Shell

Newsletter

Department of Computer Science & Engineering

Volume 2 | Issue 2 | 11-2016

Vision and Mission of the Institute

Vision

- To be one of the premier Institutes of Engineering and Management education in the country.

Mission

- To provide Engineering and Management education that meets the needs of human resources in the country.
- To develop leadership qualities, team spirit and concern for environment in students.

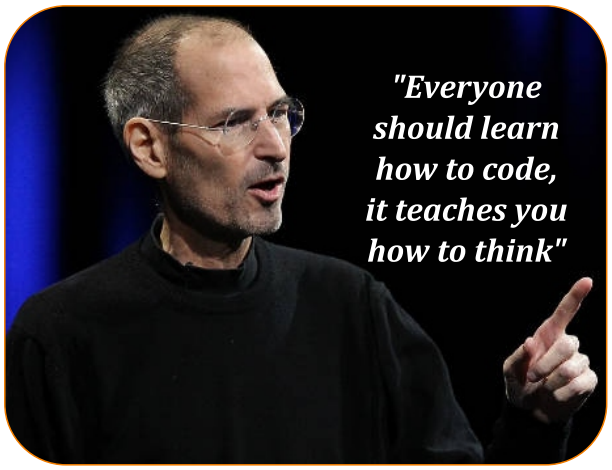
Vision and Mission of the Department

Vision

- To be a premier department for education in Computer Science and Engineering in the state of Karnataka, moulding students into professional engineers.

Mission

- To provide teaching/ learning facilities in Computer Science and Engineering better than prescribed by University for easy adaptation to industry and higher learning.
- Provide a platform for self learning to meet the challenges of changing technology and inculcate team spirit and leadership qualities to succeed in professional career.
- Comprehend the societal needs and environmental concerns in the field of Computer Science.



"Shell"

from the Department of Computer Science and Engineering, is dedicated to Late. Mr. Steve Jobs, Co-founder, Chairman, and CEO of Apple Inc.

Inside Shell ....

B. N. M. Institute of Technology

(Approved by AICTE, Affiliated to VTU, Karnataka and ISO 9001:2008 certified Institution)

27th Cross, 12th Main Road, Banashankari II Stage, Bengaluru- 560070, INDIA

Vidyaya Amrutham Ashnuthe

Editor's Message

Welcome to our readers!!!
"The only source of knowledge is experience"- Albert Einstein
From being a team member to becoming an editor, I truly had a phenomenal experience. My team proudly presents**"Shell"** - November edition, 2016.

The editorial team takes immense pleasure in expressing the views, ideas and thoughts based on the recent advances in technology through this newsletter. Hope you get to learn new technologies explored by writers and editors of this edition and that you enjoy what we've put together as much as we did.

I will be failing in my duties if I don't sincerely thank the relentless efforts put forth by my team members in bring out this newsletter. I would like to acknowledge the support given by the faculty members

I am truly grateful to everyone who provided their insights and help in completion of the newsletter as it makes your life more meaningful.

Thank you

Anagha A.
VII CSE 'A'

Department of CSE

Department of Computer Science & Engineering at BNMIT is renowned for imparting state of the art education and also carrying out cutting edge research. In addition to the strong UG Program, two PG Programs and research facilities for M.Sc (Engg.) and Ph.D courses are also offered. The Department has an equipped R&D centre and ongoing sponsored projects from VTU, DST-IISC and company incubated facilities.

The Department is associated with professional bodies viz. IEEE (USA), ACM (USA), Computer Society of India (CSI), Institution of Engineers & Indian Society for Technical Education.

Areas of specialization of the faculty members include Image Processing, Computer Vision, Pattern Recognition, Computer Networks, Network Security, Embedded Systems, Compiler Design, Wireless Sensor Networks and Data Mining.

The department has been organizing national and international conferences regularly. Guest lectures are arranged every semester for the benefits of students. Students are placed in leading IT companies. Students are also pursuing higher studies in reputed Universities around the globe.

Innovative Project Lab - Finalists

1 Ms. Anushree Dutta, 3rd Sem 'A' Section, for the **Project** PC Based Home Appliance.

2 Mr. Rachith, Mr. Ajay K V, Mr. Kaushal B, Mr. Anuraag M, 3rd Sem 'B' Section, for the **Project** Machine Learning & Energy conservation used in the real world application.

3 Ms. Vinuta M, Ms. Vasavi A R, Ms. Prathima P, Ms. Yashuraj Gowda C Y, Ms. Tanushree K, Ms.Meghana Chowdary , 3rd Sem 'C' Section, for the **Project** Remote Desktop Administration (RDA).

4 Mr. Prem, Mr. Rajeev, Mr. Roshan, 5th Sem 'B' Section, for the **Project** IoT Home Automation.

5 Nagarjun T N , 5th Sem 'A' Section, for the **Project** Design and Implementation of Connection Oriented Fair Multitask University Network.

Game Engines

What it takes to build a computer game? A serious thought as to what kind of tools go into designing and developing a full-fledged RPG game that kept you from studying or sleeping many a sleepless night.

Let's start with what a Game Engine is, and then we will look at its constituent modules. A period marked by the dominance of games like Doom, one of the first few games in which we can witness this separation between a game and its engine. Game engine is based on a data-driven architecture where the game itself provides the data needed for the engine and the engine acts like a software framework that does the background tasks. Components that constitute the architecture of generic Game Engines are listed as below:

- **Input** – The gamer interacts with the game through various input devices and sensors such as keyboard, mouse, joystick, gamepad, steering wheel, foot pedal, roller ball, touch screen etc. The Game Engine must provide functionality to handle the inputs from all such devices.
- **Graphics (Rendering Engine)** – The Game Engine must provide graphics rendering functionality for creating 2D and 3D objects. It must also support 3D objects that are imported from external graphic rendering tools such as Blender or Maya because most developers prefer to use such tools that provide a very rich and comprehensive environment for creating 3D objects.
- **Sound (Audio Engine)** – The integration of sound into the game is an integral feature that needs to be provided by the engine. With the emergence of 3D gaming, integration of soundtracks alone is not enough. The engine must render the sounds to reflect the position and the orientation of the object from the source of the sound.
- **Physics Engine (Collision detection)** – A Physics Engine is one that handles how the objects and the environment in which these objects exist and interact with one another and with each other. It is this part of the Game Engine that deals with handling events such as a car crash or the trajectory made by an object thrown into the air.
- **Networking** – Many games are played online over the internet or any other network. These games need to tap into the networking features of the engine, which provide functionalities such as connecting multiple instances of the engine over the network and so on.
- **Artificial Intelligence** – The objects created must be imbibed with intelligent characteristics to simulate their real life counter-parts. The AI of the engine handles this.
- **Scripts** – The engine must be shipped with compilers, interpreters and/or debuggers for the various programming, scripting and embedded languages used by the developer to communicate with the engine.

Some of the popular Game Engines available are:

- **Unity3D** - It targets APIs such as Direct3D, OpenGL, and OpenGL ES etc. This seems to be the most frugal option among Game Engines as it does not demand royalties like most others .It has healthy community support and is easy to use as compared to most Game Engines. It is used by leading games like Fallout Shelter, Angry Birds, Temple Run, PokemonGO etc.
- **Unreal Engine** - Its resume boasts of heavyweights like Gears of War, Batman, Arkham Asylum, Mass Effect and many other blockbuster games. Now, this is not the most pocket-friendly of the lot and it comes with a royalty clause, which would make any developer think twice before investing.
- **CryEngine 3** - The next one on the list is CryEngine that is renowned for its beautiful graphic outputs. It is admired for its audio tools as well. It powers games like Far Cry and Crysis and many others.

Sudesh Kumar
VII CSE 'B'

Inferring urban travel patterns from cell phone data

In the latest issue of the *Proceedings of the National Academy of Sciences*, researchers from MIT and Ford Motor Company describe a new computational system that uses cell phone location data to infer urban mobility patterns. Applying the system to six weeks of

data from residents of the Boston area, the researchers were able to quickly assemble the kind of model of urban mobility patterns that typically takes years to build.

The system holds the promise of not only more accurate and timely data about urban mobility but also the ability to quickly determine whether particular attempts to address cities' transportation needs are working.

This method and model could be the next generation of tools for the planners to plan for the next generation of infrastructure.

The great advantage of this framework is that it learns mobility features from a large number of users, without having to ask them directly about their mobility choices. Likely, in time, this brings the comparative advantage of making urban transportation planning faster and smarter and even allows directly communicating recommendations to device users.

How it Works

Cell phone records report only the locations at which users place calls or access the Internet. The researchers had to discard 25 percent of their data because it was too scanty.

From the rest, however, their algorithm was able to infer patterns of activity that recurred over the course of the six-week period. To piece together a picture of a cell phone user's day, the algorithm makes a few assumptions.

The algorithm assumes that the lengths of workdays of most people accord with national averages. For instance, if a given user makes phone calls from work only between the hours of 12 p.m. and 2 p.m., the system does not interpret that as evidence of a two-hour workday — unless that interpretation is corroborated by other data, such as regular calls from home at 11:30 a.m. and 2:30 p.m.

The estimates of workday length are probabilistic, however; the model doesn't assume that people arrive at work at exactly the same time every morning.

From the available data, the system builds a probabilistic mobility model for each user, breaking every day of the week into 10-minute increments. For each increment, the model indicates the likeliness of a location change, possible destinations, and amount of time likely to be spent at each of those destinations. The system then generalizes those probabilities across communities, based on census data, and deduces cumulative traffic flows from the resulting probability map.

Yash Ravindra
V CSE 'B'

iTwin Connect

USB flash drive or cloud storage is used to store the data on the middle server. The USB flash drive has the drawback of small size, because of which it can be easily misplaced or lost. In case of cloud storage, data can be misused if the username and password is hacked by someone else.

To overcome all these problems, iTwin is the best solution. It is the secure USB device that can be used to access, share & edit all the files and media between any two online computers anywhere in the world. It allows remote file access without any security and privacy risks.

iTwin is completely new file sharing and remote access device developed by a company named as iTwin. It is very similar like two ends of a cable, but is does not need the cable. It is simpler to use than a flash drive. It is just a plug and play device. With iTwin, it is possible to connect any two online computers located anywhere in the world. iTwinwas invented by an Indian named Lux Anantharaman. iTwin Connect device works like Peer to Peer. Access - excluding the data, is only being shared between you and your main computer.

How it Works

- The iTwin Connect device resembles a USB flash drive that is designed with two USB connections. The device is very compact and establishes a secure connection between two computers or a secure connection between one computer and the iTwin server.
- When you plug the iTwin Connect device into the main computer in your home or at work, the software is automatically installed and configures the computer for the remote connection. Once the device is disconnected from the main computer, you separate the two parts of the USB stick which results in two separate USB devices.

- The two separate devices are very compact at less than two inches, which makes it convenient and easy to carry with you. When you connect the second part to your laptop while on the go, it will automatically install itself without any user intervention.

- Additionally, you can set up a special password that disables the device in the event you happen to lose it. This ensures you can lock down your files to prevent access by an unauthorized user.

The advantages are:

i) onetime straight payment gives you lifetime access of the device.

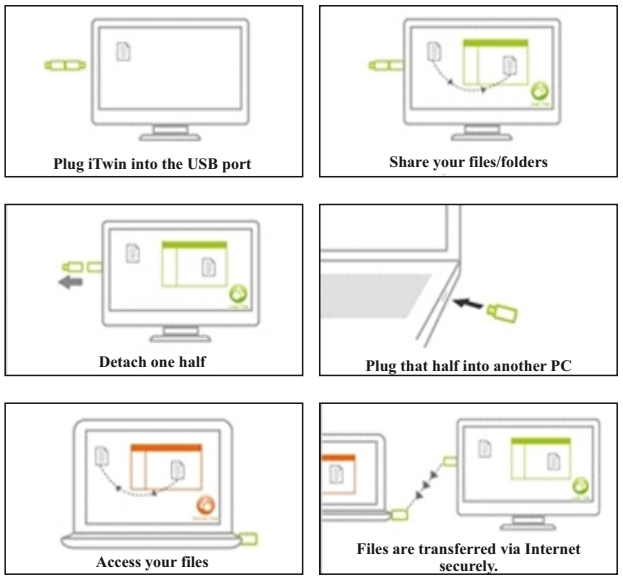
ii) The capability to disable the device remotely if it is lost or stolen.

iii) There are no restrictions in terms of file size or type.

iv) It has secure military grade AES encryption which ensures secure file and data transport.

The disadvantages are:

i) iTwin Connect device is 3.5 inches long in total. That means, when the parts are separated, they are very easily misplaced. When the iTwin Connect USB dongle is plugged in, it can slow down network performance. You have to set up files to share in advance to access them. Requires support for mobile devices.



Divyashree B.S
Donthu Padmesh
HimikaPrakash
Bhavana Vasudev
Deepak VK
V CSE 'A'

HIV test performed on USB stick

USB stick that can perform HIV test has been created. The device, created by scientists at Imperial College London and DNA Electronics, uses a drop of blood to detect HIV, and then creates an electrical signal that can be read by a computer, laptop or handheld device. The disposable test could be used for HIV patients to monitor their own treatment.

Furthermore, the technology could enable patients with HIV to be managed more effectively in remote locations. New research, published in the journal Scientific Reports, shows the device is not only very accurate, but can produce a result in less than 30 minutes.

The new technology monitors the amount of virus in the bloodstream. This is crucial to monitoring a patient's treatment. Current tests to detect the amount of virus take at least three days, often longer, and involve sending a blood sample to a laboratory. In many parts of the world, particularly those with the highest number of HIV infections, such testing does not exist at all.

The current treatment for HIV, called anti-retroviral treatment, reduces virus levels to near zero.

However, in some cases the medication may stop working -- perhaps because the HIV virus has developed resistance to the drugs. The first indication of this would be a rise in virus levels in the bloodstream.

Furthermore, regularly monitoring of viral levels enables healthcare teams to check a patient is taking their medication. Stopping medication fuels HIV drug-resistance, which is an emerging global problem.

Viral levels cannot be detected by routine HIV tests, which use antibodies, as these can only tell whether a person has been infected.

However, monitoring viral load is crucial to the success of HIV treatment. At the moment, testing often requires costly and complex equipment that can take a couple of days to produce a result. We have taken the job done by this equipment, which is the size of a large photocopier, and shrunk it down to a USB chip.

The device, which uses a mobile phone chip, just needs small sample of blood. This is placed onto a spot on the USB stick. If any HIV virus is present in the sample, this triggers a change in acidity, which the chip transforms into an electrical signal. This is sent to the USB stick, which produces the result in a programme on a computer or electronic device.

In the latest research, the technology tested 991 blood samples with 95 per cent accuracy. The average time to produce a result was 20.8 minutes.

The teams are also investigating whether the device can be used to test for other viruses such as hepatitis. The technology was developed in conjunction with the Imperial spinout company DNA Electronics that is using the same technology to develop a device for detecting bacterial and fungal sepsis and antibiotic resistance.

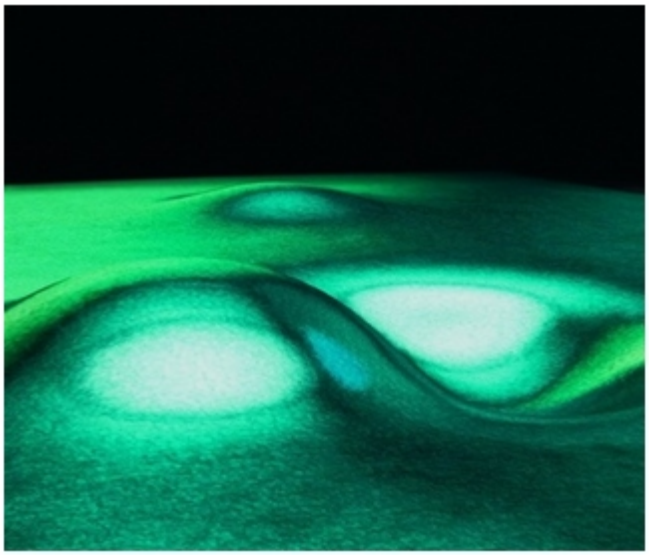
Sumuka G Surabhi N

V CSE B

A NANO DRUM

Researchers at Tata Institute of Fundamental Research (TIFR), Mumbai, have demonstrated the ability to manipulate the vibrations of a drum of nanometer-scale thickness, which would be the world's smallest and most versatile drum. This work, has implications in improving the sensitivity of small detectors of mass, very important in detecting the mass of small molecules like viruses.

They made use of grapheme, a one-atom thick wonder material, to fabricate drums that have highly tunable mechanical frequencies and coupling between various modes. Coupling between the modes was shown to be controllable, which led to the creation of new, hybrid modes and, further, allowed amplification of the vibrations.



The experiment consisted of studying the mechanical vibration modes, or “notes”, similar to a musical drum. The small size of the drum (diameter 0.003 mm, or 30 times smaller than the diameter of human hair) gave rise to high frequencies of vibration for the “nano drum” in the range of 100 megahertz (100 million times/second). The work showed that the notes of these drums could be controlled by making use of an electrical force that bends, or strains, the drum. The bending of the drum also caused different modes of the drum to interact with each other. Using this interaction we can now show that energy can be transferred between the modes, leading to the creation of new “notes” in the drum says under whose supervision this work was carried out. At low temperatures, the high mechanical frequencies would allow studies of energy transfer of a quantum mechanical nature between the notes, says the press release. The coupling between various notes of the drum could also be engineered to work as mechanical logic circuits and lead to improvements in quantum information processing. The ability to amplify the mechanical motion will also help improve the sensitivity of sensors based on nanoscale drums.

Yasha Ravindra

V CSE 'B'

QUIZ Time

1) EdX is a non-profit organization that brings the best of higher education to students of all ages via the internet. EdX is a venture jointly developed by _____.

2) Amazon's search engine has a facility, which allows users to virtually walk down the blocks in US cities. What is the name of this facility and search engine?

3) Who is frequently referred to as the Father of the Indian Software Industry due to his significant contribution in Indian IT industry? He is also the founder and the first CEO of Tata Consultancy Services.

4) Which award is often referred to as the Nobel Prize of Computing?

5) Which Linux OS is named after a South African ideology, roughly translating to English as 'humanity towards others'?

Kunal V

VII CSE 'A'

Answers in next Issue

Answers for quiz: Shell Volume 1 Issue 2

1) Param - India's first supercomputer.
2) The Wiki prayer.
3) Computer Virus
4) Bit Torrent
5) Mario

Departmental Activities

1) Non-Governmental Organization (NGO) Student volunteers from UG program are actively involved in NGO activities. U & I is volunteer driven charitable organization based in Bangalore. Our student volunteers for U & I teach at a school - Nirmala Vidyalaya, near Koramangala, once a week for two hours. They help children aged between 4 years and 7 years,with their English and Communication Skills. Student volunteers: Ms. Meghana S, Ms. Nidhi S, Mr. Kunal V, Mr.Kushal S – all from VII CSE 'A'.

2) Technical talk on Project Management and Finance - An Underappreciated Task Mr. Kailash Bhoopalam at BNMIT, 27th Oct 2016. Project management is a science and art form that is very valuable for successful execution of projects, irrespective of the domain. However, young engineers do not appreciate the role that Project Managers play in managing the costs, schedules, and aspirations of various stakeholders of a project.

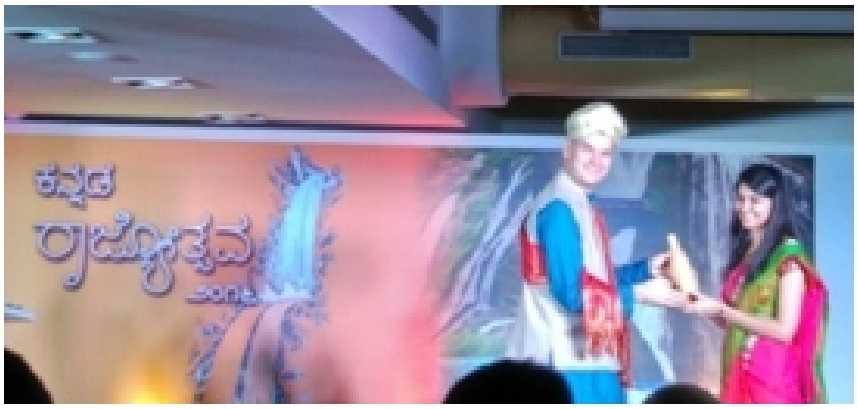
The speaker also mentioned that the young and distinguished engineers in the audience who are soon to join the workforce, will have a better understanding of goals of any project and the role that Project Managers play in accomplishing it.

Students' Achievements

1. Mr. Aashutosh Singh, Mr. Harshith G Guruprasad, Mr. Madhav Ram have been awarded 2nd prize for the project entitled "Bluetooth Control Rover" in the National students' project exhibition-2016, organized by Alpha College of Engineering, Bangalore, in association with All India Council for Technical Education (AICTE), New Delhi, held on 14th May 2016.

2. Mr. Kiran Raju K. participated in the workshop conducted by Jyothi Institute of technology Bangalore, on Android development using Corona SDK tool using the language LUA, R programming and certified in event participation.

3. Mrs. Swathi Ahoka Kumar, M.Tech (CSE) secured 2nd prize in painting competition conducted on behalf of Kannada Rajyotsava in Siemens.



Mrs. Swathi Ahoka Kumar receiving prize from STS, CEO Mr. Klaus

4. BNMIT provides a very good opportunity for pre-final year students to go abroad and get trained in the latest research technologies for a period of 4 weeks. Five students of Computer Science and Engineering were selected for the year 2015-2016:

   1. Ms. Namana M Pawar 2. Ms. Shwetha 3. Ms. Aishwarya S
   4. Mr. Kunal V 5. Ms. Anushka Radhakrishna Kamath

   The Management of BNMIT was magnanimous in supporting these students to go to (Old Dominion University, 4700 Elkhorn Avenue, Suite 3300, Norfolk, VA 23529, USA) and complete their one month "2016 Summer Research Workshop", from 6th of July 2016 to the 4th of August 2016.

   Students were exposed to many of the latest research areas like Image Processing, Web Archiving, Machine Learning and hands on session to Python, Java script, Open CV and other recent tools.

   Ms. Namana M. Pawar was awarded for exhibiting the most "Exceptional Technical Abilities" during the internship and she received a stipend of Rs.30, 000.

Editorial Team

Students

1. Ms. Anagha A -VII A
2. Mr. Sumuka Gummaraju -V A
3. Ms. Surabhi N-V B
4. Mr. Rohan K M -III C

Staff

1. Prof. Sheela Sridhar
2. Prof. Shashikala
3. Prof. Sajitha N