Volume 12

Apr 2018

T.U.R.I.N.G

The Lost Pages Of A Computer Maniac.

Department of Computer Engineering, Rajiv Gandhi Institute of Technology, Versova, Andheri West, Mumbai- 400 053 Telephone - 022 2670 7025

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From The Editor's Desk,

This edition of TURING Newsletter is a toast to all our authors who have shared their insights with the readers through their valuable articles throughout this outgoing academic year. This is also a toast to all our readers whose constant support and feedbacks kept us moving. The entire CESS Editorial Team remains grateful to them.

A fresh page in our lives will soon unfold and we'll soon find ourselves taking charge of new responsibilities that might seem uncertain at this moment. Let's hope that our zeal never diminishes, and that it motivates us to constantly explore, learn and evolve.

Let's keep the child's curiosity alive within us. What if Joey doesn't share food? We may always share knowledge. And TURING is the medium. Cheers!

-Anindya Vinayak

BRAIN PRINT AS PASSWORD?- HERE IS HOW IT WORKS

-Bharat Nair, CSE

We all know that biometrics technology is that it can recognize people on the basis of various physical as well as behavioural characteristics such as our voice, face as well as fingerprints and speaking about the world today these are important for an individual to combat financial as well as security risks. People now have moved on from traditional methods such as pin numbers and passwords. Barclays the multinational giant has introduced Touch-ID where customers can login using fingerprints during net banking.

This is not even foolproof either as it is possible to forge them as fingers can be chopped off and placed to get fraudulent access by hackers or imposters or the prints acquired using cellphone tape after getting prints can also be used to prepare fake ones.

So now the time has come where more advanced biometrics that are difficult to forge or hack and the solution to it is brain.

The biometric technology is based on the electrical activity of the brain which have shown resistance to fraud activities. Across the world no of research are taking place on how brain reacts to tasks and those of them varies from person to person. And these are almost close to that of fingerprints which is presently the most used biometric method.

And it has also been confirmed by functional MRI, by tracking blood flow changes thus measuring brain activity.

But the major disadvantage is the cost of the fMRI scanner which is not practical to be used for an enterprise for biometric authentication everyday, Thus researchers have also used EEG using electrodes to track the patterns of brain wave, But this is also having a disadvantage as individuals will be reluctant wearing gel based electrodes cap to login into the database.

The alternative to this is recording EEG from the ear using standard earphones but it is not possible to perform all the processing required in a phone and the twin people cannot use as they have near identical EEG. And one time enrolment of brain to the database is not possible as they exhibit plastic behaviour and changes over time.

While finger prints and voice recognition are possibilities, thought based biometric technology is more advantageous as copying a person's exact though process is extremely very difficult.

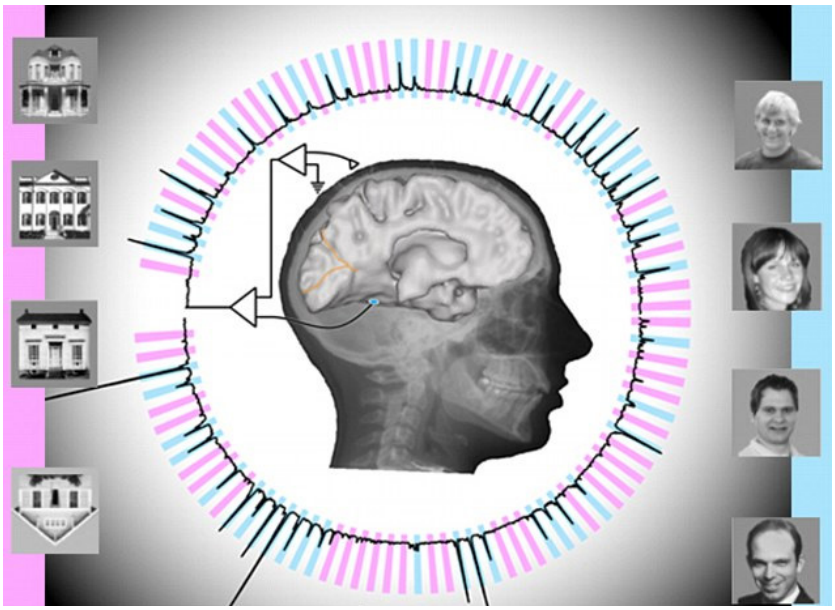
Now considering the advantages in the changes in the technology we will soon see biometrics based on fingerprints soon.

TRIVIA :

- It took the radio 38 years and the television only 13, but the internet reached 50 million users in only 4 years.
- The computer mouse was invented by Doug Engelbart in 1963. It was made out of wood (weird, huh).
- Early hard disks in personal computers held only 20 MB of data and cost around $800. Now, you could get a 2 GB flash drive for around Rs. 500. This implies that there is a 100-fold reduction in the price and a 100-fold increase in storage capacity.
- Rear Admiral Grace Hopper, the first female admiral in the US Navy is also known in the computer world for creating the popular programming language COBOL. She also came up with the term 'debugging' after removing a moth from a computer.
- The computing power in today's cell phones is much higher than the processing power of all the computers in the Apollo 11 Lunar Lander that put 2 men on the moon.

MIND READING COMPUTERS- YOUR HUMANOID PARTNER

-Prathamesh Sawant, CSE



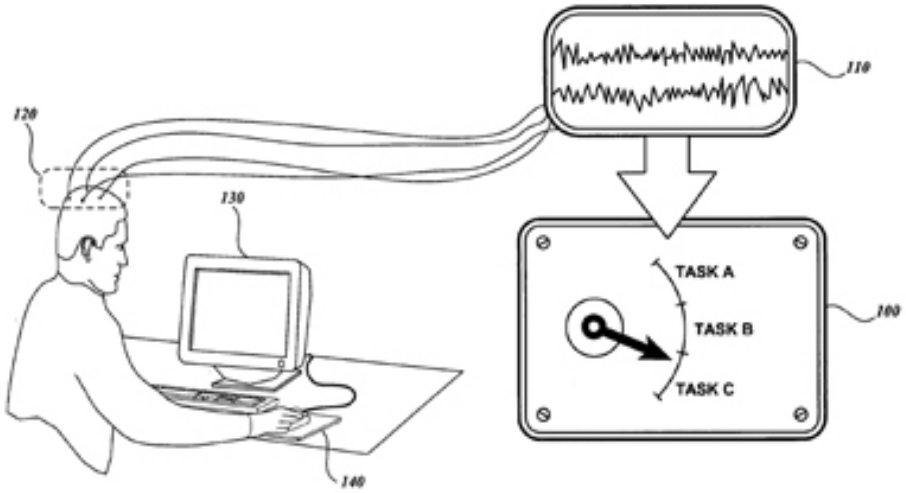
Humans have always feared dominance by entities such as fellow humans, aliens or even supernatural entities. A certain futurist added another entry to this list with the onset of the 20th century, namely, artificial intelligence. Ray Kurzweil sent the technological world into frenzy with his hypothesis on technological singularity and since then the human race has tried to come up with innovative ideas to avoid such an event. While brain surgeries continued giving meek promises to paralysis patients and permanently handicapped patients awaited for breakthroughs in the organ regeneration area, another interesting stream began developing.

As it turned out, humans had underestimated the capability of the most intriguing organ of their bodies - the brain. The basic work of the brain is done by its smallest units - the neurons. These neurons have an electrical method of passage of signals from the brain to- the various organs it controlsthrough the respective important nerves like optic and auditory nerves. These electrical impulses create potential difference between two points in the brain, causing current to flow.

Brain waves map this current whenever an action is being performed by the brain, which is all the time. Earlier open brain surgeons, through surgeries, made a person literally relive memories. Those surgeries involved a bunch of neurologists, passing current- at particular points in the brain cortex- which were most active while remembering it. The patients recalled the exact taste, smell and feel of things around them from the memory.

Brain Computer Interfaces use the exact reversal of this concept. A large number of electrodes are inserted directly in the brain in pairs. The potential difference between two points is measured when a signal is passed by the brain, for instance, "Go left". That value of voltage is recorded and then this value is used in an algorithm for, say, a prosthetic arm to m ake it move left. The only problem is that, this algorithm is a learning algorithm and needs a number of trials before the algorithm learns what value of voltage corresponds to which command.

- The first and still the oldest domain name to be registered is Symbolics.com, it was created on March 15th, 1985.
- Most Central Processing Units (CPU's) are sold as a bit slower than they actually run. By over-clocking them you can get them to run faster – for free.
- The first micro-processor was the 4004, Intel had originally designed it for a calculator and no one had any idea to what it would lead.
- Interface Manager! That's what Windows was originally named.
- If you find a way to hack Facebook, the company will pay you $500. Hackers, go for it.
- The 12 engineers at IBM that developed the IBM PC had a code name – "The Dirty Dozen".
- Mosaic' was the first popular web browser, released in the year 1993.
- Interface Manager! That's what Windows was originally named.



In 2006, 25 year old Matt Nagle, a tetraplegic (paralyzed in all limbs and torso) volunteered for an experiment, where 96 electrodes were inserted in his brain's motor cortex. In the span of a 114 day trial, he performed a number of tasks successfully which included moving a cursor to a certain point on a screen and staying on that point for 150 ms till the success was shown by a smiley. Others included the opening of email and reading of first and second messages, using a prosthetic as well as a robotic arm.

Explaining how they did it, Nagle said that, at first, a technician would move the cursor up to the point and he was told to imagine he was controlling it. The signals in his brain were recorded and then he was told to think that he was moving the cursor left, right, above or below so that the signals were taken by the computer and translated into the motion of the cursor.

Although it sounds simple, this task was successfully concluded on the 98th day of trial. Emotiv systems had another application for this ability. The device EPOC uses the electroencephalograph (EEG) to map the brain waves and then uses the prerecorded brain waves received at several points on the scalp to perform an action. It is a hardware which is sold to consumers and developers alike- to use for different kind of applications like gaming or controlling a robot.

'Traditionally scientists have looked at single neurons,' Rao said. 'Our study gives a more global picture, at the level of very large networks of neurons, of how a person who is awake and paying attention perceives a complex visual object.'

The scientists' technique, he said, is a steppingstone for brain mapping, in that it could be used to identify in real time which locations of the brain are sensitive to particular types of information.

'The computational tools that we developed can be applied to studies of motor function, studies of epilepsy, studies of memory.

'The math behind it, as applied to the biological, is fundamental to learning,' Ojemann said.

- The computing power in today's cell phones is much higher than the processing power of all the computers in the Apollo 11 Lunar Lander that put 2 men on the moon.
- The two main components in IT (Information Technology) are hardware and software. But there is also a lesser known 'grey' component. This is the software that is stored in hardware and cannot be modified easily. It is known as 'firmware'.
- There are over 20 billion web pages on the internet, and that number is rapidly growing every day. Also, there are over 2 billion internet users worldwide at present.
- The first hard disk drive was created in 1979 by Seagate. Its capacity was a whopping (not) 5 MB
- HP, Google, Microsoft, and Apple have one thing in common – apart from the obvious that they are IT companies. They were all started in garages.

METEOR- JAVASCRIPTS' NODE. JS FRAMEWORK

-Vishal Bisht, CSE

The Google's Node.js which provides a runtime environment for running various JavaScript frameworks has increasingly gain popular demand in recent time for backend development. Node.js 's frameworks are giving tough competitions to all the other languages like Python, Ruby and Java in terms of efficiency, speed and support facilities. The credit goes to its event-driven, non-blocking I/O model which basically means that all the input requests coming to node.js enabled server will be blocked as the current thread is busy with some other process.

So now we are going to have a look at one of the fastest growing framework of Node.js, that is, Meteor. Meteor is JavaScript's open-source, model-view controller (MVC) framework for building amazing web/mobile applications. The amazing part is, you can write your both client as well as server side code in same language, JavaScript. If you are a person who likes to write application codes, then Meteor will help you by providing its large set of in-built pre-written and self-contained modules. If you want to build smaller and reactive application with speed being its priority on Node.js platform, then Meteor is the best choice. For the full stack developers, Meteor has already assembled the compatible parts of the stack, from the database integrations to the front-end framework. For full functionality, MongoDB is the database to connect with Meteor. Meteor best suits for real-time applications like social networking or collaborative platforms like messaging where users want updates shared right as they are happening.

Meteor is still growing, so it lacks scalability, robustness and it cannot be integrated with SQL databases. But as a developer you should be able to understand not all frameworks are best when it comes to build a specific application and that your application decides the framework you are going to use. Because, a framework is designed to do one or more things very well. So choose your one well !

Shareware tends to combine the worst of commercial software with the worst of free software.
-Linus Torvalds

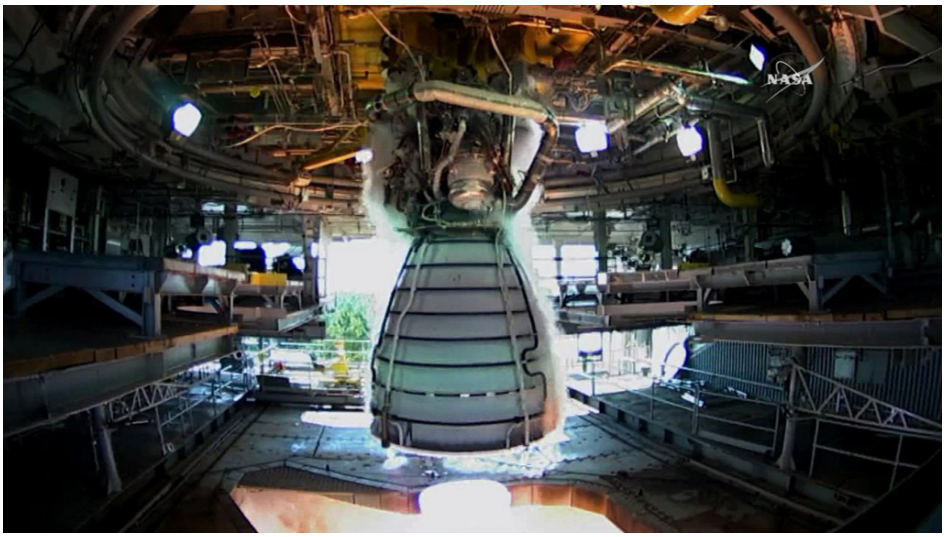
APP OF THE MONTH :

Wunderlist is a simplistic task manager that lets users easily create lists to share with others. The minimalistic design of Wunderlist makes it super easy to capture, share, and complete all of your daily tasks. The service is also cross-platform for iOS, Mac, Windows, and Android, so your tasks go wherever you go. While the basic free account will be enough for most people, there is also a Pro subscription that can be purchased as an in-app purchase for even more productivity-on-the-go, such as files and delegating tasks to others.

We enjoy using Wunderlist because it is simple, sleek, and powerful yet flexible enough for all of our needs. It is a pleasure to capture your to-dos in the app, and sharing is a must for most people nowadays. Plus the variety of backgrounds are gorgeous and make task management fun, and the Pro subscription is optional for those who need it.

CRYOGENIC ROCKET ENGINE

-Jaitra Khanna, Mech



A cryogenic rocket engine is a rocket engine that uses a cryogenic fuel, that is its fuels are gases liquefied and stored at very low temperatures.

During World War II, when powerful rocket engines were first considered, it was discovered that rocket engines need high mass flow rate of fuel to generate a sufficient thrust. At that time oxygen and low molecular weight hydrocarbons were used as fuel. At room temperature and pressure, it is in gaseous state.

To get the required mass flow rate, the only option was to cool the propellants down to cryogenic temperatures (below −183 °C [90 K], −253 °C [20 K]), converting them to liquid form. Hence, all cryogenic rocket engines are also, by definition, either liquid-propellant rocket engines or hybrid rocket engines.

The combination of liquid fuel and the liquid oxygen oxidizer is one of the most widely used. Both components are easily and cheaply available, and when burned have one of the highest enthalpy releases by combustion, producing effective exhaust velocity of about 4.4 km/s. It is used for space applications.

The advantages are as follow:
High Energy per unit mass
Clean Fuels
Economical
High fuel efficiency
One of the major disadvantages is that it is bulky and require heavy insulation to store the propellant.

Construction
The major components of a cryogenic rocket engine are:

The thrust chamber or combustion chamber,
Gas turbine,
Fuel injector,
Fuel turbopumps,
Pyrotechnic igniter,
Cryo valves,
Regulators,
The fuel tanks and
Rocket engine nozzle.

The fuel flow can be differentiated into a main flow or a bypass flow configuration. In the main flow design, the entire fuel is fed through the gas turbines, which intern drive the cryopump for fuel and oxidizer, and then injected to the combustion

ALGORITHM CONTEST:

Harry the Intrepid Archaeologist has discovered a wealth of treasure hidden deep in an ancient ruin. The room that houses this treasure is tiled in a grid-like fashion with columns at the grid points (the corners where tiles meet). So, the only way to traverse this room is by traveling from a tile to one of its four adjacent tiles.

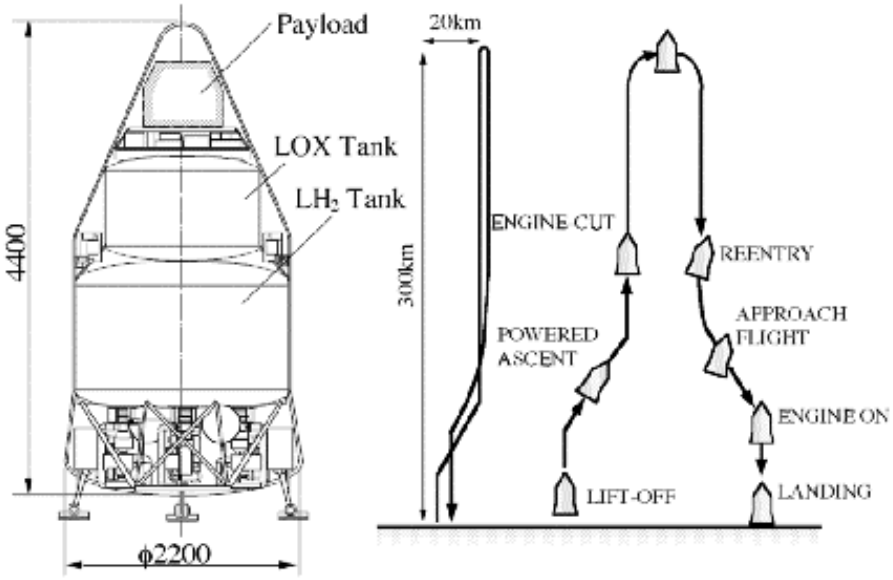
Alas, when Harry reached the treasure a trap was sprung and some gaping holes opened at some of the tiles. Over time, the tiles next to these holes will also collapse to create larger holes. This process will continue until all tiles in the room collapse!

Harry needs to escape the room quickly. He also wants to carry some treasure back with him. However, Harry moves slower if he carries more treasure so he has to determine the slowest he is allowed to travel to escape the room alive.

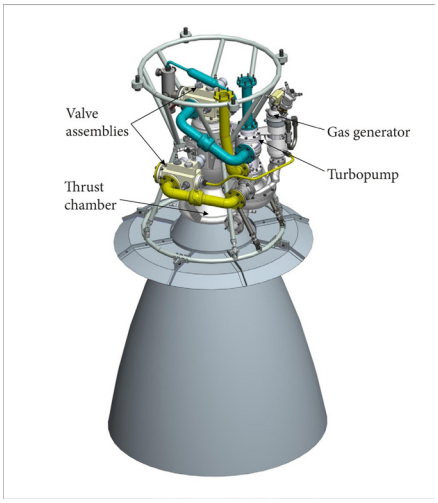
Suppose Harry's speed is d tiles per second. After the initial holes are created, Harry can traverse up to d tiles. Then, all of the tiles adjacent to a collapsed tile will then collapse. After this, Harry may move another d tiles. Then, all of the tiles adjacent to a collapsed tile will then collapse. This process repeats until either Harry reaches the exit or else Harry falls into one of the holes. Harry better be careful because the exit tile can also collapse which leaves him stranded with no way out!

To be clear, if Harry steps on an intact tile that is not the exit tile after d steps but then the tile collapses before Harry can take another step, he falls in the hole and is not able to reach the exit. However, if Harry steps on the exit tile the moment before it will be collapsed then he can exit safely. Your goal is to compute the minimum integer d such that Harry can safely reach the exit with speed d without falling into any holes.

Send in your answers to : editorials.cess@gmail.com.



chamber. In the bypass configuration, the fuel flow is split, the main part is goes to the combustion chamber to generate thrust, while a small amount of the fuel goes to the turbine, to drive the cryopumps for fuel and oxidizer and is subsequently injected to combustion chamber.



Rocket engine can generates 5,000 degree steam and 13,800 pounds of thrust form icicles at the rim of its nozzle. It's cryogenic. The Common Extensible Cryogenic Engine (CECE) has completed its third round of intensive testing. This technology development engine is fueled by a mixture of -297°F liquid oxygen and -423°F liquid hydrogen.

The engine components are super-cooled to similar low temperatures. As CECE burns its frigid fuels, gas composed of hot steam is produced and propelled out the nozzle creating thrust. The steam is cooled by the cold engine nozzle, condensing and eventually freezing at the nozzle exit to form icicles. Using liquid hydrogen and oxygen in rockets will provide major advantages for landing astronauts on the moon. Hydrogen is very light but enables about 40% greater performance (force on the rocket per pound of propellant) than other rocket fuels. Therefore, NASA can use this weight savings to bring a bigger spacecraft with a greater payload to the moon than with the same amount of conventional propellants. CECE is a step forward in NASA's efforts to develop reliable, robust technologies to return to the moon, and a winter wonder.

INTERVIEW

A POTTER'S PLAY

One hand that roughly rubs and beats clay from outside, while the other hand gently caressing from inside. This is what a potter does to turn a worthless piece of clay into a beautiful valuable pot! And this is exactly what a mentor does to shape his student's mind so it shines brightly. We got an opportunity to speak with one of our professors who play a similar role for us, Prof. Sharmila Gaikwad.

Q. You are a senior teacher of this institute. It's been how long since you started teaching here?
A. I have been with this institute since July 2003.

Q. This is a long period. How do you experience changes in teaching methods since then, if there are any?
A. I think students are spoonfed with infromation nowadays. This is inhibiting them to strive for more knowledge.

Q. What should be done to solve this issue?
A. I believe research culture is the need of the hour. Teachers are always there to help, but it is upto the students to seek their help.

Q. Did you always want to be a professor?
A. Yes, I always admired the teaching profession. I was teaching since I was 16, when I first started teaching a small group of government employees. Sharing knowledge with others is something I always loved.

Q. As a student were you focused only on the academics or were you active in cocurricular activities as well? Also, what would you advise your students to focus more on?
A. Being studious, I had topped in my sophomore year. I was also the Ladies' Representative in my college. We used to play sports and I was also interested in singing, but only as a pasttime. I think indulging in extracurricular activities along with academics is essential for a students all round development.

Q. You handle our college website and are also the In-charge of the Training and Placement Cell of our college. How are you able to manage these works apart from your teaching?
A. As a teacher, handling the college website and managing the Training and Placement Cell motivates me that I am doing something for the future of the students. This motivation drives me to fulfill all my responsibilities almost effortlessly. Once a year, in July/August handling the website becomes a hectic task because of the admission process and the database entries. But we have a wonderful team that does this work very efficiently.

Q. Do you believe that the students should pursue higher education or should they search for a job after graduation?
A. The idea of a higher education is good, but only after having a job experience for a couple of years. That way you not only gain knowledge of your domain but also get the experience which is essential for higher studies and beyond.

Q. What is your domain of interest and how do you keep up with it?
A. My area of interest are Computer Netwroking, Software Engineering and Ar-

ticifcial Engineering. I am currently doing a thesis on Software Engineering. Apart from that, I read technical books and take part in discussion forums. Also I am an editorial board member of a few international journals.

Q. The domains you mentioned: Networking, Software Engineering and Artificial Intelligence are the important dimensions of IoT. The security aspect of IoT is a genuinely concerning issue. Do you believe that we would be able to achieve a rigidly secure IoT system in near future?
A. I think the growing concern for this issue is itself a progressive factor. Researchers have been doing research on this issue dynamically and I believe that we would be able to definitely find a solution.

Q. Finally, we are at the end of this academic year. Anything you would like to convey to the students?
A. I would like to tell them that preparing for exams, submitting assignments and journals, getting passing marks or failing a subject are all a part of the engineering life. Do not worry, you will get through. Do not restrict yourself to just the curriculum. Do something extra and utilize your vacation. Do internships, write technical papers and always strive for more knowledge. An engineer should be an all rounder. Being the Training and Placement incharge I would say that we have points for students with co-curricular records. So spread your wings and do everything you possibly can. Remember, when a student shines, the teacher is the one whole feels the proudest.

COMIX:

Note: If you have any grievances or suggestions please mail us at- mctrgitcess@gmail.com

Typesetter - Mandar Mhaske