

'Boot' For Computer

Best of Outstanding Technology



**Department of Computer Science & Engineering
Institute of Engineering and Science
IPS Academy, Indore
2014-2015**

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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 an 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.

Dr. Namrata Tapaswi
Professor & Head CSE Department

Session 2014-15

Editorial

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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 inculcate in students 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, softwares 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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Rajendra Nagar, A.B.Road, Indore (M.P) PIN-452012

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 was increased to 120 in year 2012 and again intake was increased to 180 in year 2014. 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

 <p>Dr. Namrata Tapaswi HOD & Professor</p>	 <p>Mr. Jayesh Gangarade Associate Professor</p>	 <p>Mr. Arvind Upadhyay Associate Professor</p>	 <p>Mr. Neeraj Shrivastava Associate Professor</p>
 <p>Mr. Sunil Nimawat Assistant Professor</p>	 <p>Mr. Deepak Shukla Assistant Professor</p>	 <p>Ms. Nisha Bhalse Assistant Professor</p>	 <p>Mr. Yagyapal Yadav Assistant Professor</p>
 <p>Mr. Neeraj Mehta Assistant Professor</p>	 <p>Mr. Anil Panwar Assistant Professor</p>	 <p>Ms. Barkha Sahu Assistant Professor</p>	 <p>Mr. Sourabh Jain Assistant Professor</p>
 <p>Ms. Shruti Sharma Assistant Professor</p>	 <p>Ms. Shweta Gangrade Assistant Professor</p>	 <p>Mr. Vijay Choudhary Assistant Professor</p>	 <p>Mr. Ved K Gupta Assistant Professor</p>



Ms. Anjali Verma
Assistant Professor



Ms. Vaishali Gupta
Assistant Professor



Ms. Nitu Mathuriya
Assistant Professor



Mr. Ankur Ratmele
Assistant Professor



Mr. Sudhir K Patidar
Assistant Professor



Mr. Pratik Jain
Assistant Professor



Mr. Pankaj Pateriya
Assistant Professor



Mr. Prateek Nahar
Assistant Professor



Ms. Purnima Pandey
Assistant Professor



Ms. Priyanka
Vijayvargiya
Assistant Professor



Ms. Shaba P Khan
Assistant Professor



Mr. Abhaydeep Seth
Assistant Professor



Ms. Neha yadav
Research Associate



Mr. Dharmendra
Choukse
Sr. Programmer

Department Events

Five faculty development programs were organized in which one day program on Netbeans technology in the month of July 2014, one day program on Java technology in the month of July 2014, one day program on Introduction to research methodology in the month of August 2014, two days program on Cloud Competency Centre in the month of September 2014 & seven days program on Android in the month of March 2015.

One day Seminar on Envisage'2014-Programming Fundamental in the month of January 2014. Other events like X-Box Gaming, Lan Gaming, Photography, Beg Borrow Steal, Paper Presentation, C Quiz, Trivial Quiz are also organized under the banner of Envisage' 2014.

Thirty Seven different Workshops were organized on different topics covering Cyber Security, JAVA, C/C++, LINUX, Cloud Computing & Security, Basic Computer Skills, Netbeans, Android, and Introduction to design of algorithm.

Seven expert lectures were organized in which one day program on Cloud Computing by Mr. Mitesh Devgan in the month of July 2014, one day program on Hadoop by Mr. Hemant Vijayvergiya in the month of August 2014, one day program on Data Communication by Ms. Kameshwari Chebrolu in the month of August 2014, one day program on NP complete by Dr. S. R. Sathe in the month of September 2014, one day program on IIT-NMEICT by Dr. Mukta Atre in the month of February 2015, one day program on Research Methodology by Mr. Gaurav Vinchurkar in the month of April 2015, one day program on Research Methodology by Ms. Ruchi Vijaywargiya in the month of April 2015.

One Industrial Visit program was organized by Ypsilon Solution Pvt. Ltd., Indore in the month of August 2014. Two Training programs were organized in which one month program on Advanced JAVA & Android in the month of July 2014 & one week program on Cloud Computing in the month of August 2014.

Sixteen Other Events were organized in which eleven days program on Cyber security in the month of July 2014, eight days program on Database Fundamentals in the month of

August 2014, one day program on Information Storage Management in the month of November 2014, one day program on Cloud Infrastructure Services in the month of November 2014, one day program on Major Project Competition Cum Exhibition also known as Udaan in the month of April 2015, one day program on Minor Project Competition Cum Exhibition also known as Udaan in the month of May 2015.

Envisage





Department of Computer Science & Engineering, IES IPS Academy organized a tech-fest 'ENVISAGE' on November 1, 2014 included seminar by Prof. Atul Kahate having over 13 Years of experience in the IT industry in varying capacities in India and abroad. He is Author of 18 highly acclaimed text books on IT, 2 on cricket, and 1 in Marathi. He is also the Author of over 2000 articles on Technology and Cricket in technical magazines, journals, all leading Marathi newspapers, and Web sites.

Topics of the seminar were Programming Fundamentals. The main objective of this seminar was to enable participants to gain practical insight into building real life application with demonstration of pointing game program, mobile computing, Bluetooth program, security, pointers in c etc.

‘ENVISAGE’ included technical as well as non-technical events clubbed with various guest lectures and workshops participated by more than 1800 students from various Engineering colleges.

Membership of Professional Societies

Department of Computer science & engineering is having the membership of Computer society of India (CSI). Two programs were organized under the banner of CSI in which one week program on Android Application and Development by Mr. Hemant Vijaywargiya Ypsilon Pvt. Ltd. in the month of March 2015, one day program on Paper Presentation(envisage 14) by Dr. Atul Kahate,Oracle Financial Services Software Ltd, Pune in the month of November 2014.

Placements

Students were placed in top companies in the year 2014. 15 Students got placed in Tata Consultancy Services(TCS), 3 students got placed in L&T Infotech, 3 students in Sofmen, 3 students in Wide Vision, 2 students in HSBC Software Dev.(I) Ltd, 2 students in Amdocs, 2 students in Bitwise Solutions, 2 students in Hot Wax Media P.Ltd and one student each in NIIT Technologies, Borm Bruckmeire Infotech, Gyrix Technolabs and Webtech Developers P.Ltd.

Sports Activities

Students were received winner & runner up awards in different sports activities were State Level Swimming Competition, Cricket Competition (IPSA Level) (Girls), Chess(IPSA Level), Volleyball, Shot Put, Basketball.

Also students receive National/State Level individual sports achievers awards in Chess, Basketball, All India National Level Aquatics (Swimming) Competition, and All India National Level Aquatics (Diving) Competition.

Social Activities

World Literacy Day

Department of Computer Science & Engineering, IES IPS Academy Indore celebrated “World Computer Literacy Day” on 02nd December 2014. On this occasion department organized one day awareness camp and Basic Computer Skills training under the banner of Spoken Tutrial IIT Bombay for the students of Gov. Girl’s higher secondary school, Bijalpur Indore.

Number of students who actively participated in the above event were Fifty Two.

Glimpses of the event are:



Faculty Members Achievements

In the Department, Paper published in Journals was six in numbers. Journals are International Journal of Advance Research in Science and Engineering, International Journal of Software & Hardware Research in engineering, IJRCEE, International Research journal of engineering and technology, Springer, International journal of engineering science and management by the faculty.

Five seminars/conferences were conducted on different areas under Conference on social ethics of technology & business in entrepreneurship management, 15th International business horizon-INBUSH ERA 2015 International conference on futuristic trends in computational analysis and knowledge management, Eleventh IRF International Conference, IEEE international conference computer communication centre MGI indore.

Highlighted topics were Women empowerment and entrepreneurship through decision making, Design and development of rule based inflectional and derivational Urdu stemmer"Usal", Identifying the problem & solution of false positive, An Enhanced framework of genomics using big data computing, Supervised Classification of dermoscopic images using optimized fuzzy clustering based multi layer feed forward neural network.

Five Expert Lectures were delivered by Faculties in Seminars and Workshop on Basic Computer Skills, Women Entrepreneurship, IPR, Cloud Computing & Security. Eight Seminars & Workshops were attended by the faculty members on different areas like Cyber Security, Cloud Computing & Security, Programming Fundamentals, Introduction to design of algorithm, Impact of cloud technology in education, MATLAB & simulink for engineering education, Introduction to robotics. Seven SDPs/FDPs were attended by the faculty member on the topics Netbeans, JAVA, Introduction to research methodology, Cloud Competency Centre, Entrepreneurship & Android.

Students Achievements

Five different Academic Awards were distributed: winner & runner up awards in Paper Presentation, “UDAAN2015” Minor Competition Cum Exhibition, “UDAAN2015” Major Project Competition Cum Exhibition were received by students.

In the department, Papers published in Journals were five in numbers. Journals are International Journal of Software & Hardware Research in engineering, International Research journal of engineering and technology, International journal of engineering science and management, IJRCEE, IJDACR.

Two Papers were presented in Seminars like Eleventh IRF International Conference, IEEE international conference computer communication centre MGI indore on topic Identifying the problem & solution of false positive, An Enhanced framework of genomics using big data computing.

Twenty Five Workshops/Seminars were Attended on different topics like Netbeans , Android , IIT, Cloud Infrastructure Services, ISM, Programming Fundamentals, Cloud Computing & Security, LINUX, Data Communication, JAVA, Introduction to research methodology, Database Fundamentals, HADOOP, Cloud Computing, Cyber Security, Advanced JAVA & Android.

Google Glass

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INTRODUCTION

Google Glass is a wearable, voice-controlled Android device that resembles a pair of eyeglasses and displays information directly in the user's field of vision.



Google Glass offers an augmented reality experience by using visual, audio and location-based inputs to provide relevant information. For example, upon entering an airport, a user could automatically receive flight status information. Users can also control the device manually through voice commands and a touchpad located on its frame.

The Google Glass operating system is based on a version of Android, and it can run apps called Glassware that are optimized for the device. The glasses have built-in Wi-Fi and Bluetooth connectivity and a camera for taking photographs and videos.

SPECIFICATION& FEATURES

- Android 4.4

- 640×360 Himax HX7309 LCoS display
- 5-megapixel camera, capable of 720p video recording
- Wi-Fi 802.11b/g
- Bluetooth
- 16 GB storage (12 GB available including OS)
- Texas Instruments OMAP 4430 SoC 1.2 GHz Dual (ARMv7)
- 2 GB RAM
- Ambient light sensing and proximity sensor
- Bone conduction audio transducer
- Prescription frames available

USING GLASS

The eyepiece, that small clear vision is a thick stick of half-mirrored material and has a small adjustment hinge for left-to-right movement. It's meant to float above your eye, not in front of it. The screen is crisp and bright indoors, but in bright sunlight outdoors it can get hard to see over your surroundings. It's a 720p-display equivalent, which feels like a 25-inch screen that's 8 feet away.

A little lozenge-shaped raised bar above the right ear houses a bone-conduction speaker. You can hear it, but it's not as loud as a standard earpiece. The microphone has decent receptivity outdoors, but in noisy areas it's like talking loudly into a bluetooth headset.

Google Glass allows users to control the device by swiping through a timeline-like interface displayed on the screen. Sliding backward shows current events, such as weather, and sliding

forward shows past events, such as phone calls, photos, circle updates, etc. It has the ability to record video and take photos in 720p. Either using touchpad it has voice controlled also.

SECURITY

With the many abilities and functions of Google Glass, one must also look at the potential dangers that might come with such a device. To combat the problem of theft there will be a system introduced to Google Glass. Montgallo (2012) writes, "This system will immediately disable the augmented reality glasses when it detects unnatural movements. The system will also be able to detect if the person using it is its actual owner."

CONCLUSION

Google Glass hopes to be one of the newest and most innovative technologies in recent times. The world of wearable computers and augmented reality has barely been introduced, and Glass intends to be a pioneer into this field in the same way that the iPod was in the electronic music player industry. Users will be able to utilize email, video chat such as Skype, and social networking services such as Twitter and Facebook.

A New Design of In-Memory File System Based on File Virtual Address Framework

Amaan Mansoori
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Increasing timing requirement of data processing calls for new solutions of in-memory computing to overcome the performance penalty caused by the huge performance gap between storage and memory. For example, 'Spark' a cluster computing framework, can be 100 times faster than Hadoop, a well-known implementation of MapReduce for cloud computing, because Spark supports some degrees of in-memory computing. As file systems are the most fundamental infrastructure for storing data, making file systems "in-memory" can significantly benefit applications involving data processing.

In addition to DRAM, emerging persistent memories, such as Storage Class Memory and NVDIMM, also provide opportunities for implementing in-memory file systems. Persistent memories can be directly connected to the memory bus and provide fast byte-addressable data accesses. The design of traditional I/O stack, however, causes unnecessary workload and performance penalty on file systems in memory. Therefore, file system needs re-studying and re-designing in order to effectively exploit the benefits of memory, which is of great importance and also a challenging problem for system designers.

In file accesses, file systems search the metadata structures to find the physical location of file data. Both existing temporary and persistent in-memory file systems use software routines to search the metadata. Or they should build

additional mapping tables to map the file into the virtual address space. These methods of file accesses cannot fully take advantages of the memory mapping hardware MMU.

This article, propose a novel framework called “File Virtual Address Space” for high-performance persistent in-memory file systems. Within this framework, each opened file has its own contiguous virtual address space that is organized by a hierarchical page table dedicated to the file. File system can use hardware MMU to locate the physical locations of file data via the contiguous virtual address space of file. A file system, Sustainable In-Memory File System (SIMFS), is designed and fully implemented based on this framework. In SIMFS, the data of a file are organized by a structure called “file page table”.

The proposed framework and SIMFS can be used on any byte-addressable memory connected to the memory bus.

The file virtual address space of an opened file is embedded into the calling process’ address space. This embedding process can be done efficiently by updating few pointers.

Once the embedding process is accomplished, data pages can be accessed by load/store instructions directly using virtual addresses, and file data can be read without interrupt such as page fault. There are no conflicts between the address spaces of files as each file is incorporated into an appropriate virtual address space.

SIMFS is able to take advantages of memory mapping hardware in CPU to access file data with significant high throughput.

The experimental results show that the throughput of SIMFS can approach the memory bus bandwidth. As Linux, where paging system is its core memory management structure, supports most of existing modern CPUs, our framework can be generally applied to different CPUs.

We believe the proposed design framework will have long-lasting impact on the design of persistent in-memory file system. SIMFS can be implemented in either kernel space or user space with little modification.

When it is implemented to support user space file data accesses, the file is opened in the user process directly, i.e., SIMFS inserts the pointers at the top-level file page table into the page table in a user process. Then, an application is able to directly manipulate file data at its own address space with no need of copying data to the user buffer.

The main contributions of this paper include:

- To propose a novel framework, file virtual address space, for high-performance, persistent in-memory file system.
- To design and implement a fully functional in-memory file system, SIMFS, based on the proposed framework.

- To propose a technique, PFW, to achieve efficient data consistency in SIMFS.
- To offer a method, in-file execution, for the execution of applications to achieve higher performance by eliminating data copies between user buffer and files.

File Virtual Address Space

A new framework based on the concept that each file has its own contiguous “file virtual address space.”

In the new framework, when a file is opened, its file virtual address space is embedded into the virtual address space of process. Thus, each opened file has its own contiguous virtual address space.

The virtual space of a file is mapped to the physical space by “file page table.”

The file virtual address space is detached from the process virtual address space when the corresponding file is closed. With contiguous virtual address space, any data in a file can be quickly located by an addition on the beginning address of the file and the corresponding offset.

The translation from virtual address to physical address is done by address translation hardware, Memory Management Unit. Therefore, to read contiguous pages, say k pages, in contiguous virtual address space, the file system merely calculates the beginning address of the contiguous k -page address

space, then calls data transfer function only once to read the whole k -page data.

A write to an existing file address space behaves the same way as a read.

In this paper, we presented a new design of persistent in-memory file system based on the novel framework of file virtual address, where each open file has its own continuous virtual address space.

In this new framework, the virtual address space of an opened file is established by embedding its file virtual address space into the process virtual address space. The file data can be accessed with high throughput using the contiguous virtual address space of the opened file.

Our framework can be generally applied to most of existing modern CPUs. We have implemented a fully functional persistent in-memory file system, SIMFS in Linux based on the new framework.

The evaluation results show that SIMFS constantly outperforms existing in-memory file systems.

The throughput of SIMFS even approaches the memory bus bandwidth on best cases.

Quantum Computing

Abhishek Halwai
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Quantum Computing is major step in computer science field. In future we have not any type of ordinary computer

we have “quantum computer” which is much much faster than the ordinary computers. Actually quantum computer does not work on the bits like ‘0’ and ‘1’ which is present in existing computers. Quantum computers work on the “Qubits” or “Quantum bits” rather than classical bits.

A *qubit* is two state quantum-mechanical systems, such as the polarization of a single photon.

In polarization here the two state are which is vertical polarization and horizontal polarization.

In classical system a bit would to be one state either 0 or 1 but *qubit* to be superposition of both state at same time. Hence we can say that 1 qubit contain 0 and 1 at a time. It is a property which is fundamental to quantum computing.

Hence it is faster than present computers which are based on classical bits.

In future for faster computation quantum computer is used.

By quantum computing we can be able to make a thinking robots and computer which is related to artificial intelligence.

In present, NASA and GOOGLE are doing research and implementing the quantum computers.

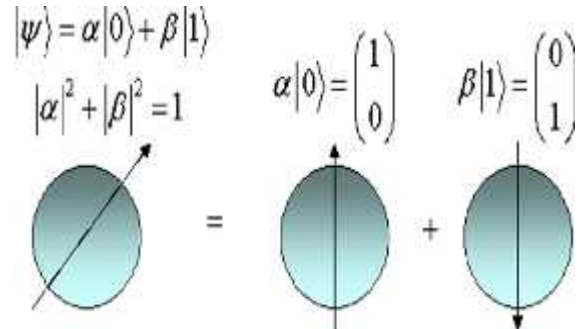
Data Scientist

Aastha Jain

0808CS141003

Data, Information and Knowledge

In the early days of computing, companies had data processing offices. In fact, automated data processing (ADP) began with punch card machines



that preceded the electronic digital computer by half a century. In the 1950s, ADP offices began converting to electronic data processing (EDP). Information management came next; it reflected the increasing scope and importance of computing to organizations and recognized that whereas computers processed data, they produced information for humans. Later, organizations created offices of knowledge management, some directly related to EDP (creating knowledge from data) and some related to HR (capturing the knowledge that humans have in their heads). We now talk about the “data, information, knowledge hierarchy,” and it is common to say that a function of computing systems is to turn data into information and knowledge.

Definitions of these three terms vary. The ones that I will use are as follows: Data is the lowest level of the hierarchy, and we can al- most see “raw” as an implied adjective. For digital computers, any string of bits can be treated as data. Information, the next level, is to humans

what data is to computers. That is, it is the lowest level we normally use. To connect the two levels, computer scientists say that information is data plus metadata. Metadata is “data about the data,” which helps both computers and humans interpret it in a meaningful way. At the top of the hierarchy is knowledge, which can be defined as actionable information. Knowledge or information that enables people or computers to take action is often created by linking together many pieces of information. For example, graph databases, such as those based on the Semantic Web and can be called knowledge bases. After the information word displaced the data word in business parlance and in light of the expanding importance of computing a new executive position was created by many organizations, the chief information officer (CIO). At roughly the same time, computing began to be known as information technology, which is a more inclusive term and refers to networked computers as well as stand-alone ones. About this time, a second C-suite officer, the chief technology officer, joined the expanding list.

The CTO is supposed to keep an eye on new technology developments and recommend which ones to pursue, whereas the CIO provides information services. Since the turn of the century, the chief data officer has begun to take a place in the C-suite.

One definition of the CDO is “a corporate officer responsible for

enterprise-wide governance and utilization of information as an asset, via data processing, analysis, data mining, information trading, and other means”.

Big Data

Today’s focus on data is partly a result of yesterday’s focus on the Internet. That is, the successful effort to interconnect millions of computers has created a cornucopia of interconnected datasets. Also, the exponential increase in disk storage capacity and the similar decrease in cost have resulted in interconnected computers having a huge amount of information to share. “Enterprise-wide governance and utilization of data” doesn’t mean only data that the enterprise owns. Google and Yahoo are obvious examples of enterprises whose business plans involve “organizing the world’s information and making it universally accessible and useful”. “The world’s information” is certainly big and is about to get much bigger as the Internet of Things arrives. More generally, big data can be defined as data that has one or more of the three V attributes: volume, velocity, or variety. That is, big data is either too big, comes at you too fast, or has too much variability to be processed in a reasonable time by today’s computer systems. Thus, an active computing research topic is how to process bigger, faster, and more variable data efficiently. Let’s look at some of the methods currently being used to process big data. A prominent example of big volume data is Google’s crawling and organizing of

the huge amount of information on the Web. The company developed a method called MapReduce to parallel process on huge server farms the vast treasure of Web information. Subsequently, they published a paper describing how MapReduce worked, and an open source version called Hadoop was made available by Apache, which is now widely used. In addition, as described in last issue's Mastermind article new database models are supplanting the venerable relational database model, because it doesn't scale to big data. Examples of successful big velocity data processing are applications such as Google searching and Amazon ordering. A scientific example is the Large Hadron Collider (LHC) in Europe (where the Higgs boson was recently discovered). Even before it was upgraded to a higher power, the LHC produced a petabyte of data per second! Because it is a smart instrument, the LHC had to save "only" a petabyte per month for further processing. Such preprocessing either by smart instruments or by computers is an important technique to deal with big velocity data. Big variety data poses the largest challenge. Without extensive metadata to describe the data, meaningful processing is hope less. Without interoperable metadata, the situation is not much better. Consider the so-called "long tail" of millions of small scientific datasets. If these datasets could be meaningfully processed together, new scientific results would emerge.

Data Science

My perspective is from that of a computer scientist. However, statisticians also have a claim on this territory. A simple definition of statistics was "what to do with the data." If I interpret history correctly, 19th century statistics worked to make sense of all the data in relatively small datasets, and 20th century statistics developed sampling techniques to be able to work with small parts of larger datasets and still infer characteristics of the whole dataset. With today's advanced computing systems, statisticians are also investigating big data processing techniques. That is, they are again working with all the data as they did in the 19th century but this time, with big data, not small data. With both disciplines in mind, we can next ask: what is a data scientist?

A tongue-in-cheek definition is a computer scientist who knows more statistics than his or her colleagues, or a statistician who knows more computer science than his or her colleagues. Time will tell if data science will become a new discipline, or if it will remain a cross-disciplinary field

Between these two (and perhaps other) fields. I'll list the six sub- fields of data science that identifies and make several comments about each one:

1. Data exploration and preparation;
2. Data representation and transformation;
3. Computing with data

4. Data modeling
5. Data visualization and preparation;
6. Science about data science.

Subfields 1, 3 and 5 have primarily been the province of computer science. Subfield 3 includes the big data processing techniques just discussed. Subfield 4 is the shared subfield, in which computer scientists talk about machine learning and data mining, and statisticians talk about inferences from data. Subfield 6 is perhaps the most interesting opportunity. As data is an empirical entity and, as such, could give rise to a general science about data, not just data as related to a specific discipline. Data modelling in the sense of machine learning has emerged from the field of artificial intelligence.

The original idea of computer programming involved telling the computer what to do. Machine learning expands on this idea by developing programs that learn what to do from the data. As the computer scientist, a machine-learning program is another program that can perform a (learned) task. An example of a machine-learning program is one that can be given a number of pictures containing faces and can then pick out other pictures that also contain faces.

Educating Data Scientist

A growing demand for people trained in data science has caused the shortage of these people to balloon. Moreover, only limited opportunities to obtain such

training exist today. An article in Bloomberg Business speaks to this shortage and universities' initial efforts to address it:

A new species of techie is in demand these days—not only in Silicon Valley, but also in company head- quarters around the world. “Data scientists are the new superheroes.”

The next few years will be exciting ones for the emerging field of data science. With application pull and university push, data science is poised to grow rapidly, and people who position themselves to participate in this potentially revolutionary field should have multiple employment opportunities.

Thinking Robot

Aamir Sohail

0808CS141002

Since day by day robots are becoming more and more advanced. A new technique is being applied in robots but till now we have not gained much success and this technique is known as Thinking Robot which means that robots with human thinking ability is trying to be developed but not implemented much.

This technique is much different than any other technique (innovation or invention) being seen by the world till now. In simple words it means that robots will think like human, will be able to take decisions like humans.

They will be able to develop image of anything like humans do. We all think that this is not possible but invention of some devices has proved that a robot with human thinking ability can be developed; it can be possible in the future because researches are going at extremely fast rates in this field.

A device named Emospark has been invented which can make a profile of human; it can judge others like humans do. It is the first step in the field of Artificial Intelligence which proves that a thinking robot is possible, not now but a time will come.

What a scene it will be to observe a robot thinking like human. Many movies have come up focusing on this theme.

A famous scientist, PhD in robotics and author of book Robopocalypse Daniel H.

Wilson once said “Robots are gaining human capabilities, whether it’s smell, or touch or recognizing our voices.

If they are going to solve human problems, they will have human abilities. Those are the things that robots will have to understand if they play a role in our lives.”

Most robots with advanced sensing abilities are still in the experimental stage. More than toys but not yet tools, they work well in the laboratory but yet can’t handle real-world situations. But if we work on them then can become what is expected.

May be possible that this will have some disadvantages but if implied properly we can have many possibilities, many advantages.

Jobs in IT Sector

Faizal Khan

0808CSI41055

As the unemployment rate continues to grow worldwide, the IT sector continues to provide more and more jobs as the time is passing. The Indian IT sector hiring is expected to see significant uptrend this year just like the previous decade.

More and more companies are focusing on digitization and some claim that the sector is likely to create 2.5 lakh new job openings this year.

In 2015, the growth of IT sector was 12% more than previous and this year, the growth surpassed 14%. This trend will continue to grow for next few years. But that does not mean that the IT Sector is going to provide jobs to almost everyone. With the focus of companies being digitization and technology, the process of hiring now put more emphasis on the skills rather than the scale which was a trend in the previous time.

The Digital Marketing profile is expected to see more than 70,000 job openings.

Other in-demand profiles in the IT sector include User Experience and User Interface Designers; Full-stack web developers, product developers, mobile product development engineers, business

analysts, information security analysts, Cloud architects/integration, data scientists and content management system(CMS).

Since this article focuses on the jobs in IT Sector, I would like to suggest my fellow mates of the department to focus more on the skill rather than the grades.

Evo Mouse

Ankur Modi

0808CS141028

Evo Mouse is a latest technology in mouse. With Evo Mouse you can perform common mouse operations using only fingers. You can control the cursor click and select, double click, and right click and drag with basic hand gestures. Works well on any flat surface. Evo Mouse works on any flat surface requiring very little space .

Hardware used :-

- . IR LED's
- . Resistors and USB cables
- . Normal Webcam
- . Photographic Filmstrip
- . Mirror to improve the intensity of IR region produced by IR source.

A LINE CAP onto any Laser would make it emit in a place, generating a line when focused on any subject. This line generated creates plane which is what we require. In this



RGB image is first converted to greyscale and then binary setting up a decent threshold value. Your finger tips get illuminated as blobs onto the screen. The cameras finally track those bright blobs and the co-ordinates of centroid of the preferred blobs are passed into the mouse event function. Its features are Compatibility, Gesture Recognition, USB connectivity.

Goodbye, Nexus! Hello, Pixel Phones: Android 7

Amit Kumar

0808CS141019

Google last week on tuesday officially announced its much-anticipated Pixel phones the Pixel and Pixel XL the Google firm unwrapped the new Android 7.1 Nougat devices which will apparently usurp Google's long-standing Nexus series.

Analysts have begun issuing predictions for the expected market performance of the Pixel handsets. Luke Lin, senior Analyst at Digitimes Research in Taiwan, estimates Google will ship between 3-4 million Pixel handsets

(including both Pixel and Pixel XL combined) inside 2016 alone. Bearing in mind we've only a bit less than three months left in the year ,that's not bad going at all.

The news is particularly good for Google's partner for the design and production of the Pixel phones - HTC

The Pixel phone launch has been a long time coming and a lot has been said about Google's plans for its mobile division.

The decision to axe its Nexus brand and how it will differentiate its Pixel phones from other Android phones available from its hardware partners.

Google Pixel Specs & Hardware

- Dimensions: 143.8 x 69.5 x 8.6 mm
- Weight: 143g
- Display: 5in 1920 x 1080 pixels
- Processor: Qualcomm Snapdragon 821 quad-core 2.1 GHz
- GPU: Adreno 530
- RAM: 4GB
- Storage: 32GB or 128GB
- MicroSD: Up To 256GB
- Rear Camera: 12MP
- Front Camera: 8MP
- Software: Android 7.1 Nougat
- Battery: 2770mAh Quick Charge
- Colours: Silver, Black



Google Pixel XL Specs & Hardware

- Dimensions: 154.7 x 75.7 x 8.6mm
- Weight: 168g
- Display: 5.5in 2560 x 1440 pixels
- Processor: Qualcomm Snapdragon 821 quad-core 2.1GHz
- GPU: Adreno 530
- RAM: 4GB
- Storage: 32GB or 128GB
- MicroSD: Up To 256GB
- Rear Camera: 12MP
- Front Camera: 8MP
- Software: Android 7.1 Nougat
- Battery: 3450mAh Quick Charge
- Colours: Silver, Black

However, the duo is for the most part identical except for the physical dimensions, the display size and resolution, and the presence of a higher milliamp-hour rated battery cell in the Pixel XL

Here are some words from inside the firm on launch day of the much awaited Smartphone Sensation "With Pixel," said Brian Rakowski, Google's VP of Product Management, "we obsessed over every detail, from the industrial design to the user experience.

We carefully sculpted the surfaces of the phone, and rounded the edges to make it easy to grip.

We used 2.5D Corning® Gorilla Glass 4 on the front display and back glass to accent the aerospace grade aluminum body. The glass on the back also features Pixel Imprint, our fingerprint sensor,

which is placed on the back of the phone where your finger expects it.

You can even swipe it to access your notifications. And no matter what you're using your phone for, you'll need a battery that lasts all day and charges fast — up to seven hours in 15 minutes."

Google is pretty pleased with the Pixel's cameras. Here's what it said at launch:

"With a best-ever 89 DxoMark Mobile score, Pixel's camera lets you take stunning photos in low light, bright light or any light. #No filter needed. Catch action shots as they happen with Smart burst, which takes a rapid-fire sequence of shots. Use Lens Blur to achieve shallow depth of field and bokeh effects, making your subject pop.

And capture dramatic landscapes or make faces glow with new exposure controls."

The way Google created its new Pixel devices is similar to the way Apple develops its iPhones Considering the pricing of the devices specially but these are the some major driving factors why One should Invest their money in Google's masterpiece rather than that of the iPhones and Apple designs its smart phones in-house, while outside manufacturers takes care of assembling the components.

FIRST WITH GOOGLE DAY DREAM

The Pixel phones are also the first Android phones to support Google's VR platform, Daydream.

It also announced its Daydream View VR headset, which is designed to be the most comfortable VR headset in its class. But more on this tomorrow, once we've had time to gestate EVERYTHING that Google discussed Earlier.

FIRST WITH GOOGLE ASSISTANT

The idea with Assistant is that you can talk to it as you would a person. Simply say, "OK, Google," and Assistant will be on hand to do your bidding, whether playing music, reading emails or regaling you with the morning's headlines.

GOOGLE PIXEL & GOOGLE PIXEL XL PRICE

The two phones Pixel and Pixel XL will be available in India, priced at Rs 57,000 in 32GB and 128GB versions.



All-Optical Control of Light on a Silicon Chip

Sourabh Sharma

Photonic circuits, in which beams of light redirect the flow of other beams of light, are a long-standing goal for developing highly integrated optical communication components. Furthermore, it is highly desirable to use silicon—the dominant material in the microelectronic industry—as the platform for such circuits.

Photonic structures that bend, split, couple and filter light have recently been demonstrated in silicon, but the flow of light in these structures is predetermined and cannot be readily modulated during operation. All-optical switches and modulators have been demonstrated with III–V compound semiconductors, but achieving the same in silicon is challenging owing to its relatively weak nonlinear optical properties. Indeed, all-optical switching in silicon has only been achieved by using extremely high powers in large or non-planar structures, where the modulated light is propagating out-of-plane. Such high powers, large dimensions and non-planar geometries are inappropriate for effective on-chip integration. Here we present the experimental demonstration of fast all-optical switching on silicon using highly light-confining structures to enhance the sensitivity of light to small changes in refractive index. The transmission of the structure can be modulated by up to 94% in less than 500 ps using light pulses

with energies as low as 25 pJ. These results confirm the recent theoretical prediction of efficient optical switching in silicon using resonant structures.

Importance of Technical Education in India

Nilesh Chawda

India is witnessing the age of science and technology. There is huge demand for technical education in modern age. The pattern of life evolving in this age is very much different from the one we would find in our society even some fifty years back. Technical Education imparts knowledge of specific trade, craft or profession.

General education has been substituted by professional technical education in many cases. Technical education offers good opportunity for employment and successful career.

Technical Education can meet the expanding demands of expanding society and to meet its multiplying demands. The industries, mechanized systems and scientific research centers all over the world prove beyond doubt that our tie with the past is snapped and instead of bare hands we must use machines and technological devices for all-round development and regeneration of human society.

In our everyday life and in every sphere of our life the influence of science and technology is becoming so pervasive that man's existence in this world is simply inconceivable in their absence

today. This is why, to train our people in response to the need of the time, our education must be reorganized to give it the necessary practical and technical bias. Such education alone can produce the specialized armies for making and operating the modern machines.

In free India, the education was thoroughly reorganized again stressing the importance of science and technology to bring about a total regeneration. Quite a number of regional engineering colleges, institutes of technology, and centers for researches on science came into existence all over the country.

This role of education institutions found it necessary to redefine the end of education, which was to be in the main stream of economic development and to ensure a place for India in the community of prosperous nations. It was not just an end, it was the dream of modern India, and technical education was given the due importance with a view to realizing that dream.

Besides this, in this age of unemployment, only technical education can assure one of a job and a comfortable living. Those who are still in the conventional institutions, passing examination that have little relevance in the modern systems, find no opportunities of employment. And, quite naturally, they are victims of frustration and find themselves alienated from the mainstream of modern world. With their stereo-typed general education without

any specialization and professional skill they acquire nothing to contribute to the progress and prosperity of the human society. They are quite aware of this and this awareness leaves them demoralized. It is heartening to find even our schools introducing new syllabus making science and vocational courses compulsory. Right from the beginning our students' to-day are shown the way in which they can explore avenues of their choice and participate in the march towards human progress.

The Fundamental of IOT Security

Skand Gupta

0808CS161036

IoT, stands for Internet of things, term was first sprouted in the mind of Kevin Ashton at Auto-ID center at Massachusetts Institute of Technology in 1999. IoT is trending at very high pace in the scientist and researcher society. IoT alone holds a market potential of upto \$14 trillion. By this fact we can assume what IoT hold inside for humanity.

IoT is not as simple term as it looks. IoT is basically concept of giving a conscious to the things/device all around us. IoT can be seen as Inter-Network of devices/things which are connected to the internet/WWW too. In very simple word, I can say IoT takes data from the surrounding or things around us, do computing, store (both data & result) in the cloud and gives us output as per our

requirement. This is only possible by mean of network of sensor commonly referred as WSN. The WSN keep track of the all the activities around it and update it on the cloud. Now if we look at Cloud, it is nothing but an online storage and computing place made up of interconnected servers and devices itself. WSN will be continuously operating and sending the data to the personalized cloud. Based on the user perspective and requirement it will fetch the info to the user. Since all the data is stored and managed at the Cloud, there is high level risk of data hack. The Rate of data transfer is also increased with Cloud computing. To avoid data stealing and maintaining optimum solution for individual data, Network Security plays and important role. Since IoT deals with the decentralization of the Entire network we need to provide Security from the bottom level of hierarchy without affecting the power performance.

The IoT infrastructure consists of mainly 4 basic modules: WSN or sensor Hub, wireless connectivity solution, cloud computing and storage solution and finally the user device Network. All these nodes can be PC or laptop, mobile device like phone or tablet or any other PDA or embedded computing device. IoT is a representation of Connected World. And therefore the security must be provided at every node. Mainly there are 4 major security threats exist in the IoT Inter-Network structure and those are: Fake Device, Eavesdropper, Fake communication and Fake Server. Any of

these can hack into the system & steal all the information. So we need an authentication mechanism implemented at every stage. So, any failure in authentication will lead to access restriction. The Fake device can be any simple device using the ID of genuine device/user. It communicates on behalf of the genuine device and use his authorization to get the access. An eavesdropper is any genuine or fake device which monitors the flow of the data without changing or tempering the sequence of request to-&-from server or device. Eavesdropping attack can't be checked or verified by simple means because it doesn't cause any dis-integrity in the data. So the probability of detection of eavesdropping attack or threat is very less. Fake server basically an intermediate server which connects to the device with the same attributes as of main server. It copies the physical aspect of the main server and disguises itself. It processes the entire request coming from the device and then sends to the main server. This way it hacks the data transferring between device and main server. There are very less chances of hack if we safeguard all the nodes and authenticate then at each log-in. Such a Security infrastructure can be achieved using a modern cryptographic technique which provides authentication, data integrity, confidentiality of the data, and verification of authorization at all the nodes. Each node having its own digital signature and authentication, help in reducing the probability of possible threat to an IoT network. Having a safe

firewall security system provide a better mean of access proofing from unauthorized intrusion attacks from unknown and unsecured devices.

IoT acting as the standard backbone for networking of the entire device, it needs to be safe from all sorts of attacks and insecure accesses. The connection between any 2 devices must be associated and secured before transferring any data on it. To do so, we need to mutually authenticate the request at both nodes and then encrypt the data being transfer. Standard asymmetric cryptographic techniques provide better solution for authentication and verification.

Only securing the nodes is not enough for overall network security. We need to follow standard protocols to transfer the data in order to secure the medium of transfer. There are many protocols standardized by ISO, IEEE, and NIST etc which help in safeguarding the medium of transfer. The protocols provide safety from eavesdropping attack by following standardized method of connections establishment. Utilizing standard protocols help in better compatibility and connectivity with the existing network and resources. IoT mainly utilizes three types of protocols: device to device (D2D) protocol, Device to server (D2S) protocol, Server to server (S2S) protocol. Note that here device can be a sensor node or a user interface. The fig below show the protocol network handled in the IoT

Since IoT handles the networking between any two device it need to be standardized by the protocol based connectivity and then those connection must be secured using the cryptographic techniques. Here D2D protocol enables device to communicate with each other. D2D can provide data storage, computing and transferring functionality to the user. Since device can be anything, D2D protocols are designed so as to provide adequate solution in case device change from user interface device to sensor node. Same method must be employed in order to establish the connection between device to server and server to server by using D2S and S2S protocol respectively.

Another important aspect of IoT is the Connectivity. Since, we have two option of connectivity i.e Wired or Wireless. There are separate protocol standard for both wired and wireless connectivity. For wired connection we need to maintain standard IEEE based high speed LAN bus protocols whereas in case of Wireless we need follow standard IEEE based wireless protocols. Since all these protocols are having backward compatibility and interlinked to other version and platform, all the existing device also can become the part of this IoT inter-network. The device following standard protocol provides better compatibility and security to the IoT.

Every day new application and software deploy new threats, malicious activities and security issues to IoT. One very

promising solution to such issues is: Layer Based Designing. This concept allows us to provide better, robust, ready to use network, high secure and faster system.

A device's data is encapsulated in different layer to provide multilevel security and in the same fashion the server DE-encapsulate the received data. With the advancement of the semiconductor industry, the rate of data processing is increased which allow faster data transfer and computing.

This leads to faster response and better efficiency. Another very proficient method to avoid unsecured and unwanted access to the secure IoT network implemented in the corporate is firewall and anti-virus software.

The security is enhanced by these two as they do not allow any unauthorized access or eavesdropping attack on the network, and if by any mean intruder gained access then that will be detected. Anti-virus and anti Malware software provide very strong solution to the breach in the network. MAC address, IP address and other physical address are blacklisted in the server so as to restrict their access in the future. We can start some specific software for restricting and safeguarding out IoT inter-network.

There are other method which can be employed in order to increase the security of the IoT from the boot time onwards by using secure booting methodologies. Secure Boot is a concept

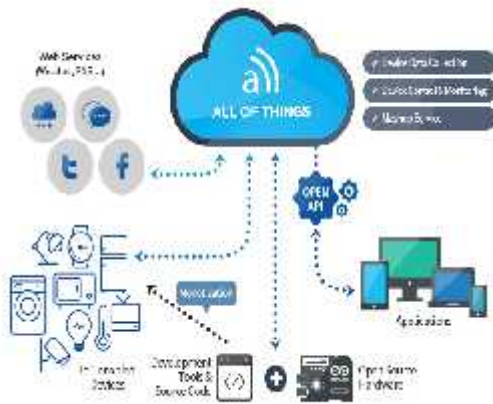
the firmware or device boot up only once it get authenticated and verified for the correct software running over it.

If any Malware or malicious software tries to boot the device it will lead to shutdown, and device will not boot. This method reduce the chances of getting unauthorized access in the IoT as only verified and certified code/application will run in the device/server.

The firmware and application are digitally signed by the actual authorized user only. Once this signature matches with the stored code in the OTP memory of device, the device boot securely without any malicious access or intrusion attack.

Same way digital signature can be used to authenticate the other device or user getting connected to this device. Once they verify their signature it will be authenticated and connection will b established. This method provides access control.

If any kind of spoofing is detected then firewall and anti-virus software restrict their access and secure the device.



So, the security in IoT network must be implement from the bottom of the hierarchy using secure cryptographic techniques, which start from the firmware and standard protocols. Hardware must be secured by mean temper security and software must be secured by using Secure Boot. This way we can secure the nodes, and utilizing standard protocol for data transfer, we can secure the connections.

Human-Robot Interaction

Rajat Manik

Abstract----

A very important aspect in developing robots capable of Human-Robot Interaction (HRI) is the research in natural, human-like communication, and subsequently, the development of a research platform with multiple HRI capabilities for evaluation.

Besides a flexible dialog system and speech understanding, an anthropomorphic appearance has the potential to support intuitive usage and

understanding of a robot, e.g .. human-like facial expressions and deictic gestures can as well be produced and also understood by the robot. As a consequence of our effort in creating an anthropomorphic appearance and to come close to a human-human interaction model for a robot, we decided to use human-like sensors, i.e., two cameras and two microphones only, in analogy to human perceptual capabilities too.

Despite the challenges resulting from these limits with respect to perception, a robust attention system for tracking and interacting with multiple persons simultaneously in real time is presented. The tracking approach is sufficiently generic to work on robots with varying hardware, as long as stereo audio data and images of a video camera are available. To easily implement different interaction capabilities like deictic gestures, natural adaptive dialogs, and emotion awareness on the robot, we apply a modular integration approach utilizing XML-based data exchange. The paper focuses on our efforts to bring together different interaction concepts and perception capabilities integrated on a humanoid robot to achieve comprehending human-oriented interaction.

Introduction of Human-Robot Interaction For face detection, a method originally developed by Viola and Jones for object detection is adopted. Their approach uses a cascade of simple rectangular features that allows a very

efficient binary classification of image windows into either the face or non face class. This classification step is executed for different window positions and different scales to scan the complete image for faces. We apply the idea of a classification pyramid starting with very fast but weak classifiers to reject image parts that are certainly no faces. With increasing complexity of classifiers, the number of remaining image parts decreases. The training of the classifiers is based on the AdaBoost algorithm. Combining the weak classifiers iteratively to stronger ones until the desired level of quality is achieved.

As an extension to the frontal view detection proposed by Viola and Jones, we additionally classify the horizontal gazing direction of faces, as shown in Fig. 4, by using four instances of the classifier pyramids described earlier, trained for faces rotated by 20°, 40°, 60°, and 80°. For classifying left and right-turned faces, the image is mirrored at its vertical axis, and the same four classifiers are applied again.

The gazing direction is evaluated for activating or deactivating the speech processing, since the robot should not react to people talking to each other in front of the robot, but only to communication partners facing the robot. Subsequent to the face detection, face identification is applied to the detected image region using the eigenface method to compare the detected face with a set of trained faces. For each detected face, the size, center

coordinates, horizontal rotation, and results of the face identification are provided at a real-time capable frequency of about 7 Hz on an Athlon64 2 GHz desktop PC with 1 GB RAM.

Ethical Hacking

Abhishek Yogi

0808CS151004

What is Hacking?

Hacking is the technique in which the persons, what is in the name? Call them hackers, crackers, intruders, or attackers; they are all interlopers who are trying to break into your networks and systems. Some do it for fun, some do it for profit, or some simply do it to disrupt your operations and perhaps gain some recognition. Though they all have one thing in common; they are trying to uncover a weakness in your system in order to exploit it. Local network test simulates an employee or other authorized person has a legal connection to the organization's network. The primary defenses that must be defeated here are intranet firewalls, internal Web servers, server security measures, and e-mail systems.

In Stolen laptop computer test, the laptop computer of a key employee, such as an upper-level manager before telephone numbers of the modem pool. Defending against this kind of attack is the hardest, because people and personalities are involved. Most people are basically helpful, so it seems harmless to tell someone who appears to be lost where the computer room is

located. The only defense against this is to raise security awareness. Special arrangements must be made for this, since security guards or police could become involved if the ethical hackers fail to avoid detection. Once inside the building, it is important that the tester not be detected.

One technique is for the tester to carry a document with the target company's logo on it. Such a document could be found by digging through trash cans before the ethical hack or by casually picking up a document from a trash can or desk once the tester is inside. The primary defenses here are a strong security policy, security guards, access controls and monitoring, and security awareness. Each of these kinds of testing can be performed from three perspectives: as a total outsider, a semi-outsider, or a valid user.

What is Ethical Hacking?

Yes! Prevention is better than cure. This is not the James Bond 007 film like "License to Kill". This is License to Hack". But the theme is same. Where in the Bond film the James Bond the hero fight against the villain.

Here the Computer Experts as "Ethical Hackers" fight against the Computer-savvy criminal's malicious attack. We have to protect our Network, confidential information, bank accounts, and even an identity. We are in the time to fight against these malicious hackers who breach the most secure bank accounts, corporate information or even

government website to mischief, damage or even sabotage.

Many companies are nowadays employing these experts as "Ethical Hackers" to actually test by attacking their own Computer Networks. They attempts to detect potential weak systems or servers to intrude or crash their own security systems and suggest changes to increase the safety. These steps are made effective in such technical methods and procedures to test the effectiveness and quality of their own network systems and prevent the attack of intrusions before they happen.

Here we are using the term " Ethical hackers" as a legal profession for Computer Networks Experts to keep the bad things out. These experts use the same tactics and techniques to violate the security protocols as their vigorous counterparts, but in an ethical manner.

These ethical hackers test the systems in the company for a secured network quantitatively and evaluating weakness flaws and threats.

Career Wise Now this kind of jobs leads to make a team of these experts in a company as a bright career option to do the intrusion testing or penetration testing as "Ethical Hackers". There is a worldwide demand for information security professionals up to 60,000 and many of the multinational companies such as IBM, Infosys, Wipro, Reliance and Airtel looking for good ethical hackers as reported by a survey made by the International Data Corp.

Impact of Hacking On Businesses and Governments

Some of the most expensive and prolific victims of hacking have been businesses. Businesses are many times targeted for their customers' personal and financial data and often are targeted by their own employees, whether disgruntled or just opportunistic. Businesses lose billions of dollars yearly as a result of hacking and other computer breaches. Many times, the true cost cannot be evaluated because the effects of a security breach can linger for years after the actual attack. Companies can lose consumer confidence and in many cases are held legally responsible for any loss to their customers. The cost of recovering from an attack can spread quickly: legal fees, investigative fees, stock performance, reputation management, customer support, etc. Companies, and more recently, consumers, are investing more and more money into preventing an attack before it actually happens. Businesses that hold stores of consumer's personal and financial data are especially taking extra steps to insure the data's safety. Microsoft's online group, MSN/Windows Live, requires that no single group store personally identifiable information without explicit consent from an internal security group. Security reviews occur frequently for groups that do store consumers' data and the security group performs its own personal security review by actually attempting to hack into the sites. Sites have actually been withheld from

releasing to the web due to flaws found through this method.

Benefits of Ethical Hacking

This type of "test" can provide convincing evidence of real system or network level threat exposures through proof of access. Even though these findings may be somewhat negative, by identifying any exposure you can be proactive in improving the overall security of your systems.

- However, information security should not be strictly limited to the mechanics of hardening networks and computer systems. A mature security information program is a combination of policies, procedures, technical system and network standards, configuration settings, monitoring, and auditing practices. Business systems, which have resisted simple, direct attacks at the operating system or network level, may succumb to attacks that exploit a series of procedural, policy, or people weak points.

An ethical hack, which tests beyond operating system and network vulnerabilities, provides a example, should your ethical hack prove that your firewalls could withstand an attack because there was no breach, but no one noticed the attacks, you may be better prepared to make a case for improving intrusion detection broader view of an organization's security. The results should provide a clear picture of how well your detection processes works as well as the response mechanisms that

should be in place. “Tests” of this sort could also identify weakness such as the fact that many systems security administrators may not be as aware of hacking techniques as are the hackers they are trying to protect against. These findings could help promote a need for better communication between system administrators and technical support staff, or identify training needs.

Quite often, security awareness among senior management is seriously lacking. Traditional diagnostic work primarily deals with the possibility of a threat and this often leads to a casual view of the threat, deferring the need to immediately address the requirements. Through an ethical hacking exercise, especially if the results are negative, senior management will have a greater understanding of the problems and be better able to prioritize the requirements. For improving intrusion detection.

Limitations of Ethical Hacking

Ethical hacking is based on the simple principle of finding the security vulnerabilities in systems and networks before the hackers do, by using so-called “hacker” techniques to gain this knowledge. Unfortunately, the common definitions of such testing usually stop at the operating systems, security settings, and “bugs” level. Limiting the exercise to the technical level by performing a series of purely technical tests, an ethical hacking exercise is no better than a limited “diagnostic” of a system’s security.

Time is also a critical factor in this type of testing. Hackers have vast amounts of time and patience when finding system vulnerabilities. Most likely you will be engaging a trusted third party” to perform these test for you, so to you time is money. Another consideration in this is that in using a “third party” to conduct you tests, you will be providing inside information” in order to speed the process and save time. The opportunity for discovery may be limited since the testers may only work by applying the information they have been given.

CONCLUSION

Hacking has both its benefits and risks. Hackers are very diverse. They may bankrupt a company or may protect the data, increasing the revenues for the company.

The battle between the ethical or white hat hackers and the malicious or black hat hackers is a long war, which has no end.

While ethical hackers help to understand the companies’ their security needs, the malicious hackers intrudes illegally and harm the network for their personal benefits which may allow a malicious hacker to breach their security system.

Ethical Hackers help organizations to understand the present hidden problems in their servers and corporate network.

Ethical Hacking is a tool, which if properly utilized, can prove useful for understanding the weaknesses of a

network and how they might be exploited.

This also concludes that hacking is an important aspect of computer world. It deals with both sides of being good and bad. Ethical hacking plays a vital role in maintaining and saving a lot of secret information, whereas malicious hacking can destroy everything.

What all depends is the intension of the hacker. It is almost impossible to fill a gap between ethical and malicious hacking as human mind cannot be conquered, but security measures can be tighten.

Blue Eyes Technology - Monitoring Human Operator and Intelligence sensing System

Ankita Arora

Blue Eyes is a technology conducted by the research team of IBM at its Almaden Research Center (ARC) in San Jose, California since 1997. Blue eyes technology makes a computer to understand and sense human feelings and behavior and also enables the computer to react according to the sensed emotional levels. The aim of the blue eyes technology is to give human power or abilities to a computer, so that the machine can naturally interact with human beings as we interact with each other. All human beings have some perceptual capabilities, the ability to understand each other's emotional level

or feelings from their facial expressions. Blue eyes technology aims at creating a computer that have the abilities to understand the perceptual powers of human being by recognizing their facial expressions and react accordingly to them.

Imagine, a beautiful world, where humans collaborate with computers!! .The computer can talk, listen or screech aloud!! .With the help of speech recognition and facial recognition systems, computers gathers information from the users and starts interacting with them according to their mood variations. Computer recognizes your emotional levels by a simple touch on the mouse and it can interact with us as an intimate partner. The machine feels your presence; verifies your identity and starts interacting with you and even it will dial and call to your home at any urgent situations. This all is happening with this “**Blue Eyes**” technology. The main objective of Blue eyes technology is to develop a computational machine having sensory and perceptual ability like those of humans. The Blue Eyes technology system is a combination of a set of hardware and software systems.

The Blue Eyes Technology and Its Basic Structure: The objective of Blue Eyes technology is to design a computational machine having sensory and perceptual abilities like human beings. Blue Eyes technology uses most modern cameras, microphones and advanced non-obtrusive sensing

techniques to interact with humans and understand the emotions of human beings. The machine has the ability to grasp the eye movement of the user, the needs of the user and also can understand the emotional and physical states of a user in front of the machine. The process of making a computer having sensing and emotional capabilities is known as “Affective Computing”.

The steps involved for designing such type of computers are given below.

Process of giving sensing capacity. Human Emotion detection or Affect Detection. Respond appropriately and properly.

Process of giving sensing capacity:

Blue Eyes utilizes many sensor mechanisms, which is equivalent for the ears, eyes and other sensory organs that human beings used to express emotions and recognize each other. Blue Eyes uses voice recognition software, cameras and biometric sensors to understand and respond to the emotional levels of humans. The voice recognition software can perceive not only what is being spoken but also the tone how it is said. High resolution cameras are used for tracking the minute facial expressions, hand gestures and eye movements. Biometric sensors are used for measuring and analyzing the muscle tension, body temperature, blood pressure and other physiological gesture correlated with emotions.

Detecting human emotions/ Affect

Detection: In Blue Eyes technology, the machines have the ability to identify the minor variations in the moods of human beings. Say a person may strike the keyboard hastily or softly depends on his mood like happy or in angry. The Blue Eyes enables the machines to identify these minor emotional variations of human beings even by a single touch on the mouse or key board and the machines started to react with the users according to this emotional levels. This is done with the guidance of intelligent devices like “Emotion Mouse”. Along with this Emotion Mouse, Simple User Interest Tracker (SUITOR) and Artificial Intelligent Speech Recognition are equipped with the Blue Eyes technology to understand the speech and identify the interest of the peoples at that instance of time. For implementing the Affective Computing we need Emotion Sensors.

Types of Emotion Sensors used in Blue Eyes Technology: For Hand - Emotion Mouse:

The major aim of Brain Computer Interface (BCI) is to develop a smart and adaptive computer system. These types of project must include speech recognition, eye tracking, facial recognition, gesture recognition etc. software and hardware. Similarly in Blue Eyes technologies, we need to build a system have the ability to identify all these perceptual abilities of human beings. In Blue Eyes, the machines have the ability to identify the minor variations in the moods of human

beings. Say a person may strike the keyboard hastily or softly depends on his mood like happy or in angry. The Blue Eyes technology enables the machines to identify these minor emotional variations of human beings even by a single touch on the mouse or key board and the machines started to react with the users according to this emotional levels. This is done with the guidance of intelligent devices like “Emotion Mouse”. Actually this Emotion Mouse is an input device to track the emotions of a user by a simple touch on it. The Emotion Mouse is designed to evaluate and identify the user’s emotions such as fear, surprise, anger, sadness, happiness, disgust etc. when he/she is interacting with computer. The main objective of the Emotion Mouse is to gather the user’s physical and physiological information by a simple touch.

For Eye - Expression Glass: Expression Glass is an alternative for the usually available machine vision face or eye recognition methods. By analyzing pattern recognition methods and facial muscle variations, the glass senses and identifies the expressions such as interest or confusion of the user. The prototype used for this glass uses piezoelectric sensors.

MAGIC Pointing: The Eye gaze tracking methods explores a new way for handling ‘eye gaze’ for man machine interfacing. The gaze tracking has been deliberated as an excellent pointing method for giving input to computers. But many drawbacks exist with this

traditional eye gaze tracking methods. To overcome these difficulties an alternative approach – termed as MAGIC - Manual and Gaze Input Cascaded – is projected. In this approach, eye gaze pointing appears to the user as a manual job, utilized for fine selection and manipulation processes. Even so, a large amount of the cursor movement is removed by bending the cursor to the eye gaze portion, which surrounds the target. The selection and pointing of the curser is primarily controlled by manual means but also guided by a gaze tracking mechanism and is commonly known as MAGIC Pointing. The main aim of MAGIC pointing is to use ‘gaze’ to warp the previous position (home) of the curser to the locality of the target, reasonably where the user was looking at, so as to reduce the cursor motion amplitude required for target selection. When the cursor position is identified, only a small movement is needed by the user to click on the target by a manual input device that is to accomplish Manual Acquisition with Gaze Initiated Cursor or Manual and Gaze Input Cascaded (MAGIC) pointing.

Advantages of MAGIC Pointing Technique: Reduced physical effort compared with the traditional manual pointing techniques. Greater spontaneity than traditional manual pointing, greater accuracy, faster speed of operation than manual pointing.

Conclusion:

BLUE EYES technological approach assure a convenient technique, that simplifies the life by supporting more elegant and user friendly provision in computing devices. The day is very near, that this Blue Eyes technology will advance its way towards your house hold devices and makes you lazier. In future, even this Blue Eyes will reach as your hand held mobile device...

Moto Z Review: Tony Stark of smart phones

Deepak Singh

Motorola brings sexy back with the Moto Z. But are looks and futuristic "mods" good enough to keep users hooked?



What is Tony Stark without his Iron Man suit? A lot actually. Stark is a flamboyant billionaire driving supercars, wearing slick suits and with the brains not many possess. Even without the Iron Man suit, he would still be an icon, an inspiration and a role model. The Moto Z, in my opinion, is the Tony Stark of smart phones.

Motorola is bringing sexy back with the Moto Z. At a time when most Android smart phones look and feel the same, Lenovo-owned Motorola is hoping to bring back the cult that the Moto Razr V3 was with an ultra-slim design and appearance that is instantly recognizable. It is sharp with its features too, boasting top-of-the-line hardware like Qualcomm's Snapdragon 820 SoC, 4GB of RAM and a pretty capable camera. On its own, the Moto Z is a pretty capable device. But just like Mr Stark, even the Moto Z has its own idiosyncrasies. The metal back is a fingerprint magnet and you will wish you wore white gloves while handling the phone. The edges are sharp and will dig into your palm when you hold it for lengthy calls.

MOTO Z HARDWARE AND PERFORMANCE

Like most flagship Android smartphones, the Moto Z also runs on Qualcomm's Snapdragon 820 processor that is paired with 4GB of RAM. As anticipated, the phone does not lag or hang no matter what I threw at it. Even the graphics performance was up to the mark, whether it was Marvel Contest of Champions or a basic game like Subway Surfer. Long term game play makes the phone warm but it never heated up to an alarming level.

The Moto Z also comes with a square fingerprint sensor that's placed below the display, which Resembles the one we had seen recently in the Moto G4.

One of the controversial things missing from the Moto Z is its 3.5mm audio port. The Moto Z joins a steadily growing list of smartphones that are ditching the century-old audio output standard for the new USB Type-C. I am not a big fan of this move. Firstly, there are no noticeable advantages and you lose the capability of charging the phone while listening to music. Secondly, it becomes cumbersome to use your existing headphones, all of which are likely to have a 3.5mm jack. Motorola bundles a 3.5mm to USB Type-C adapter in the box but it becomes yet another dongle that you have to carry with you everywhere, increasing the chances of losing it.

MOTO Z CAMERA PERFORMANCE

The Moto Z comes with a 13-megapixel camera with an aperture of f/1.8 and relatively large 1.2 micron pixels. It also comes with optical image stabilization, dual-LED flash and laser auto-focus. The camera shines in most well lit conditions and HDR mode does a good job in challenging conditions.

MOTO MODS

The Moto Z is a capable smartphone on its own but Motorola is looking at pushing boundaries with the powerful hardware smartphones have these days. Modular smartphones are not exactly a new concept with the now-defunct Israeli startup Modu giving us the first feel of modularity years ago. Google

tried its hand with Project Ara, which has now been shelved and LG came up with the G5, which was weird considering you had to remove the battery and fit it in the new mod you wanted to add. Motorola feels modular smartphones should not be that difficult to use and has come up with a simple snap-on concept. Say hello to Moto Mods, or what I call its armor suits.

The mods snap on to the back of the phone with the 16-dot magnetic gold plated connector at the back of the phone. Adding or removing a mod is simpler than putting on a case on any smartphone. Currently, there will be a handful of mods that would be available when the Moto Z goes on sale.

The USP of the mods is they are extremely simple to use. All you have to do is hold it to the rear of the phone and the connectors connect magnetically. The phone vibrates along with a notification to confirm the mod has been attached.

Similarly, the Incipio off Grid battery bank is an expensive accessory and the only convenience you get there is that it is fused to the phone so you are not carrying two devices separately. Then it is only compatible with the Moto Z family of devices. For less than Rs 2,000 one can easily get a 20,000 mAh power bank that will work with any device. This is the price that you pay for convenience. Right now, there are not enough compelling mods, though the Hasselblad True Zoom Mod is something that could be preferred for

those looking at getting out more from the phone's camera.

Review verdict

The Moto Z reminds me a lot of the Moto Razr V3 with its edgy design and gutsy proposition. Even on its own, the Moto Z is a good flagship smartphone with a sharp 2K display, stunning design, top-of-the-line performance and a battery that easily lasts a day. It comes with the Snapdragon 820 SoC, 4GB of RAM, 64GB of internal storage, a microSD card slot and also has nano coating to repel water. The 13-megapixel rear and 5-megapixel front cameras do a decent job as well. And yes, there are those mods which, though expensive, can raise the performance by a few notches. At Rs 39,999, the Moto Z is indeed a well rounded flagship smartphone that's got the looks and features too.

Artificial Intelligence

Raj Kumar

What was once just a figment of the imagination of some of our most famous science fiction writers, artificial intelligence (AI) is taking root in our everyday lives. We're still a few years away from having robots at our beck and call, but AI has already had a profound impact in more subtle ways. Weather forecasts, email spam filtering, Google's search predictions, and voice recognition, such as Apple's Siri, are all examples. What these technologies have in common are machine-learning algorithms that enable them to react and respond in real time. There will be growing pains as AI

technology evolves, but the positive effect it will have on society in terms of efficiency is immeasurable.

A LESSON IN HISTORY

AI isn't a new concept; its storytelling roots go as far back as Greek antiquity. However, it was less than a century ago that the technological revolution took off and AI went from fiction to very plausible reality. Alan Turing, British mathematician and WWII code-breaker, is widely credited as being one of the first people to come up with the idea of machines that think in 1950. He even created the Turing test, which is still used today, as a benchmark to determine a machine's ability to "think" like a human. Though his ideas were ridiculed at the time, they set the wheels in motion, and the term "artificial intelligence" entered popular awareness in the mid- 1950s, after Turing died.

American cognitive scientist Marvin Minsky picked up the AI torch and co-founded the Massachusetts Institute of Technology's AI laboratory in 1959, and he was one of the leading thinkers in the field through the 1960s and 1970s. He even advised Stanley Kubrick on "2001: A Space Odyssey," released in 1968, which gave the world one of the best representations of AI in the form of HAL 9000. The rise of the personal computer in the 1980s sparked even more interest in machines that think.

But it took a couple of decades for people to recognize the true power of AI.

High-profile investors and physicists, like Elon Musk, founder of Tesla, and Stephen Hawking, are continuing the conversation about the potential for AI technology. While the discussion occasionally turns to potential doomsday scenarios, there is a consensus that when used for good, AI could radically change the course of human history. And that is especially true when it comes to big data.

While the discussion occasionally turns to potential doomsday scenarios, there is a consensus that when used for good, AI could radically change the course of human history. And that is especially true when it comes to big data.

The very premise of AI technology is its ability to continually learn from the data it collects. The more data there is to collect and analyze through carefully crafted algorithms, the better the machine becomes at making predictions. Not sure what movie to watch tonight? Don't worry; Netflix has some suggestions for you based on your previous viewing experiences. Don't feel like driving? Google's working on a solution for that, too, racking up the miles on its driverless car prototype.

THE BUSINESS EFFECT

Nowhere has AI had a greater impact in the early stages of the 21st century than in the office. Machine-learning technologies are driving increases in productivity never before seen. From workflow management tools to trend

predictions and even the way brands purchase advertising, AI is changing the way we do business. In fact, a Japanese venture capital firm recently became the first company in history to nominate an AI board member for its ability to predict market trends faster than humans.

Big data is a goldmine for businesses, but companies are practically drowning in it. Yet, it's been a primary driver for AI advancements, as machine-learning technologies can collect and organize massive amounts of information to make predictions and insights that are far beyond the capabilities of manual processing.

Not only does it increase organizational efficiency, but it dramatically reduces the likelihood that a critical mistake will be made. AI can detect irregular patterns, such as spam filtering or payment fraud, and alert businesses in real time about suspicious activities.

Businesses can "train" AI machines to handle incoming customer support calls, reducing costs. It can even be used to optimize the sales funnel by scanning the database and searching the Web for prospects that exhibit the same buying patterns as existing customers.

There is so much potential for AI development that it's getting harder to imagine a future without it. We're already seeing an increase in workplace productivity thanks to AI advancements. By the end of the decade, AI will

become commonplace in everyday life, whether it's self-driving cars, more accurate weather predictions, or space exploration. We will even see machine-learning algorithms used to prevent cyber terrorism and payment fraud, albeit with increasing public debate over privacy implications. AI will also have a strong impact in healthcare advancements due to its ability to analyze massive amounts of genomic data, leading to more accurate prevention and treatment of medical conditions on a personalized level.

But don't expect a machine takeover any time soon. As easy as it is for machine-learning technology to self-improve, what it lacks is intuition. There's a gut instinct that can't be replicated via algorithms, making humans an important piece of the puzzle.

The best way forward is for humans and machines to live harmoniously, leaning on one another's strengths. Advertising is a perfect example, where machines are now doing much of the purchasing through programmatic exchanges to maximize returns on investment, allowing advertisers to focus on creating more engaging content.

While early science fiction writers might have expected more from AI at this stage, the rest of the world is generally satisfied with our progress. After all, not everyone is ready for humanoid robots or self-learning spaceships.