Session 2012-2013

‘Boot’ For Computer

Best of Outstanding Technology

Department of Computer Science & Engineering
Institute of Engineering and Science
IPS Academy, Indore
2012-2013

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Principal Message

Technical Education is the most potential instrument for socio-economic change. Presently, the engineer is seen as a high-tech player in the global market. Distinct separation is visible in our education between concepts and applications. Most areas of technology now change so rapidly that there is a need for professional institutes to update the knowledge and competence.

Institute of Engineering and Science, IPS Academy is a leading, premium institution devoted to imparting quality engineering education since 1999. The sustained growth with constant academic brilliance achieved by IES is due to a greater commitment from management, dynamic leadership of the president, academically distinctive and experienced faculty, disciplined students and service oriented supporting staff.

The Institute is playing a key role in creating and ambiance for the creation of novel ideas, knowledge, and graduates who will be the leaders of tomorrow. The Institute is convinced that in order to achieve this objective, we will need to pursue a strategy that fosters creativity, supports interdisciplinary research and education. This will also provide the students with an understanding and appreciation not only of the process of knowledge creation, but also of the process by which technology and knowledge may be used to create wealth as well as achieve social economic goals.

I am delighted to note that the engineering graduates of this institute have been able to demonstrate their capable identities in different spheres of life and occupied prestigious position within the country and abroad. The excellence of any institute is a measure of achievements made by the students and faculty.

Dr. Archana Keerti Chowdhary
Principal

HOD Message

Today we find that information technology has become overwhelmingly pervasive, while its parent, computing science, has become correspondingly hard to find. While many CS educational institutions have shifted focus from core CS. This is the single most important attribute of the education offered here. Our department has remained true to the vision on which it was founded.

There are several ways to present the canonical core of computer science. Over the years we have developed a distinct style and method that bridges the theory - practice divide while remaining grounded in the core. Technology changes rapidly, especially in the field of computing, whereas the science, if it changes at all, does so much more gradually.

Our Department has produced hundreds of professionals and has established a name for itself in the country and abroad. They have consistently excelled in the highly competitive industrial environment, Best Employer/ awards in top-ranking companies. Learning is a continuous process and does not end with the acquisition of a degree, especially because steady and rapid advances in computing technologies shorten the life of tools and techniques prevalent today. Therefore we do not aim to make our students walking manuals of any language or package. Instead, they are given a strong foundation in computer science and problem-solving techniques, and are made adaptable to changes.

We believe that this approach to teaching-learning, coupled with practical experience gained during Industrial Training in reputed organizations, equips our students to handle the challenges posed by the software industry.

Prof. Namrata Tapaswi

Head CSE

Editorial

Faculty Coordinator

Ms. Shaba Parveen khan

Mr. Pratik jain

Student Editorial Board

Dinesh Kushwah

Ayushi Tugnawat

Shifa Ali

To the Readers

*In continuation of our endeavors to inform, educate as well as provide an opportunity to deserving people. This edition of Magazine '**Boot for Computer'** is the premier chronicler of computing technologies, covering the latest discoveries, innovations, and research that inspire and influence the field. Every year, we bring readers in-depth stories of emerging areas of computer science, new trends in IT, and practical research applications. Faculty and students choose this to debate technology implications, public policies, engineering challenges, and market trends.*

Besides that it doesn't forget its primary objective that is to promote computer science & engineering from its grass root levels. We hope that this edition would be enjoyable as well as informative.

Editors...

Programme Education Objectives

The educational objectives of the Computer Science & Engineering programs are as follows:

1. To prepare students for successful careers in software industry that meet the needs of Indian and multinational companies.
2. To develop the skills among students to analyze real world problem & implement with computer engineering solution and in multidisciplinary projects
3. To provide students with solid foundation in mathematical, scientific and engineering fundamentals to solve engineering problems and required also to pursue higher studies.
4. To develop the ability to work with the core competence of computer science & engineering i.e. software engineering, hardware structure & networking concepts so that one can find feasible solution to real world problems
5. To inseminate in student's professional and ethical attitude, effective communication skills, team work skills, multidisciplinary approach, and an ability to relate engineering issues to broader social context.
6. To motivate students perseverance for lifelong learning and to introduce them to professional ethics and codes of professional practice

Programme Outcomes

An engineering program defines a set of specific program outcomes that relate to its educational objectives, including the items a-k listed below. We regularly review the courses in our curriculum to make sure that all these items are covered, and try to measure whether our students are successfully attaining the following goals:

a. Graduates will demonstrate knowledge of mathematics, science and allied engineering in computer science & engineering.
b. Graduates will demonstrate ability to analysis, design and implement the problems as per user requirements and specification.
c. Graduates will possess strong fundamental concepts on database technologies, operating system, compiler design, networking, data structure, software engineering.
d. Graduates will be able to demonstrate with excellent programming, analytical, logical and problem solving skills.
e. Graduates will demonstrate and ability to visualize and work on laboratory and multidisciplinary tasks.
f. Graduates will demonstrate skills to use modern engineering tools, software's and equipment to analyze problems.
g. Graduates will posses leadership and management skills with best professional ethical practices.
h. Graduates will be able to communicate effectively in both verbal and written form.
i. Graduates will have the confidence to apply computer science and engineering solution for the welfare of human being.
j. Graduates will enhance their self confidence and capable of being a kaizen.
k. Graduates can participate and succeed in competition examination like GATE, GRE, IES etc.

Departmental Information

Name and address of the department:

Department of Computer Science & Engineering
Institute of Engineering and Science, IPS Academy
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Head of the Department

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HOD, Computer Science & Engineering
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History of the department:

The Department of Computer Science & Engineering was established in the year 1999 offering Bachelor of Engineering (BE) with intake 60, it has increased to 120 in year 2012. The programme is intended to educate students on the applications of scientific knowledge for practical purposes involving activities like modeling, analysis, design and other associated fields of core courses in Computer Science & Engineering education. It intends to equip graduates with profound theoretical knowledge and rich hands on experience.

Vision & Mission of the Department

Vision

Attaining global recognition in computer science and engineering education, research and training to meet the growing needs of the industry and society

Mission

Provide quality undergraduate and postgraduate education, in both the theoretical and applied foundations of computer science, and train students to effectively apply this education to solve real-world problems, thus amplifying their potential for lifelong high-quality careers.

Department Faculty Details

 \ Dr. Namrata Tapaswi HOD & Professor	 Mr. Jayesh Gangarade Associate Professor	 Mr. Arvind Upadhyay Associate Professor	 Mr.Neeraj Shrivastava Associate Professor
 Mr. Sunil Nimawat Assistant Professor	 Mr.Sourabh Jain Assistant Professor	 Ms.Shruti Sharma Assistant Professor	 Ms.Shaba P Khan Assistant Professor
 Mr.Deepak Shukla Assistant Professor	 Ms.Nisha Bhalse Assistant Professor	 Ms.Shweta Gangrade Assistant Professor	 Mr.Vijay Choudhary Assistant Professor

 Mr.Yagyapal Yadav Assistant Professor	 Mr.Neeraj Mehta Assistant Professor	 Mr.Ved Kumar Gupta Assistant Professor	 Ms.Anjali Verma Assistant Professor
 Mr. Anil Panwar Assistant Professor	 Ms.Barkha Sahu Assistant Professor	 Ms.Vaishali Gupta Assistant Professor	 Mr.Sudhir Kumar Patidar Assistant Professor

Department Membership

Department of Computer science & engineering is having the membership of Computer society of India (CSI). Three programs were organized under the banner of CSI in which one week program on Android Application Development, one day program on Technical quiz by Department Level.

Sports Activities

Students had received winner & runner up awards in different sports activities (IPSA Level) were Cricket Competition (Boys), Basketball (Boys), Volleyball (Girls), Shot-put (Boys & Girls), Table Tennis (Boys), Chess (Boys & Girls), and Caroms (Boys & Girls).

1. Big Data

Big data is the term for a collection of data sets so large and complex that it becomes difficult to process using on-hand database management tools or traditional data processing applications. The challenges include capture, curtain, storage, search, sharing, transfer, analysis and visualization. The trend to larger data sets is due to the additional information derivable from analysis of a single large set of related data, as compared to separate smaller sets with the same total amount of data, allowing correlations to be found to spot business trends, determine quality of research, prevent diseases, link legal citations, combat crime, and determine real-time roadway traffic conditions.

As of 2012, limits on the size of data sets that are feasible to process in a reasonable amount of time were on the order of Exabyte of data. Scientists regularly encounter limitations due to large data sets in many areas, including meteorology, genomics, connectomics, complex physics simulations, and biological and environmental research. The limitations also affect Internet search, finance and business informatics. Data sets grow in size in part because they are increasingly being gathered by ubiquitous information-sensing mobile devices, aerial sensory technologies (remote sensing), software logs, cameras, microphones, radio-frequency identification readers, and wireless sensor networks. The world's technological per-capita capacity to store information has roughly doubled every 40 months since the 1980s; as of 2012, every day 2.5 hex bytes (2.5×10^{18}) of data were created. The challenge for large enterprises is determining who should own big data initiatives that straddle the entire organization.

Big data is difficult to work with using most relational database management systems and desktop statistics and visualization packages, requiring instead massively parallel software running on tens, hundreds, or even thousands of servers. What is considered "**big data**" varies depending on the capabilities of the organization managing the set, and on the capabilities of the applications that are traditionally used to process and analyze the data set in its domain. For some organizations, facing hundreds of gigabytes of data for the first time may trigger a need to reconsider data management options. For others, it may take tens or hundreds of terabytes before data size becomes a significant consideration.

Based on **TCS 2013 Global Trend Study**, huge improvements in supply planning and boost product quality are the greatest benefit of Big Data for manufacturing. Big Data provides an infrastructure for transparency in manufacturing industry, which is the ability to unravel uncertainties such as inconsistent component performance and availability. Predictive manufacturing as an applicable approach toward near-zero downtime and transparency requires vast amount of data and advanced prediction tools for a systematic process of data into useful information. A conceptual framework of predictive manufacturing begins with data acquisition where different type of sensory data is available to acquire such as acoustics, vibration, pressure, current, voltage and controller data. Vast amount of sensory data in addition to historical data construct the "**Big Data**" in manufacturing. The generated Big Data acts as the input into predictive tools and preventive strategies such as Prognostics and Health Management (PHM).

Architecture: In 2004, Google published a paper on a process called Map Reduce that used such architecture. Map Reduce framework provides a parallel processing model and associated implementation to process huge amount of data. With Map Reduce, queries are split and distributed across parallel nodes and processed in parallel (the Map step). The results are then gathered and delivered (the Reduce step). The framework was incredibly successful, so others wanted to replicate the algorithm. Therefore, an implementation of Map Reduce framework was adopted by an Apache open source project named Hadoop.

MIKE2.0 is an open approach to information management that acknowledges the need for revisions due to big data implications in an article title Big Data Solution Offering. The methodology addresses handling big data in terms of useful permutations of data sources, complexity in interrelationships, and difficulty in deleting (or modifying) individual records.

Recent studies show the use of multiple layer architecture as an option to Big Data. The Distributed Parallel architecture distributes data across multiple processing units and parallel processing units provide data much faster, by improving processing speeds. This type of architecture inserts data into parallel DBMS, which implements the use of Map Reduce and Hadoop frameworks. This type of framework looks to make the processing power transparent to the end user by using a front end application server.

Some facts that you may or may not know:

400 millions tweets are done daily.

- 1 million transactions are handled by Walmart each hour.
- Comparison showing performance upgrade in speed of Disks….
    - Traditional Hard disk: - up to 100 MB/sec.

- Solid State Hard disk: - up to 550 MB/sec.

Thinking this is a good performance upgrade we have achieved Well Think again???

Data is doubling in size every 18 months…

- Yahoo claims that by 2015 50% of enterprise data will be processed using Big Data processing software suites like Hadoop.

Alpa Chhariya (0808CS101004)

2. Gesture Recognition Technology

Gesture recognition is a topic in computer science and language technology with the goal of interpreting human gestures via mathematical algorithms. Gestures can originate from any bodily motion or state but commonly originate from the face or hand. Current focuses in the field include emotion recognition from the face and hand gesture recognition. Many approaches have been made using cameras and computer vision algorithms to interpret sign language. However, the identification and recognition of posture, gait, proxemics`, and human behaviors is also the subject of gesture recognition techniques. Gesture recognition can be seen as a way for computers to begin to understand human body language, thus building a richer bridge between machines and humans than primitive text user interfaces or even GUIs (graphical user interfaces), which still limit the majority of input to keyboard and mouse.

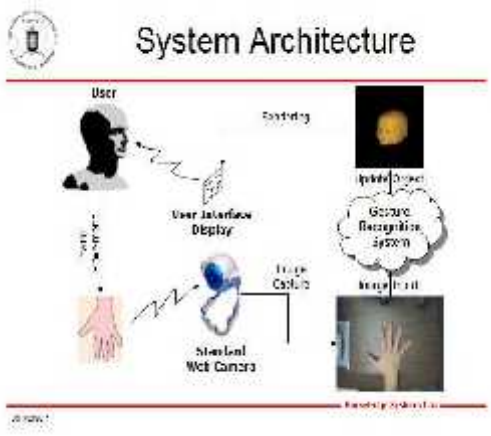
Interface with computers using gestures of the human body, typically hand movements. In gesture recognition technology, a camera reads the movements of the human body and communicates the data to a computer that uses the gestures as input to control devices or applications. For example, a person clapping his hands together in front of a camera can produce the sound of cymbals being crashed together when the gesture is fed through a computer. One way gesture recognition is being used is to help the physically impaired to interact with computers, such as interpreting sign language.

The technology also has the potential to change the way users interact with computers by eliminating input devices such as joysticks, mice and keyboards and allowing the unencumbered body to give signals to the computer through gestures such as finger pointing. Unlike haptic interfaces, gesture recognition does not require the user to wear any special equipment or attach any devices to the body. The gestures of the body are read by a camera instead of sensors attached to a device such as a data glove.

In addition to hand and body movement, gesture recognition technology also can be used to read facial and speech expressions (i.e., lip reading), and eye movements. The literature includes ongoing work in the computer vision field on capturing gestures or more general human pose and movements by cameras connected to a computer.

Gesture Only Interfaces:

The gestural equivalent of direct manipulation interfaces is those which use gesture alone. These can range from interfaces that recognize a few symbolic gestures to those that implement fully fledged sign language interpretation. Similarly interfaces may recognize static hand poses, or dynamic hand motion, or a combination of both. In all cases each gesture has an unambiguous semantic meaning associated with it that can be used in the interface.



Tracking Technologies

Gesture-only interfaces with syntax of many gestures typically require precise hand pose tracking. A common technique is to instrument the hand with a glove which is equipped with a number of sensors which provide information about hand position, orientation, and flex of the fingers. This uses thin fiber optic cables running down the back of each hand, each with a small crack in it. Light is shone down the cable so when the fingers are bent light leaks out through the cracks.Measuring light loss gives an accurate reading of hand pose. The Dataglove could measure each joint bend to an accuracy of 5 to 10 degrees, but not the sideways movement of the fingers (finger abduction).

Gesture Based Interaction

The Cyber Glove captures the position and movement of the fingers and wrist. It has up to 22 sensors, including three bend sensors (including the distal joints) on each finger, four abduction sensors, plus sensors measuring thumb crossover, palm arch, wrist flexion and wrist abduction. Once hand pose data has been captured by the gloves, gestures can be recognized using a number of different techniques. Neural network approaches or statistical template matching is commonly used to identify static hand poses, often achieving accuracy rates of better than 95%

Time dependent neural networks may also be used for dynamic gesture recognition, although a more common approach is to use Hidden Markov Models. With this technique Kobayashi is able to achieve an accuracy of XX%, similar results have been reported by XXXX and XXXX. Hidden Markov Models may also be used to interactively segment out glove input into individual gestures for recognition and perform online learning of new gestures (Lee 1996).

In these cases gestures are typically recognized using pre-trained templates; however gloves can also be used to identify natural or untrained gestures. Wexelblat uses a top down and bottom up approach to recognize natural gestural features such as

finger curvature and hand orientation, and temporal integration to produce frames describing complete gestures. These frames can then be passed to higher level functions for further interpretation.

Apeksh Agarwal (0808CS111012)

3. Technology as an Influence on Teens

Technology is relatively new in terms of its prevalence with children. As many parents are up-to-date with the latest gadgets, they tend to have little knowledge on the possible effects technology might bring. But technology, while useful, brings many negative effects to teens' lives. Parents who have technophile kids should be aware of the possible risks and dangers.

Informed parents know that the media blows the prevalence of online sexual predators out of proportion. However, they do exist, and they often go after easy targets, namely children. Technology such as the Internet and smart phones give both children and predators the ability to make contact with large amounts of new people. Uninformed children might feel they are making a friend but in fact are running the risk of being preyed upon. The key risk here, though, is not the predator but the lack of adult knowledge about technology and the lack of supervision parents give to their children's online behaviors. Parents who feel bad prying into their children's lives are ignoring the fact that most children, especially teens, are sexually curious, willing to take risks, and have poor decision-making behaviors. So, while not common, sexual predators do exist and should be

something parents talk to their kids about before allowing them full reign online.

Clinical coordinator at Illinois Addiction Recovery Shannon Chris more wrote in the book, "Internet Addiction: A Handbook and Guide to Evaluation and Treatment," about the co morbidity between technology addiction and other mental health problems, mainly depression and anxiety disorder. Chris more found that 76 percent of those seeking treatment for technology addiction were also positive on a depression diagnosis; 24 percent were positive on an anxiety disorder diagnosis. The more children use technology, the more likely they are to fall into habits or emotions that lead to other mental health disorders. For example, spending most of your time playing online games leaves little time to develop meaningful relationships or social skills. The result can be a lack of friends and social awkwardness in school. This

feeling of being unaccepted can result in depression or anxiety.

Technology today makes many things possible that were impossible in the past. Today, through smart phone apps or social media sites, kids are connecting with others like them. The problem with this is that groupthink can develop. Whereas a diverse social group or a social group supervised by adults will quickly bring to parents' attention to problem behaviors, these "under-the-radar" kid-to-kid relationships often encourage risk-taking. For example, teens who wish to experiment with alcohol might go online to seek out an adult who can supply them with beer or liquor. Some of the conversations online are completely focused on risky or illegal activities, such as those in forums dedicated to drug use or vandalism.

Technology is fun, which, surprisingly, can be a huge problem. The release of dopamine children receive when engaging in certain types of technology use is addictive. The mental response to technology addiction is similar to that of substance abuse, according to the founder of The Center for Internet and Technology Addiction, David Greenfield, who wrote a section of the book "Internet Addiction: A Handbook and Guide to Evaluation and Treatment." The good feelings brought on by dopamine during a fun technology session are the feelings that both start an addiction and drive addictive behavior, such as sudden urges to use technology at inappropriate times, including during class, church and the family dinner. Technology is not all bad. When used in the right way, children can benefit from the advantages of technology. For example, the availability of information online allows children to easily find answers to their many questions and collect data for school projects. The social side of technology also brings some advantages, giving kids the capacity to make new friends, expanding their social networks. Teens with weaker social skills, such as the autistic and those with Asperser's, might find the Internet and technology such as smart phones as suitable substitutes to face-to-face communication in many cases. With supervision, children can gain the advantages of technology while avoiding the many traps it brings.

Kratika Purohit (0808CS101024)

4. Apps That Can Make You More Productive

SkyDrive(free)

Microsoft's cloud service, SkyDrive, combines online storage with document creation, editing, and syncing, much like Google Drive does. SkyDrive is a cornerstone of Microsoft's next big operating system version, Windows 8. The Web apps for creating files mimic Word, Excel, and PowerPoint, and all the core features and functionality are there.

IBM Lotus Symphony 3.0

IBM Lotus Symphony 3.0 is the best free productivity suite you've probably never heard of. Expert users who need to open files in a wide range of formats, including

Microsoft Works, Corel WordPerfect, or Lotus WordPro, will prefer LibreOffice, because Lotus Symphony only imports Microsoft Office and OpenOffice.org documents—but that's all that almost every office environment ever needs.

Mention

The search-and-alert program Mention takes the concept of Google Alerts and blends it with social media monitoring tools, resulting in one rich package for businesses. Mention actively searches the Web and social media sites for key terms of your choosing, with advanced search criteria available, and in multiple languages. Mention is much richer than Google Alerts. There's a lot to uncover in this wonderful program.

OfficeTime

Freelancers, contractors, and others in the self-employed ranks grapple with the administration and paperwork that comes with running a small business. OfficeTime tracks how much time you spend on various projects and tasks while you're working, and it shows the minute-by-minute costs as they accumulate, or with numbers rounded however you choose. And whenever you can decrease the time spent managing yourself, you're likely to be worlds more productive.

SohoOS

SohoOS has set out on an understated undertaking: to create an online operating system for the small office/home office (SOHO) market. In addition to bundling all the tools you need to manage your small business—project management, inventory management, invoicing, payments processing, CRM, reporting, and more—SohoOS suggests a seductive price point: free. If you accept that SohoOS isn't a premium service, and that its aim is to bundle previously pricey features into a cohesive whole, Soho not only makes sense, it makes a stir.

Prezi.com

Prezi.com is one of one of a new generation of cloud-based presentation apps. It uses Adobe's Flash technology to create animated presentations with a few clicks and drags. Instead of creating a series of separate slides, you put all your content—text, graphics, captions—on a single canvas, and then you trace a path from one item to another.

TeamViewer

If you're looking for feature-packed remote control, desktop sharing, and presentation software, TeamViewer is both the simplest and most powerful option. Businesses will have to shell out a bunch up front (a lifetime license is $795), but individuals can use it free. Either way, it's a very good deal.

ABBY FineReader

ABBYY FineReader 11 is optical character recognition (OCR) software that can handle difficult and massive jobs, like converting complex tables into usable spreadsheets, or scanning a hundred-year-old book into a searchable PDF. It even masters weird-looking typefaces. If you often need to copy text from images found on the Web, you

need to get the most accurate possible text out of images on your disk or documents that you've fed to a scanner, or you want to convert a scanned document into HTML or into the ePub format used by e-readers, the app that gets those jobs done best, too, is ABBYY FineReader.

Doodle.com

Doodle has long been my go-to tool for scheduling with large groups of people, whether I'm planning a virtual meeting with people from around the world, or just trying to find a suitable night when all my friends are free to have dinner. With a free Doodle account, you can create simple polls where invitees mark themselves as free, busy, or available-if-need-be. There are more features and functions, too, especially if you pony up for a paid account, but Doodle's scheduling capabilities eliminate so much back and forth that this one feature alone makes it an essential tool in a productivity lover's kit.

Dragon NaturallySpeaking 12 Premium

Dragon NaturallySpeaking 12 is an extremely accurate dictation-transcription and voice command tool from Nuance Communications. With Dragon and your voice, you can control virtually any computer program, after getting over an acceptably small learning curve. Loaded with features that you didn't know you needed, Dragon NaturallySpeaking solves so many problems: it makes writing faster, relieves carpal tunnel syndrome and other mobility issues, creates closed-captioning for lectures, removes spelling anxiety, and on and on. Dragon is ripe for being co-opted for many purposes far beyond dictation/transcription, making it an amazing productivity booster.

Harshit Sethi(0808CS101020)

5. NuCaptcha & Traditional Captcha

NuCaptcha is operated by NuCaptcha Inc. and is a patent-pending Captcha platform that has taken three years of development to bring it to where it is today: the #1 Captcha platforms for security and usability in the world. The considerations outlined below are intended to explain the key differentiators that NuCaptcha provides as a platform. Traditional Captcha has been in use for over a decade. One commonly seen example of traditional Captcha is provided by reCAPTCHA a free Captcha service operated by Google which focuses on translating English text from books to digital format. Other examples of traditional Captcha can be found on sites related to entities such as Microsoft, Yahoo and others as described in a study performed by Stanford University in March, 2010.

Assessment

This document is an assessment on the differences between NuCaptcha and traditional Captcha. Based on over three years of research and discussions with hundreds of businesses, NuCaptcha has found that companies today have a need for

a Captcha service as part of their application security layer.

This Captcha requirement is broken down into four key areas:

[1]Security
[2]Ease of Use
[3]Platform Support
[4]Enterprise Ready

Consideration 1: Security

The primary consideration of any Captcha system must be security. Without security, there is little value in placing a Captcha on a web page. This section outlines three key security differentiators between NuCaptcha and traditional Captcha.

Behavior Analysis

Most traditional Captcha systems do not use behavior analysis or use only a rudimentary one that simply measures the solve rate of an IP address. For example, in one system it is reported that if the success rate drops below 50% over 32 attempts, the IP is flagged, and the user must consistently solve both words displayed to proceed. NuCaptcha has developed a sophisticated Behavior Analysis technology that can modify the security of the Captcha in real-time on a per-user basis. This behavior analysis system works on three levels:

1. The system measures how a user interacts with the Captcha system, and scores their behavior as it deviates from the norm.
2. The system measures how a user interacts with the Captcha system, and scores their behavior as it relates to previously detected risky patterns of behavior.
3. A rule-based system is applied to modify the users score that can be customized and integrated with the website/application's other security measures.

The result is a score that determines a relative risk level of the user, and is used to pick the security level of the puzzle to display. This system allows NuCaptcha to maximize usability for low-risk users and ramp up security for less trusted users.

Figure 1: Sample screenshot non animated security settings for NuCaptcha

Consideration 2: Ease of Use

All Captcha systems must balance between security and usability. Generally, increasing security reduces usability. NuCaptcha increases ease of use through two methods: Animation and Behavior Analysis. As discussed above, animation itself doesn't increase security, the increase in overlap does. However, animating the characters relative to each other makes them easier to read when they are highly overlapped as compared to a static image with similar

amounts of overlap. This is what allows NuCaptcha to increase the overlap (security) of the puzzles while still being easy to use.

Consideration 3: Platform Support

A Captcha system must work across all platforms, including mobile. It should work natively in all browsers and configurations, and should not require any plug-ins or features not common to all browser configurations "out of the box". For the user, it must just work. Always. NuCaptcha is a video based Captcha that examines the capabilities of the browser in real-time and displays the best possible Captcha based on that browser configuration. No plug-ins are required, no fancy CSS or HTML5 features, no Flash, not even JavaScript. No matter the configuration, it'll just work- always.

Consideration 4: Enterprise Ready

Each of our enterprise customers has had their own unique requirements that NuCaptcha has met. Meeting these requirements is only possible with the support and customization available from NuCaptcha as compared to traditional Captcha system's one-size-fits-all approach to providing Captcha security.

Some key Enterprise Ready NuCaptcha differentiators:

*NuCaptcha provides an SLA with a guaranteed 99.99% availability.

*NuCaptcha provides both integration and ongoing development support.

*NuCaptcha provides customizable security settings to support each customers unique balance

between security and usability.

*NuCaptcha provides a real-time data stream on the risk of individual users, as well as a dashboard to monitor how your site is performing.

*NuCaptcha provides full customization of the skin, help text, and Captcha.

*NuCaptcha provides true multi-national support with per-language customization.

Mayank Jain(0808CS101029)

6. Motion control - wave to the future

Motion control has come on in leaps and bounds (and swipes and punches) in recent years, and hardware companies are getting all e-motional in a bid to engage with users. But do we really know what to use it for yet?

Smart phones and tablets have led us into a touchable digital world. Gone are the days of pressing keys and moving a scroll wheel. Now we expect instant feedback via touch controls and air-based gestures are the next natural step for this type of interaction.

Companies like Leap Motion are looking to make waves in the human-computer

interface market with a product that enables users to manipulate on-screen items not with a joystick or a mouse or a gadget of any kind, but directly with hand gestures.

Last year, Hewlett Packard announced an expanded partnership with Leap Motion that saw gesture-based controllers embedded in a range of HP laptops. And with Apple patenting a touchless control interface, it's time for manufacturers to start thinking about the next steps in user interaction.

Norwegian startup Elliptic Labs has made an ultrasound software development kit (SDK) that uses sound waves to interpret hand movements. Then there's Prime Sense, the company behind gesture control for Microsoft's Xbox Kinect, which recently demonstrated a smaller version of the Kinect sensor working with a Nexus 10 tablet at a Google developers' conference in May.

However, it's Leap Motion that has arguably the biggest potential to reach users.

Founded as OcuSpec in 2010, Leap Motion has amassed a global developer base tasked with creating apps for its gesture-based controller, which can be bought as a plug-and-play USB device or picked up as an embedded peripheral in laptops and keyboards.

CEO and co-founder Michael Buckwald has been busy promoting the application store where several developers have created applications for the device.

"One of the things we've done over the past few months is create a new module reference design that takes the module at the top of the peripheral, which is about 10mm, and reduce it to 3.5mm so that it's easy to be embedded in things like laptops and ultra-thin keyboards," he says. The company expects to launch a version for tablets and smart phones later this year.

Wand TV control

At the annual Consumer Electronics Show Las Vegas in January, Samsung took the wraps off its brand-new TV remote control. It has every control method imaginable baked in, from buttons to a touch pad to motion control and even voice recognition.

"As more and more functions are added to TVs, the remote control is also evolving to accommodate the added functions," says Kwang Ki Park, Samsung's executive vice president of visual display sales and marketing. "We will continue to work so that our customers can use remote control more intuitively and easily."

Other features on the new remote include'a"Soccer Mode' button, which apparently flicks your TV over to a set of interface and screen modes custom-built to best show off the football, and 'Multi-Link Screen' which is a fancy picture-in-picture mode. The new controller was on display with Samsung's new 110in Ultra HD TV at the show.

As ever, Samsung will want to steal a march on any motion-control interface that rival Apple may introduce in the near

future. But motion control has been touted for TV for several years. In fact, Philips has long been demonstrating a gesture control device – but so far there has been little uptake by other TV manufacturers of their technology.

Television remote controls haven't changed a great deal since they were invented. The first generation looked more or less as they do now, but was often connected to your equipment with a cable. Philips's idea is a gesture-control device called u Wand. It's exactly that: a wand, which you use to move through your TV's menu systems.

It is reminiscent of the Nintendo Wii remote, with the difference being that the Wii controller is designed for playing games – something that's obvious when you try to use it to press buttons in the console's menus, which is fiddly and annoying. The u Wand is much smoother. The cursor doesn't jump about all over the place, and grabbing hold of things in the menus is simple.

Perhaps now is finally the right time for the u Wand. Modern televisions are dominated by menu systems, especially for using the programme guides. On a standard remote, navigating through listings requires countless button presses, and is quite a pain to use. The uWand simplifies that by letting you scroll with a twist of the controller and select items to see in more detail with a large 'OK' button, one of only three physical controls on the remote.

What's more, you can record a programme by dragging the name of the show from the EPG to a drop zone. This makes recording things much faster than messing around with arrow keys and buttons.Early versions of the controller employed a Wii-style sensor bar, which feeds back information to the remote about positioning. Philips says that when it makes its way into TVs, it will simply be integrated into the bezel. The remote communicates via radio frequency at the moment, but Bluetooth connectivity is in the pipeline.

Philips won't be keeping this technology to itself; any TV manufacturer can license it, with the hope that viewers will soon be able to interact with their new TVs in an entirely new and more logical manner. Whilst Philips has developed the hardware, user interface design will be handled by the TV manufacturers. Philips is also keen to point out that the uWand is well-suited to navigating around a 3D environment too.

Sonar

All the gesture and motion control technologies currently being promoted are line-of-sight or gyroscopic based – except one. Elliptic Labs is a Norwegian based company that has developed gesture recognition technology using ultrasound for touch-less gesturing smartphones and Windows PCs."It enhances the way you interact with applications, such as browsing through pictures, social media and games like Fruit Ninja or Subway Surfer; it uses little power, and works in low light or in the dark."The software can recognise gestures within 180 degrees from the front of a display at a range of 50cm to a metre away from it. Developers or users can create their

own gestures in ways that help them navigate quickly.

The Elliptic SDK is currently being licensed to mobile phone ODMs in collaboration with Wolfson Microelectronics for use with its Audio Hub chip and MEMs microphone technology operating at around 40 KHz – although it can operate at higher and lower frequencies – explains Haakon Bryhni, chief technical officer, for Elliptic Labs who is based at the company's Norwegian R&D centre."Along with voice control, touch less gesture control is fast becoming one of the'next-generation human/machine interfaces for mobile and wearable devices," says Andy Brennan, commercial director for Wolfson.The main push for Wolfson and Elliptic appear to be mobile. At the upcoming Mobile World Congress, Elliptic Labs will be present and will demonstrate its technology to potential original device manufacturers (ODMs) at the mobile industry's annual tech jamboree. No mobile phone company has currently announced that it is to incorporate the Wolfson/Elliptic Lab touchless gesture platform, but Danielsen claims that we will see devices with their technology later this year.Gesture controls certainly have the potential to improve the existing interface experience, and there is a huge opportunity for a number of tech companies to define the future of gesture controls. The marketplace is ready and waiting for that one killer application to take us to the next level of human/interface interaction.

Ramlakhan Pawar(0808CS113D06)

7. Inviting machines in to body

In what amounts to a fairly shocking reminder of how quickly our technologies are advancing and how deeply our lives are being woven with networked computation, security researchers have recently reported successes in remotely compromising and controlling two different medical implant devices. Such implanted devices are becoming more and more common, implemented with wireless communications both across components and outward to monitors that allow doctors to non-invasively make changes to their settings. Until only recently, this technology was mostly confined to advanced labs but it is now moving steadily into our bodies. As these procedures become more common, researchers are now considering the security implications of wiring human anatomy directly into the web of ubiquitous computation and networked communications.

Barnaby Jack, a researcher at McAfee, was investigating how the wireless protocols between implants and their remote controllers opened up potential vulnerabilities to 3rd party attacks. Working with instrumented insulin pumps he found he could compromise any pump within a 300-foot range. “We can make that pump dispense its entire 300 unit reservoir of insulin and we can do that without requiring its ID number”, he noted, adding that

making the device empty its entire cartridge into a host's bloodstream would cause "deep trouble". Previously, independent security researcher Jerome Radcliff, a diabetic and insulin pump recipient himself, showed a crowd at the 2011 Black Hat Security Conference how he could wirelessly hack into his own pump to obtain its profile, then alter it in a way that would modify his prescription when sent back to the device.

In another case, computer science researcher and professor at the University of Massachusetts Amherst, Kevin Fu, found that by interrogating an implantable heart defibrillator he could capture its signal and use the identifier to remotely turn the device on & off. This would have potentially catastrophic effects for a patient relying on such a device to maintain a steady heart rhythm. Many new pacemakers include wireless components and remote authentication schemes that are open targets for potential attackers. A near-future wireless implant ecosystem might become a target for scripts looking to scour data or add more microcontrollers to their botnets.

Over the past 15 years these types of malevolent attacks have become the driver for a suite of best-practices used to design security into wireless consumer goods. Until recently, little thought was given to the same challenges in connected devices implanted into our bodies, mainly because there wasn't much reason to do so. Both the threats and the devices were mostly the province of science fiction and outlier scenarios. But with the advancing pace of convergence & computation we're now at the advent of a new era marked by the steady ingression of such devices into our bodies, used to manage chronic conditions and preserve us from untimely expiration.

There are now numerous examples of in-the-field connected implants. Stanford researchers have developed a wireless retinal implant that allows the blind to recover the beginnings of sight. The implant takes a video feed from a camera mounted on a pair of eyeglasses and beams it as near-infrared light to a chip implanted at the back of the eye, stimulating retinal nerves to pass visual data to the cortex. In trials, blind users were able to see rudimentary lines and shadows. This device overcomes existing power limitations via a wireless connection to its battery pack. If the power to such a device is cut, the user returns to darkness. Perhaps future devices might allow capture of the visual stream entirely (while hopefully defending against intrusive feed-jacking and advert bill-boarding).

The UK company, Retina Implant, is conducting human trials of its own technology that improves on the Stanford implementation by removing the need for an external camera. To treat those with blindness due to retinitis pigmentosa their device uses a microcontroller that includes a pixel array and two photocells sitting at the back of the retina. As light comes in it is transduced and passed as electrical signals to the optic nerve. Although not implemented in their initial trial, the next-generation device will receive its power from a wireless source. It would seem a fairly simple proposition to extend wireless

control to include modification of brightness & contrast settings, addition of new visual filters, and sensing capabilities to report on energy use, heat levels, or perhaps the robustness of surrounding cellular structures. Once the transduction language is optimized it would be possible to draw additional images onto the optic nerve, such as alpha-blended head's-up annotations, rendering augmented reality directly onto the optic nerve.

I spoke with a surgeon at the University of Florida working in pain management who told me of an implanted mat that wraps around a part of the spine in a way that interfaces with nerves targeting a specific locus of chronic pain, such as a joint injury. The mat can be remotely programmed to provide varied modulation of the nerves to assist in pain relief. When I suggested it won't be long before you can control your pain management mat with your iPhone he didn't even blink, saying simply "Oh, yeah". Remote microcontrollers are extended by the supercomputers in our hands and will draw 3rd party services into this new relationship.

These somewhat rudimentary examples are notable not only because they signal the evolution of implantable medical devices to include wireless components and over-the-air authentications but also because they illustrate the flow of capital investments into such technologies. The past 10 years have shown countless research papers published out of labs working to bring more sophisticated microcontrollers into alignment with real-time remote communication protocols. Now this research has moved out of the labs as viable commercial applications finding their way into our bodies. On the wave of capital flowing from the aging Boomer generation ride innumerable start-ups seeking funding rounds to finance their biomedical devices. As this young industry matures, regulatory agencies and standards bodies are taking notice.

To manage the frequency needs of these new connected implants the FCC has proposed to set aside a spectrum of wireless bandwidth reserved specifically for their use.

The IEEE recently published a new standard, IEEE 802.15.6(TM)-2012, "optimized to serve wireless communications needs for ultra-low power devices operating in or around the human body". The Department of Homeland Security's National Cyber security and Communications Integration Center (NCCIC) published a report provocatively titled "Attack Surface: Healthcare and Public Health Sector" [PDF] offering guidance for addressing the apparent oncoming onslaught of hackers seeking to compromise our implants. Offering a bit of a twist on implant-enabled attack surfaces, the TSA recently diverted a US Airways flight when a passenger told a steward that she had special needs due to a surgical implant.

It seems the TSA is growing concerned about implanted explosive devices. No doubt additional regulatory structures will evolve to address wireless implant tech though such controls may not reach the

back-alley biotech shops in Bangalore, Lagos, Sao Paolo and similar destinations across the developing world less encumbered by such oversight.

Wiring up our medical implants to remote processes provokes discussion of many significant implications. Security is obviously a concern and the recent movement of government agencies to address the issue reinforces the imminence of its arrival while hopefully re-assuring potential recipients that such devices will be adequately secured and quality-controlled. As we instrument ourselves and connect to standard digital communication protocols 3rd parties will inevitably move into the interstitial space. While some may be malevolent, many will be motivated by the same somewhat uneasy combination of self-interest and do-gooder-ness that drives the rest of our economy. Service layers will be built to manage the patient-implant-doctor relationship, enabling more precise on-demand control while sending real-time data to medical analytics dashboards. Messaging will pass event commands to your devices and notifications to your doctors. As this data flows off of 3rd party micro machines and through 3rd party service providers' questions of data access & ownership will further erode the boundaries between our bodies and the web of information in which we're embedding.

Like all good service platforms, API's will be developed around these device-data ecosystems to make them standardized, interoperable, and social. It's safe to assume that some sort of mobile application layer will evolve to give us greater insight and more immediate control over our biological processes. Inviting the Internet of Things into our bodies may very well reveal much more information about physiology and biochemistry while potentially opening up entirely new behaviors & capabilities. Efforts in brain-machine interface are opening up the likelihood of bionics to replace lost limbs and to overcome motor disorders. As neural implants mature and the precision of their capture & transduction capabilities converges with wireless communication, how long might it be until we have some rudimentary degree of telepathy based simply on familiar http & REST protocols dancing across the FCC-approved wireless implant spectrum? Will a time come when we fall asleep counting electric sheep streamed directly into our brains from the devices on our bedside?

It's worth considering those who are already moving into this new relationship, like Cathy Hutchinson who recently overcame 15 years of paralysis by using her mind alone to direct a robotic arm to deliver a cup of coffee to her lips. What sort of future cyber morphology might she be stepping into? Might the aging western nations invest their 1st World retirement savings into biocybernetics, stepping away from the un-augmented masses across some future transhumant gap?

Computation has reliably gotten smaller and more powerful, instrumented with greater capacity to sense surrounding conditions and to communicate across the air with a global mesh of sympathetic devices. We now hold incredible amounts of computational power in our hands and

these devices sit adjacent to literally billions of sensing & communicating microcontrollers embedded into infrastructure, machines, tools, goods and garments. On top of this mesh we've built vast service layers to stretch greater utility across their abstracted functional landscapes. Our never-ending medical needs seem to compel us to draw these solutions into our own bodies in hopes of some great cybernetic control to stave off infection, malaise, chronic suffering, and untimely demise. As we grow more comfortable with them we'll inevitably begin self-tuning for optimizations, enhancements, and special powers. Yet, if we are to jump into the technological convergence, instrumenting and extending and connecting ourselves through a sort of soft machine hybridization, network security will be only one concern on the road to a new form of humanity that may challenge our very notion of what it means to be human. Chris is a researcher at the Hybrid Reality institute. He is an independent researcher, analyst, and innovation strategist in the San Francisco Bay Area.

Parag Neekhra(0808CS101042)

8. Smoke Detector/Sensor

Where there's *smoke*, there's fire and we usually don't amuse ourselves with the idea of having a fire anywhere else other than a fireplace. So, we equip ourselves with an arsenal of early detection sensors that can help avert a potential disaster to life and property. One of the chief whistleblowers in this assortment of accident prevention devices is the smoke detector, which we can often see as round perforated plastic disks, fixed to the ceilings of offices and homes.

A **smoke detector**, in all its simplicity, detects smoke in its surroundings and sounds an alarm.

These are one of the most important safety devices in an establishment especially in homes, where it is one of the few sensors which can provide safety 24x7. The alarm issued may manifest itself as a Blinking LED, an Audio siren, or in case of establishments connected with a central monitoring station, an alert on the management screens in the control room.

If a smoke detector is to be considered to be a fire alarm, then the credit of inventing the first automatic electric fire alarm goes to Francis Robbins Upton in the year 1902. Otherwise, George Andrew Darby holds the patent for the first electrical heat and smoke detector. In 1930, a Swiss physicist Walter Jaeger accidentally discovered the phenomena of smoke detection through ionization. But it was in 1965 that the first truly affordable smoke detector with replaceable batteries was invented. This paved the way for commercialization of

smoke detectors as we know of them today. In early 1980s solid state circuitry replaced cathode tubes, significantly reducing the size of alarms and also the costs. The effect has been such that the fatalities from fire in home which used to be around 10,000 per year dropped drastically to less than 6000 per year in early 90s.

The area of utility determines the scope of smoke detectors. A small area, like a household, does not need many smoke detectors and the setting off of alarms can be easily identified and mitigated. Now, consider the case of a corporate building which has many floors. One cannot simply know the location of any alarm going off on some floor while sitting in ground floor. It is evident that a large number of smoke detectors cannot be allowed to perform independently and need some sort of central monitoring. This leads to a classification into two **types of smoke detectors**.

Commercial smoke detectors: These can either be conventional or analogue *addressable* and are wired up to the security monitoring systems of the commercial establishment. These usually do not have an inbuilt alarm but are connected to the control panel which would set off the relevant alarm and also automate several other mitigation functions.

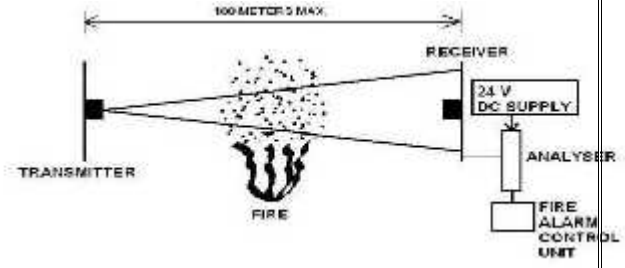
Conventional smoke detectors cannot be individually identified by the control unit. These are connected in parallel and the current flow in them is monitored. In case of smoke, there is an increase in current on that particular line. The fluctuation can be monitored giving an approximate location of the trouble area.

Addressable detectors give each device on the system an individual address. Thus these detectors can help know the exact location of the alarm.

· **Standalone smoke alarms:** These are localized alerting alarms which are not connected to any central control panel. Alerting methods may include sirens, visual indicators, or tactile stimulation. Most of these alarming methods must conform to the set of industry specifications. For example, audible tones used for alerts usually have frequencies around 3200 Hertz with loudness level of about 85dBA at 10 feet, and visual light must have an output of 110 candelas.

Construction-wise there are mainly two types of smoke detectors: ionization detectors and photoelectric detectors. The detectors may use any one of these methods or a combination of both. There is also an aspirator based air sampling smoke detector.

Photoelectric light scattering smoke detector: It has a light beam offset from the photo detector such that in the presence of smoke, some part of the light is scattered onto the light sensor, hence sending off an alarm. Such smoke detectors are usually 'spot type' having localized detection area.



· **Photoelectric light obscuration smoke detector**: Another option, less effective though, is to have a line of sight

between the light source and a photo detector. When the intensity of light falling on the photo detector falls below a threshold value, alarm is sent off. This design is less effective as a false alarm may be set off in case of obstruction from any physical object. It is usually of 'projected beam type' so as to span a wider area.

Photoelectric detectors are found to perform better in detecting fires which have a long time of smoldering and release large amounts of smoke. Photoelectric smoke detectors respond quickly to particles between 0.3 and 10.0 microns. However, these are less sensitive to rapidly growing fires when compared to ionization detectors.

Arti Patel(0808CS113D01)

9. Some interesting figures about Computer

Friends today we will highlight interesting computer Facts that you might not be knowing it before lets see them now.

- Amazon, originally a printed book seller company, now sells more e-books than printed books.
- The first domain name ever registered was Symbolics.com.
- 80% of all pictures on the internet are of naked women
- Tim Berners-Lee coined the phrase "World Wide Web" in 1990.
- U.S. President Bill Clinton's inauguration in January 1997 was the first to be webcast.
- Google uses an estimated 15 billion kWh of electricity per year, more than most countries. However, Google generates a lot of their own power with their solar panels.
- Bill Gates, the founder of Microsoft was a college drop out.
- Bill Gates house was designed Using a Macintosh computer.
- About 1.8 billion people connect to the Internet; only 450 million of them speak English.
- In 2012, approximately 17 billion devices (which include computers, tablets and mobile) connected to the Internet.
- Sweden has the hightest percentage of internet users, they are 75%.
- Did you know that Email was already around before the World Wide Web came?
- Up until the 14th of September, 1995, domain registration was free.
- One of the world's leading computer and computer peripheral manufacturer Hewlett Packard was

first started in a garage at Palo Alto in the year 1939.

- Google estimates that the Internet today contains about 5 million terabytes of data (1TB = 1,000GB), and claims it has only indexed a paltry 0.04% of it all! You could fit the whole Internet on just 200 million Blu-Ray disks.
- There are about five porn pages for every 'normal' web-page.
- The prime reason the Google home page is so bare, is due to the fact that the founders didn't know HTML and just wanted a quick interface. Infact, the submit button was a later addition initially; hitting the RETURN key was the only way to burst Google into life.
- Doug Engelbart had made the first computer mouse in 1964, and it was made out of wood.
- Every minute, 10 hours of videos are uploaded on Youtube.
- The world's first computer which was named the Z1, was invented by Konrad Zuse in 1936. His next invention, the Z2 was finished in 1939 and was the first fully functioning electro-mechanical computer.
- There are approximately 1,319,872,109 people using the Internet.
- Amongst the most interesting computer facts is, when the first Apple computer which was built by Steve Jobs and Steve Wozniak, it was made by using parts they got for free from their employers. They were made to scrounge spare parts from work.
- While it took the radio 38 years and the television a short 13 years, it took the World Wide Web only 4 years to reach 50 million users.
- 70% of virus writers work under contract for organized crime syndicates.

Stuti Jaiswal(0808CS101059)

10. Wearable Computers

As computers move from the desktop, to the palm top, and onto our bodies and into our everyday lives, infinite opportunities arise to realize applications that have never before been possible. To date, personal computers have not lived up to their name. Most machines sit on a desk and interact with their owners only a small fraction of the day. A person's computer should be worn, much as eyeglasses or clothing are worn, and interact with the user based on the context of the situation. With the current accessibility of wireless local area networks, and the host of other context sensing and communication tools available, coupled with the current scale of miniaturization, it is becoming clear that the computer should act as an intelligent assistant, whether it be through a remembrance agent, augmented reality, or intellectual collectives. It is also important that a computer be small, such as something we could slip into our pocket, or even better wear like a piece of clothing. It is rapidly becoming apparent that the next technological leap is to integrate the

computer and the user in a non-invasive manner, this leap will bring us into the fascinating world of Wearable Computers.

Wearable computers, also known as body-borne computers or wearable are miniature electronic devices that are worn by the bearer under, with or on top of clothing.

This class of wearable technology has been developed for general or special purpose information technologies and media development. Wearable computers are especially useful for applications that require more complex computational support than just hardware coded logics.

One of the main features of a wearable computer is consistency. There is a constant interaction between the computer and user, i.e. there is no need to turn the device on or off. Another feature is the ability to multi-task. It is not necessary to stop what you are doing to use the device; it is augmented into all other actions. These devices can be incorporated by the user to act like a prosthetic. It can therefore be an extension of the user's mind and/or body.

Many issues are common to the wearable as with mobile computing, ambient intelligence and ubiquitous computing research communities, including power management and heat dissipation, software architectures, wireless and personal area networks. The International Symposium on Wearable Computers is the longest-running academic conference on the subject of wearable computers. Because wearable computing affects society so profoundly, it is the central topic of the 2013 IEEE International Symposium on Technology and Society, Many applications, user's skin, hands, voice, eyes, arms as well as motion or attention are actively engaged as the physical environment.

Wearable computer items have been initially developed for and applied with e.g.

- sensory integration, e.g. to help people see better (whether in task-specific applications like camera-based welding helmets, or for everyday use like computerized "digital eyeglass") or

to help people understand the world better

- behavioral modeling,
- health care monitoring systems,
- service management
- mobile phones
- smartphones

Today still "wearable computing" is a topic of active research, with areas of study including user interface design, reality, pattern. The use of wearables for specific applications or for compensating disabilities as well as supporting elderly people steadily increases. The application of wearable computers into fashion design is evident through Microsoft's prototype of "The Printing Dress" at the International Symposium on Wearable Computers in June 2011.

People will one day depend on wearable computers to monitor not just their activities but a myriad of data about their health, making the devices basically like a sixth sense.

That's the vision that was laid out during the MIT Tech Conference on disruptive technologies in Cambridge, Mass. this past weekend. The wearable computer market will see the kind of dramatic growth that the smartphone market has over the last decade and wearables will morph from Fitbit-like bracelets to patches that stick to users' skin and sensors embedded in t-shirts and sneakers.

"Humans interact with everything with our five senses,but I think our sixth sense is going to be digital," said Stanley Yang, CEO of NeuroSky Inc., a biosensor maker based in San Jose, Calif. "There's so much information out there that we don't have the natural ability to detect. There's information you need, whether it's health, fitness, learning or just playing. All of these will be digital."

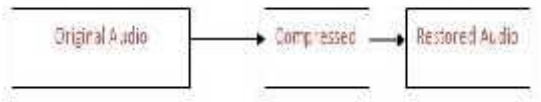
While that might sound like a bold prediction, Brian Blau, an analyst with Gartner, Inc., said it's not far-fetched at all.The wearable computer market has been getting a lot of attention. Everything from Google Glass, which enables users to send emails, shoot video and see maps, to smartwatches that can run apps or even act as a mobile phone, and smart wristbands that track a user's heart rate and number of steps taken. However, the market is just in its infancy and could be on the cusp of major changes. Wearables are going to morph from wristbands to thin patches that adhere to the user's skin. And smart sensors will become more widespread when they're embedded in clothes, footwear and even our own bodies.

Wearable computers, if they're going to become ubiquitous, need to be comfortable to wear and seamless to use. If users have to take them on and off, plug them in and keep them charged, they're less likely to use them to track their health information.

Vanishree Rao(0808CS101064)

11. MP3 Format: Understanding the basics of digital music

In today's world, the word MP3 has become synonymous with music. Almost everyone has experienced MP3 in some way – be it through listening to your favourite songs on your music player or phone, the internet, a podcast or something similar. MP3 has revolutionized the digital music world on its own and even though it's been around for quite some time, the MP3 still remains the most popular form of music used across the globe. But first, **what exactly is MP3**? The MP3 format is basically an audio-specific format which uses a compression system to reduce the size of music files. **MP3 stands for MPEG Phase 1 Layer 3**, where MPEG refers to **Motion Picture Experts Group** which is a family of standards for displaying video and audio using lossy compression. A 'lossy' compression implies that during the compression process, some of the audio data was lost which leads to the creation of a file not identical to its original. A simple schematic of the lossy compression algorithm is shown below:



Layer 3 is one of three coding schemes for the compression of audio data. It uses perceptual audio coding and psychoacoustic compression to remove all unnecessary information in the signals. It also adds a MDCT (Modified Discrete Cosine Transform) that implements a filter bank, increasing the frequency resolution 18 times higher than that of layer 2. This result in a file reduced in size with minimal audio degradation. MP3 now uses the ID3 tagging system of an audio file with details associated with its ownership, production and contents - a system which can be used to catalogue and manage collections of MP3 files. Now, let's go back – who created the MP3 and what was the need for it? MP3 technology was developed between 1987 and 1991 by engineers at the German company Fraunhofer Gesellschaft as an attempt to reduce digital audio file size with the minimum degradation of perceived audio quality

The inventors for the MP3 patent are Bernhard Grill, Karl-Heinz Brandenburg, Thomas Sporer, Bernd Kurten, and Ernst Eberlein.

Uncompressed audio files are rather large, as sound is very complex and the translation of it into a digital format that a computer can understand requires a lot of data. MP3 works to make file sizes smaller by using what is called psychoacoustic models.

In this model, the audio signals that most people would not hear because it is too low or too high are eliminated.

By doing this, file sizes can be greatly reduced. A 128 Kbit/s MP3 file is about $1/11^{th}$ the size of the corresponding file on an uncompressed CD. This smaller size enables faster delivery via the internet, and easier sharing and portability, as well as its reduced mass storage requirements.

Process Description

The key to audio compression in MP3 lies in the bit rate – the number of bits per second encoded in the audio file. If the bit

rate is low, the encoder will discard more data and vice versa.

The basic working follows that an MP3 encoder splits the signal into 22 frequency bands and then process each band separately for storage. These signals are then decoded and recombined for playback.

As shown above, if the bitrate is high, the signal is effectively conveyed with better resolution but higher file size. In case of smaller bitrate, the size is reduced but the audio resolution is changed accordingly.

Let’s break down the MP3 building process:

1. The first step is to divide the source audio into components called 'frames', which individually contains about a fraction of a second’s audio data. This happens every 26 ms or .026 seconds, i.e. creating approximately 38 frames per second.
2. The signal is analyzed to determine the distribution of bits for the best possible account of the audio on the entire spectrum. This involves splitting the signal into different bands based on frequency.
3. The audio in these frames is then compressed to a target number of bits using psychoacoustic modelling. The bitrates is used to calculate the number of bits that can be allocated to each frame and hence the amount of audio data to be stored is decided. The band frequencies of the signal are compared to the reference models in the encoder itself, and the ones that do not match are discarded.
4. The remaining data is compressed to shrink the space for redundancies via traditional means and Huffman coding.
5. The collection of frames is assembled into a serial bit-stream, with header information preceding each data frame. The headers contain instructional "meta-data" specific to that frame. Each frame header contains 32 bits, comprised of a synchronisation reference number and various other identifiers of the frame's contents (bitrate, sample rate, etc.). The header is then followed by the frame's audio data. This series of frames constitutes the standard MP3 file.

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12. Sixth Sense Technology

It’s the beginning of a new era of technology where engineering will reach new milestones. Just like in the science fiction movies where display of computer screen appears on walls, commands are given by gestures, the smart digital environment which talks to us to do our work and so on, these all will be possible very soon. You imagine it and **sixth sense technology** will make it possible. Isn’t it futuristic? Now it’s time for sci-fi movie directors to think ahead because the technology shown in there fiction movies soon will become household stuff. Before

few years back it was considered to be supernatural or tantalizing imagination. But now it has been made possible. Thanks to Pranav Mistry, a genius who introduced mankind to this futuristic technology.

What is sixth sense technology?

Sixth Sense is a wearable gestural interface that enhances the physical world around us with digital information and lets us use natural hand gestures to interact with that information. It is based on the concepts of augmented reality and has well implemented the perceptions of it. Sixth sense technology has integrated the real world objects with digital world. The fabulous **6th sense technology** is a blend of many exquisite technologies. The thing which makes it magnificent is the marvelous integration of all those technologies and presents it into a single portable and economical product. It associates technologies like hand gesture recognition image capturing, processing, and manipulation, etc. It superimposes the digital world on the real world.

Sixth sense technology is a perception of augmented reality concept. Like senses enable us to perceive information about the environment in different ways it also aims at perceiving information. Sixth sense is in fact, about comprehending information more than our available senses. And today there is not just this physical world from where we get information but also the digital world which has become a part of our life. This digital world is now as important to us as this physical world. And with the internet the digital world can be expanded many times the physical world. God hasn't given us sense to interact with the digital world so we have created them like smart phones, tablets, computers, laptops, net books, PDAs, music players, and others gadgets. These gadgets enable us to communicate with the digital world around us.

But we're humans and our physical body isn't meant for digital world so we can't interact directly to the digital world. For instance we press keys to dial a number; we type text to search it and so on. This means for an individual to communicate with the digital world he/she must learn it. We don't communicate directly and efficiently to the digital world as we do with the real world. The sixth sense technology is all about interacting to the digital world in most efficient and direct way. Hence, it wouldn't be wrong to conclude sixth sense technology as gateway between digital and real world. Before Wear Ur World (WuW) came there were other methods like speech recognition software, touch recognition etc., which empowered us with direct interfacing.

This WuW or sixth sense device invented by Pranav Mistry is a prototype of next level of digital to real world interfacing. It

comprises of a camera, a projector, a mobile cum computing device and colored sensors which are put on the fingers of a human being. The device efficiently senses the motion of the colored markers. Using them it provides us the freedom of directly interacting with the digital world. This technology enables people to interact in the digital world as if they are interacting in the real world.

Why choose sixth sense technology?

Humans take decisions after acquiring inputs from the senses. But the information we collect aren't enough to result in the right decisions. But the information which could help making a good decision is largely available on internet.

Although the information can be gathered by connecting devices like computers and mobiles but they are restricted to the screen and there is no direct interaction between the tangible physical world and intangible digital world. This sixth sense technology provides us with the freedom of interacting with the digital world with hand gestures. This technology has a wide application in the field of artificial intelligence. This methodology can aid in synthesis of bots that will be able to interact with humans.

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13. Textile takes a step towards the future with IT

The infrastructure of any industry is based as much on technical support system as it is on human resource.The expanding world of flawless machines and superior software programs has made it mandatory for industries to adapt to technology to communicate with customers, find prospective consumers, understand market requirements, keep an inventory and many other aspects.

What was once a Herculean task, either ignored or done manually, was prone to error. Now, it is easily done with information technology. This has brought with it operational efficiency, stronger customer loyalty, better security and higher profitability in the technologically advanced textile and apparel industry.

IT leads the way

Information technology (IT) has touched every aspect of the textile and apparel sector. It is required at every step from yarn production to finished product. One of the reasons of increased dependency on IT is the changing demographics and pace of growth in the fast-paced market environment in the Asian subcontinent.

The average age of the population likely to splurge on clothes has decreased considerably. Earlier, teenagers and office goers conveniently ignored attire or spent very little on the same. Today, there is increased awareness among teenagers and professionals that apart from style statements, clothes also symbolize purchasing power.The young and working population relies on social media to look

out for best deals and latest fads. Most textile and apparel brands have their own websites and profile pages on popular networking sites.

The role of IT is important here, as creating impressive web portals and checking online hits are crucial. The trend of online shopping is also catching up all over the world. One recent example of IT failure was when online shopping site Flipkart hosted a sale in 2014 and the site crashed following heavy traffic.

Many customers were dissatisfied with the service, as some did not get the order confirmation after making payment and some did not see items they had added to their shopping cart. On the other hand, Amazon's online sale garnered rave reviews for its faultless operation.

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14. Testing as a Service (TaaS)

Testing as a Service (TaaS) is an outsourcing model in which testing activities associated with some of an organization's business activities are performed by a service provider rather than employees.

TaaS may involve engaging consultants to help and advice employees or simply outsourcing an area of testing to a service provider.

Usually, a company will still do some testing in-house.

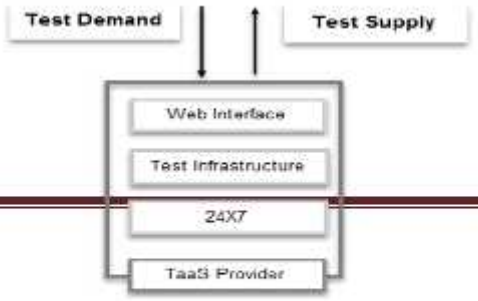
TaaS is most suitable for specialized testing efforts that don't require a lot of in-depth knowledge of the design or the system.

Services that are well-suited for the TaaS model include automated regression testing, performance, security testing, testing of major ERP (enterprise resource planning) software, and monitoring/testing of cloud-based applications. TaaS is also sometimes known as on-demand testing.

We have automated the provisioning of test services, including hosting of the application under test, on a cloud-based platform and combined our relevant testing expertise, capabilities, market leading and open source test tools, and specialized testing learning's into a single end-to-end testing service.

TaaS spans all aspects of testing, from functional, automation, performance, infrastructure, and security testing to a fully managed testing service operated on SLA's and KPI's.

Our approach delivers up to 30% improvement in quality; up to 40% improvement in productivity and up to 30%



TaaS Process

reduced costs.

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15. Supreme Court strikes down Section 66A of IT Act which allowed arrests for objectionable content online

NEW DELHI:

The Supreme Court on Tuesday struck down Section 66A of the IT Act which allowed arrests for posting offensive content on social media sites. The controversial provision made posting offensive material on social networking sites an offence punishable by up to three years in jail.

Section 66A prescribes the punishment for sending "offensive' messages through computers or any other communication device such as a mobile phone or a tablet, and a conviction can fetch a maximum of three years in jail.

According to the act, any person who sends, by means of a computer resource or a communication device,-

(a) any information that is grossly offensive or has menacing character; or
(b) any information which he knows to be false, but for the purpose of causing annoyance, inconvenience, danger, obstruction, insult, injury, criminal intimidation, enmity, hatred or ill will, persistently by making use of such computer resource or a communication device,
(c) any electronic mail or electronic mail message for the purpose of causing annoyance or inconvenience or to deceive or to mislead the addressee or recipient about the origin of such messages, shall be punishable with imprisonment for a term which may extend to three years and with fine.

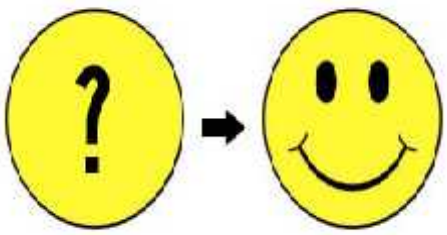
"Electronic mail" and "electronic mail message" means a message or information created or transmitted or received on a computer, computer system, computer resource or communication device including attachments in text, images, audio, video and any other electronic record, which may be transmitted with the message. The Supreme Court on Tuesday declared Section 66A of Information Technology Act as unconstitutional and struck it down. This section had been widely misused by police in various states to arrest innocent persons for posting critical comments about social and political issues and political leaders on social networking sites. The court said such a law hit at the root of liberty and freedom of expression, two cardinal pillars of democracy.

Anant Bharti(0808CS101005)

16. The Best Ways to Tweak Your Search When Google Doesn't Give You What You Want

Ideally, a simple Google search will give you exactly the results you need. When it doesn't, here are the best ways to tweak your web searches to help you get relevant results. We all (or, well, most of us) love Google but it may not be the best search tool for everything. While the following information will concentrate heavily on Google, we'll also be looking at other search engines and options that might suit you better for certain tasks. If you're not getting the results you want from Google, in some cases another search engine may be the best fix.

Creating an Effective Search Query



As much as Google (and other search engines) may try, they don't speak English or any other human language. If you ask a search engine a specific question, it's probably not going to yield the best results. Fortunately, there are some tricks you can learn to form a really good Google query and end up with more relevant results.

Don't Use Words You Don't Need

Don't search for full sentences or ask full questions. Search for the keywords in what you're looking for. Google will just ignore certain words it knows are common and irrelevant, but this may not be the case with all search engines; either way, you'll save yourself some typing time. Just leave out anything you don't need. For example "dimensions and weight of the 2010 macbook air" works just fine as "dimensions weight 2010 macbook air."

Use the AROUND() Operator

By default, Google searches for your search terms everywhere in the page and they don't necessarily have to be near each other. This is annoying when you're searching for something <like idol white> and you end up with an article about Billy Idol that later mentions his song White Wedding (it happens all the time, right?). Of course you can put "white teeth" in quotations and make sure that phrase shows up in the article, but then you're restricted to that ordering of the words. Think of all the teeth whitening articles you'll miss because of the arrangement of the words. That's where the AROUND() operator comes in. It'll let you search for things like teeth AROUND(2) white to make sure both words are near each other but not necessarily next to each other or in a specific order. The number you give to AROUND specify the proximity. A lower number means the words need to be

closer together and a higher number means they can be farther apart.

Use the AROUND Operator in Google Searches for More Specific Results

Google searches are pretty smart and tend to be relevant to your search terms, but if you want to…

Eliminate Terms You Don't Want and Force Terms You Do

Want to eliminate something from your results? Use a hyphen in front of any terms you don't want to show up. For example, defrost pipes -how will remove any How results from your search query. If you want to make sure a word appears in every result, just put a plus sign in front of it.

You can search for different options by using the OR operator. For example, if you wanted a blue or black hat, you could search for hat (black OR blue). This search query will ensure you end up getting results about hats, but allow those results to vary between hats of the black or blue variety.

Search Titles Only

Do you only need to search for page titles and ignore the actual text on the page? In Google you can do this by pretending your query with all in title: When searching on Bing or Yahoo!, you can do the same thing simple by using title:

Search for a File

Maybe you're not looking for a web page at all, but instead a specific kind of file. You can easily restrict your search to a file type by typing filetype:extension in front of your search terms. For example, if you were searching for a PowerPoint file you'd use filetype:ppt.

Conduct Site-Specific Searches

Sometimes you're looking for an article you *know* you saw on, say, Life hacker, but you can't remember what it's called. Maybe said site has, uh, a less-than-perfect search mechanism and you turn to your favorite search engine to help you find it. Adding site: in front of the site's URL (e.g. site:lifehacker.com) will force Google, Bing, and Yahoo! to return only search results from that specific domain. For example, if you know you were looking for an article about manipulation and you know you saw it on life hacker, you could search for site:lifehacker.com manipulate and you'll find some relevant, Life hacker-specific results.

The more specific you can be with your query, the fewer results you'll have to sift

through. Assuming the queries you give to Google, or any search engine, are accurate to what you want this should work in your favor and help you find what you're looking for more easily.

Getting Quick, Specific Answers

Most search engines will try to provide you with answers when you ask it specific questions or provide it with data it can detect based on a given format. Ask Google or Bing "what time is it in Los Angeles?" and you'll be provided with LA's local time. If you simply ask Google "what time is it?" and your IP address is providing an approximate (but accurate enough) location, you'll get your local time. This is just one of many types of data you can enter into Google to get answers without the need to track down a special tool in your search results. For more Google options, check out our top 10 obscure Google search tricks.

Top 10 Obscure Google Search Tricks

When it comes to the Google search box, you already know the tricks: finding exact phrases matches…

While both Bing and Google can offer lots of quick results, DuckDuck Go is a search engine designed to give you quick answers without the need to even look at your search results. Here are a few examples:

- Using age can give you the age of someone prominent. For example, searching for "age of Obama" will provide you with Barack Obama's age.
- Want to know how many calories are in two eggs? Search for calories in 2 eggs. In fact, calories in will yield calorie counts for basic foods.
- Want to know how much something weighs? Use weight. For example, weight of an apple.
- Need a random number? Type in rand plus the range. For example, rand 1 100.
- Want to search Wikipedia? Just type WIkipedia and your search terms and you'll be given an abstract from Wikipedia in addition to your search results. Here's an example for Life hacker.

These are just a few examples of searches you can conduct with DuckDuck Go to get quick information without actually visiting another web site. Here are several more. In addition to DuckDuckGo, WolframAlpha (which DuckDuckGo utilizes to get information in certain cases) is an excellent tool for getting quick answers to specific

kinds of questions. The downside is that it won't provide you with actual search results as well.

Turn Frequent, Repetitive Searches into RSS Feeds

If you search for the same thing often (e.g. yourself, maybe?), you can turn that search into an RSS feed and get notified of new results.

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17. First new cache-coherence mechanism in 30 years

In a modern, multicore chip, every core -- or processor -- has its own small memory cache, where it stores frequently used data. But the chip also has a larger, shared cache, which all the cores can access.

If one core tries to update data in the shared cache, other cores working on the same data need to know. So the shared cache keeps a directory of which cores have copies of which data.

That directory takes up a significant chunk of memory: In a 64-core chip, it might be 12 percent of the shared cache. And that percentage will only increase with the core count. Envisioned chips with 128, 256, or even 1,000 cores will need a more efficient way of maintaining cache coherence.

At the International Conference on Parallel Architectures and Compilation Techniques in October, MIT researchers unveil the first fundamentally new approach to cache coherence in more than three decades. Whereas with existing techniques, the directory's memory allotment increases in direct proportion to the number of cores, with the new approach, it increases according to the logarithm of the number of cores.

In a 128-core chip, that means that the new technique would require only one-third as much memory as its predecessor. With Intel set to release a 72-core high-performance chip in the near future, that's a more than hypothetical advantage. But with a 256-core chip, the space savings rises to 80 percent, and with a 1,000-core chip, 96 percent.

When multiple cores are simply reading data stored at the same location, there's no problem. Conflicts arise only when one of the cores needs to update the shared data. With a directory system, the chip looks up which cores are working on that data and sends them messages invalidating their locally stored copies of it.

"Directories guarantee that when a write happens, no stale copies of the data exist," says Xiangyao Yu, an MIT graduate student in electrical engineering and computer science and first author on the new paper. "After this write happens, no read to the

previous version should happen. So this write is ordered after all the previous reads in physical-time order."

Time travel

What Yu and his thesis advisor -- Srini Devadas, the Edwin Sibley Webster Professor in MIT's Department of Electrical Engineering and Computer Science -- realized was that the physical-time order of distributed computations doesn't really matter, so long as their logical-time order is preserved. That is, core A can keep working away on a piece of data that core B has since overwritten, provided that the rest of the system treats core A's work as having preceded core B's.

The ingenuity of Yu and Devadas' approach is in finding a simple and efficient means of enforcing a global logical-time ordering. "What we do is we just assign time stamps to each operation, and we make sure that all the operations follow that time stamp order," Yu says.

With Yu and Devadas' system, each core has its own counter, and each data item in memory has an associated counter, too. When a program launches, all the counters are set to zero. When a core reads a piece of data, it takes out a "lease" on it, meaning that it increments the data item's counter to, say, 10. As long as the core's internal counter doesn't exceed 10, its copy of the data is valid. (The particular numbers don't matter much; what matters is their relative value.)

When a core needs to overwrite the data, however, it takes "ownership" of it. Other cores can continue working on their locally stored copies of the data, but if they want to extend their leases, they have to coordinate with the data item's owner.

The core that's doing the writing increments its internal counter to a value that's higher than the last value of the data item's counter.

Say, for instance, that cores A through D have all read the same data, setting their internal counters to 1 and incrementing the data's counter to 10. Core E needs to overwrite the data, so it takes ownership of it and sets its internal counter to 11.

Its internal counter now designates it as operating at a later logical time than the other cores: They're way back at 1, and it's ahead at 11.

The idea of leaping forward in time is what gives the system its name -- Tardis, after the time-traveling spaceship of the British science fiction hero Dr. Who.

Now, if core A tries to take out a new lease on the data, it will find it owned by core E, to which it sends a message. Core E writes the data back to the shared cache, and core A reads it, incrementing its internal counter to 11 or higher.

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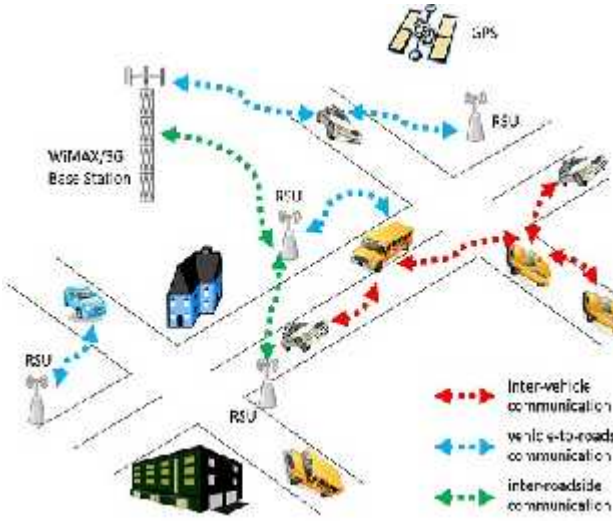
18. Mobile Ad Hoc networks

An ad hoc network is a collection of wireless mobile nodes dynamically forming a temporary network without the aid of any

predetermined network infrastructure or centralized administration. In the past, ad hoc networks have been primary used for the communications at battlefields and disaster arena, where a centralized infrastructure is expensive, or inconvenient, or even impossible. For instance, the sensor networks based on ad hoc multi-hop networking are applied in environmental monitoring, surveillance, and security. Now, as the novel radio technologies are growing, e.g., Bluetooth, the applications of ad hoc networking extend to commercial sectors through the interaction among various portable devices such as cellular phones, laptops, and PDAs. The trends of next generation wireless systems, characterized by the convergence of fixed and mobile networks and realization of the seamless and ubiquitous communications, are moving to ad hoc networking.



The nature of temporary links and the mobility of the nodes together with wireless transmission effect on attenuation, interference, and multipath propagation, bring some inherent issues of ad hoc networks. The links of the ad hoc networks are dynamic in a sense that they are likely to break or change with the movement of the nodes.

As the topology changes, the route must be updated immediately by sending a control message. Those unique features to ad hoc networks results in lots of control overhead for route discovery and maintenance. This is highly unacceptable in bandwidth-constrained ad hoc networks as well as it also increase congestion in the network. Usually these devices have limited computing resources and severe energy constraints. Routing strategies along with mobility management and resource allocation become big challenges to network designers and service providers.

The network protocols of ad hoc networks must consider the routing efficiency as well as security, minimizing various link latency, and power efficiency. In addition, the balance between network coverage, capacity, delay, and power consumption is needed. There are a lot of research investigations being carried out in the performance optimization of ad hoc networks concerning these issues. Such as efficient flooding, load aware routing, and Selective Intermediate Nodes (SIN) algorithm ,which improve the scalability and throughout of the on-demand routing protocols by avoiding unnecessary routing overhead. However, most of the research works are based on optimization at individual layer. Optimizing a particular layer might improve the performance of that layer locally but might produce non-intuitive side effects that will degrade the

overall system performance .Thus, the idea of cross-layer or interlayer networking is proposed.

Currently the most fundamental research issue in ad hoc networking, between the physical layer and the application layer, is packet routing. In fixed infrastructure mobile networks routing is, for the most part, an engineering problem (implementation of hand-overs etc.), whereas in ad hoc networks it is essentially theoretical. The problems and their solutions considering packet routing are closely related to those widely studied in the case of ordinary fixed networks, but also completely new fundamental challenges have emerged due to the peculiar features of AHNs, such as:

• Dynamic network topology and structure
  - Nodes may join or leave the network
  - Some or all nodes may be mobile
• Limited bandwidth
• Constrained power
• Broadcast nature of transmission

Ad Hoc networks Characteristics

- Dynamic network topology
- Bandwidth constraints and variable link capacity
- Energy constrained nodes
- Multi-hop communications
- Limited security
- Autonomous terminal
- Distributed operation
- Light-weight terminals

Need for Ad Hoc networks

Setting up of fixed access points and backbone infrastructure is not always viable

- Infrastructure may not be present in a disaster area or war zone
- Infrastructure may not be practical for short-range radios; Bluetooth (range 10m)

Ad hoc networks:

- Do not need backbone infrastructure support and easy to deploy
- Useful when infrastructure is absent, destroyed or impraction

Properties of Ad hoc Networks

- MANET enables fast establishment of networks. When anew network is to be established, the only requirement is to provide a new set of nodes with limited wireless communication range. A node has limited capability, that is, it can connect only to the nodes which are nearby. Hence it consumes limited power.
- A MANET node has the ability to discover a neighboring node and service. Using a service discovery protocol, a node discovers the service of a nearby node and communicates to a remote node in the MANET.
- MANET nodes have peer-to-peer connectivity among themselves.
- MANET nodes have independent computational, switching (or routing), and communication capabilities.
- The wireless connectivity range in MANETs includes only nearest node connectivity.
- The failure of an intermediate node

results in greater latency in communicating with the remote server.

- Limited bandwidth available between two intermediate nodes becomes a constraint for the MANET. The node may have limited power and thus computations need to be energy-efficient.
- There is no access-point requirement in MANET. Only selected access points are provided for connection to other networks or other MANETs.
- MANET nodes can be the iPods, Palm handheld computers, Smartphones, PCs, smart labels, smart sensors, and automobile-embedded systems\
- MANET nodes can use different protocols, for example, IrDA, Bluetooth, ZigBee, 802.11, GSM, and TCP/IP.MANET node performs data caching, saving, and aggregation.
- MANET mobile device nodes interact seamlessly when they move with the nearby wireless nodes, sensor nodes, and embedded devices in automobiles so that the seamless connectivity is maintained between the devices.

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19. History of Operating Systems

The 1960's definition of an operating system is "the software that controls the hardware". However, today, due to microcode we need a better definition. We see an operating system as the programs that make the hardware useable. In brief, an operating system is the set of programs that controls a computer. Some examples of operating systems are UNIX, Mach, MS-DOS, MS-Windows, Windows/NT, Chicago, OS/2, MacOS, VMS, MVS, and VM.

Controlling the computer involves software at several levels. We will differentiate kernel services, library services, and application-level services, all of which are part of the operating system.

Processes run Applications, which are linked together with libraries that perform standard services. The kernel supports the processes by providing a path to the peripheral devices. The kernel responds to service calls from the processes and interrupts from the devices.

The core of the operating system is the kernel, a control program that functions in **privileged state** (an execution context that allows all hardware instructions to be executed), reacting to interrupts from external devices and to service requests and traps from processes. Generally, the kernel is a permanent resident of the computer. It creates and terminates processes and responds to their request for service.

Operating Systems are resource managers. The main resource is computer hardware in the form of processors, storage, input/output devices, communication devices, and data. Some of the operating system functions are: implementing the user interface, sharing hardware among users, allowing users to share data among themselves, preventing users from interfering with one another, scheduling resources among users, facilitating input/output, recovering from errors, accounting for resource usage, facilitating parallel operations, organizing data for secure and rapid access, and handling network communications.

Historically operating systems have been tightly related to the computer architecture, it is good idea to study the history of operating systems from the architecture of the computers on which they run.

Operating systems have evolved through a number of distinct phases or generations which corresponds roughly to the decades.

The 1940's - First Generations

The earliest electronic digital computers had no operating systems. Machines of the time were so primitive that programs were often entered one bit at time on rows of mechanical switches (plug boards). Programming languages were unknown (not even assembly languages). Operating systems were unheard of .

The 1950's - Second Generation

By the early 1950's, the routine had improved somewhat with the introduction of punch cards. The General Motors Research Laboratories implemented the first operating systems in early 1950's for their IBM 701. The system of the 50's generally ran one job at a time. These were called single-stream batch processing systems because programs and data were submitted in groups or batches.

The 1960's - Third Generation

The systems of the 1960's were also batch processing systems, but they were able to take better advantage of the computer's resources by running several jobs at once. So operating systems designers developed the concept of multiprogramming in which several jobs are in main memory at once; a processor is switched from job to job as needed to keep several jobs advancing while keeping the peripheral devices in use.

For example, on the system with no multiprogramming, when the current job paused to wait for other I/O operation to complete, the CPU simply sat idle until the I/O finished. The solution for this problem that evolved was to partition memory into several pieces, with a different job in each partition. While one job was waiting for I/O to complete, another job could be using the CPU.

Another major feature in third-generation operating system was the technique called spooling (simultaneous peripheral operations on line). In spooling, a high-speed device like a disk interposed between a running program and a low-speed device involved with the program in input/output. Instead of writing directly to a printer, for example, outputs are written to the disk. Programs can run to completion faster, and other programs can be initiated sooner when the printer becomes available, the outputs may be printed.

Note that spooling technique is much like thread being spun to a spool so that it may be later be unwound as needed.

Another feature present in this generation was time-sharing technique, a variant of multiprogramming technique, in which each user has an on-line (i.e., directly connected) terminal. Because the user is present and interacting with the computer, the computer system must respond quickly to user requests, otherwise user productivity could suffer. Timesharing systems were developed to multiprogramming large number of simultaneous interactive users.

Fourth Generation

With the development of LSI (Large Scale Integration) circuits, chips, operating system entered in the system entered in the personal computer and the workstation age. Microprocessor technology evolved to the point that it becomes possible to build desktop computers as powerful as the mainframes of the 1970s. Two operating systems have dominated the personal computer scene: MS-DOS, written by Microsoft, Inc. for the IBM PC and other machines using the Intel 8088 CPU and its successors, and UNIX, which is dominant on the large personal computers using the Motorola 6899 CPU family.

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