease.
Technology has made us invisible
But surprisingly we have lost peace.

Now fire is going to destroy lives,
Through guns, bombs and arms.
I guess it was not invented to destroy,
so now we have to say,
"It's ENOUGH".

Technology is for our brighter prospect,
And not for the destruction of mankind.
But why didn't we stop it,
Rather than being naive and blind?

-Prakash Gupta
B.tech CSE Ist Sem

TRIVIA CORNER

SOLUTIONS

1 Howard Wolowitz

2 Manchester

3 Refracting Telescope

4 Raspberry Pi

5 Bill Gates

6 ‘V’ in V for Vendetta

7 The Dakshin Gangotri

8 Kailash Satyarthi

9 Malala Yousufzai

10 Cisco Networks

11 Volvo Corporation

12 George Bernard Shaw

13 Alibaba.com

TESTIMONIALS

Edition I
Spring Semester 2014

Manjil Saikia <manjil@gonitsora.com> May 9

to me

Hi,

Its a great initiative that you have started. However, some pages are very difficult to read and some facts are wrong. For example Edison is not the holder of the most number of US patents, its some Japanese guy. Anyways, all the best for the future.

With regards,
Manjil

Manjil P. Saikia,
Tezpur University, Assam, India
E-mail: manjil@gonitsora.com
Website: http://gonitsora.com

Nitin Kumar <nitin.007.kumar@gmail.com> May 6

to me

The work done here is very commendable! The one thing that has really impressed me is the participation of the juniors in this endeavor! Kudos Puneet for rallying the juniors and also kudos to the juniors for their dedication! I must say that this product looks very professional and encourage the juniors to carry the baton further and make this a tradition in the School Of Engineering.

Fantastic job on the diversity of the articles as well!!

I have nothing but praises for this magazine.

The only suggestion I have is to publicize the article submission procedure, so as to receive a greater number of high quality articles to choose from!

Kudos once again!

Tanvir Hussain <tanvir.saturn@gmail.com>

to me

Hello

Firstly, congratulations to the entire team on successfully bringing out the First Edition of "Scripture"- premier e-magazine of SOE.

I was going through the copy I downloaded from Facebook and I must say it is organized in a nice way. The cover page design is really great. All the articles are excellent. The article on "Prosthetic Hand" is very interesting. Good to know about the TEAM BRAHMAPUTRA and the "Rhino" form the magazine

The first page of the first article by Prof. SM Hazarika has a simple typing error. The error is "Six grasp rypes ...." I think It should be "types" instead of rypes.

The background images or the color on foreground text on some of the articles are too bright/dim which makes reading a bit uneasy (article on JARVIS : page 23 ; article on Energy Weapons, page 71).

The font used in the article "The Internet of Things" (page 38) is not a good one. Its very difficult to read as all the text are too compressed. All the words seem to be attracted to each other.

Being a student from a non-engineering background I really enjoyed reading the e-mag and learned what is going on in Engineering Department of our University.

Looking forward to another exciting edition of "SCRIPTURE".

TESTIMONIALS FROM FACULTY

Congratulations to Scripture Team. Really, the 1st edition reflects the enormous amount of sincerity and hard work. However, there is always a space for improvement. Best of luck...

Durlav Sonowal
Assistant Professor
Dept. of Electronics & Communication Engineering

Dr. Soumik Roy
Associate Professor
Dept. of Electronics & Communication Engineering

Very good initiative by the members of SoE. The design and content of the 1st edition of SCRIPTURE is very standard. It will be nice if we can have a print version of the magazine.

I have gone through your SCRIPTURE E-magazine. It's fantastic, novel and useful. It provides scopes to others to publish their creativity. I like it. However, try to make the content more storage economic for easy transmission and display.

Dr. D.K. Bhattacharyya
Dean, School Of Engineering
Tezpur University

Zahnupriya Kalita
Assistant Professor
Dept. of Mechanical Engineering

The first edition of Scripture is indeed a very nice effort. The topics chosen are quite interesting and innovative. It has been able to enlighten the readers with new ideas and areas of research in various engineering fields.

> “CONSTANTLY THINK ABOUT HOW YOU COULD BE DOING THINGS BETTER AND KEEP QUESTIONING YOURSELF”
>
> - ELON MUSK, TESLA MOTORS

We all need people who will give us feedback. That’s how we improve.

Mail your comments and suggestions to :

tu.soe.mag@gmail.com

Like us on Facebook : /ScriptureTezuSoe