VOLUME 8

PROTOCOL

CSI STUDENT CHAPTER, D.J.S.C.E

FROM THE PRINCIPAL'S DESK

I am pleased to note that the CSI committee is coming out with the latest edition of "Protocol", the annual magazine of the CSI students' chapter. Its' contents include few of the most promising advances and its application in the areas of Information Technology and software engineering. The IT enabled economy is growing and hence there is a need to integrate core education with thorough knowledge of latest innovation in the field. I have noticed that the DJCSI chapter has time and again provided a great platform to its members and interested learners to be introduced to the current technological ideas with its various events throughout the year. Technical ideas can only take a proper form, if the concepts are right. I am happy to note that "Protocol V.8" focuses on all the upcoming technical forays and concepts, which might lead to valuable discoveries in the near future. I extend my best wishes to the DJCSI family, even as they are trying to create their own road to success.

-Dr. Hari Vasudevan

FROM THE BRANCH COUNSELOR'S DESK

I have always been passionate about technology and have encouraged students to learn about its advances. I am proud to present the 8th volume of Protocol and congratulate the students of CSI DJSCE chapter for their work. I take this opportunity to thank our Principal Dr. Hari Vasudevan, Prof. A. C. Daptardar(Vice Principal) and the faculty for their support.

- Dr. Abhijit Joshi

FROM THE EDITOR'S DESK

In today's world, recognising upcoming trends and focusing on core concepts is key to gaining a better understanding of the digital era we live in. In Protocol Version 8. We aim to comprehensively cover all the crucial areas that the IT world is currently focusing on.

FROM THE COMPUTER SOCIETY OF INDIA (DJCSI) COMMITTEE:

My tenure as the chairperson of DJCSI made me aware of 2 things: My strengths and more importantly my weaknesses.That's great because this a great chance to work on and dissolve your weaknesses Working with a highly talented, ambitious team made me transcend my own expectations just to meet theirs. I hope that the current CSI committee succeed in all their endeavors and take DJCSI to new heights.

-Nilay Shah
[Chairperson-CSI]

ACKNOWLEDGEMENTS:

The CSI Editorial committee would like to thank Dr. Abhijit Joshi and Prof. Mrs. Neepa Shah for all the support and constant help that they have given us. We would like to express our gratitude to them and the entire DJSCE faculty without whose support any of these co curricular activities wouldn't have been possible.

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DJCSI Family

DJCSI CORE COMMITTEE

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An Engineer's Conundrum

Should I focus on competitive programming or on software development? This is a dilemma for many of us. The path one chooses significantly determines ones' future sector and profile of work, ones' approach to problems, and hence ones' thinking . And it is these major implications which begs us to give the question a serious thought.

Competitive Programming is a sport wherein you are given problem statements for which you have to come up with a solution which should correctly run for respective test cases. It's a sport because you compete with multiple participants to correctly code as many problems as quickly as possible. Software Development on the other hand is developing deployable software for a real world problem which is supposed to be used by a certain set of users. The time taken for developing a software is usually in weeks or months whereas a competitive programming solution takes hours/minutes to code. Selecting the right framework, understanding documentations, working with APIs and building upon existing code by other users to make your software are essential skills on its own. You need and learn interdisciplinary knowledge of servers, protocols, web, design and many more fields while developing a software. Software development is the skill for the industry. Competitive programming leads to a strong base of data structures and algorithms. It greatly improves ones' logical thinking, and problem solving skills. The search for the most optimised solution is fired in your head on seeing any problem, not confining t just programming. Most of the top compa nies recruit employees who have very goo algorithmic and problem solving skills.

So what does all this boil down to? A though it may sound cliched, but you nee them both. A sound competitive progran ming base ensures that you know the dat structures and algorithms you need for e ficient working softwares. Imagine yo need to write a scheduling algorithm t schedule requests to servers on a distrib uted system for your application, not onl do you require the knowledge of th tools/technologies for the softwares bu also a sound algorithmic and logical base It's important to understand that you can keep both of them on diametric ends an walk towards one. That is most probably big mistake! Prepare for ICPC and als create an application to track your attend ance. Don't choose, Just do them. All o them. Whatever your heart says. Be happy programmer, not what everyon around runs after!

-Nilay Shal
(TE IT)

Tech Telepathy

Here's something you probably didn't expect in your inbox: Researchers have now developed a way to email brainwaves. A study published in PLOS One details how an international research team transmitted words from one person's brain to another by mapping electrical currents in the brain and the spine. Scientists have been studying the possibilities of brain wave sensing technology for a while. For example, some researchers recently used electroencephalography (EEG) headsets, which record electrical activity along the scalp, to give people mind control over objects like toy helicopters.

But in the most recent study, researchers replaced the machine in that equation with a second brain and adjusted the technology so that two humans could exchange messages telepathically.

Four participants were recruited, ages 28 to 50, for the study. First, researchers used EEG to translate greetings, such as hola and ciao, into code. This was sent from a participant in Thiruvananthapuram, India to Strasbourg, France.

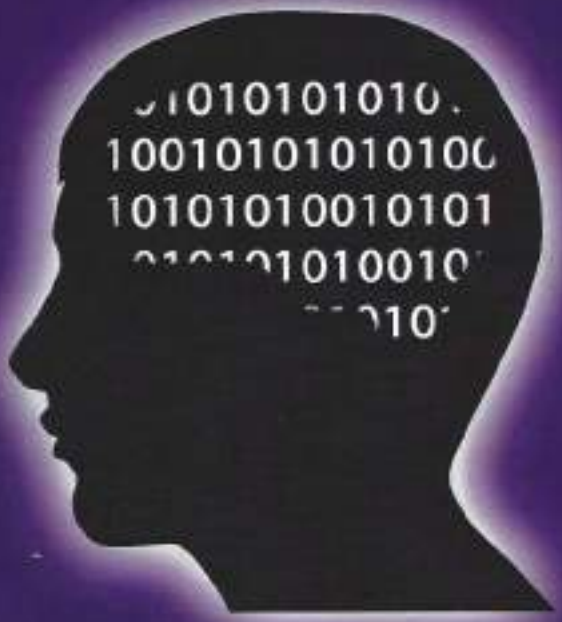
There, a computer interface translated the message from code to words and implanted them into the receiver's brain through light electrical stimulation. Participants didn't report feeling anything in the process, and only saw flickers of light in their peripheral vision-but they did hear the message. Researchers then conducted a similar experiment in which thoughts were successfully transmitted from two participants, one in Spain to one in France.

The results weren't perfect-in the second experiment, the error rate was 15 percent, 10 percent on the decoding end and 5 percent on the initial coding side-but it is a remarkable progress. Previously, EEG communication had proven successful with rats, but not with humans. Brain-to-brain transmission is still a budding area of study, but this marks a huge step: It's the first time humans have been able to drop messages into another brain using a machine.

Developing brain-to-brain transmissions further will likely raise ethical and sociological questions in the future, such as who gets to transmit these messages and what might happen if someone decides to dabble into the dystopian realm of mind control. Unless you can transmit something like "let's go eat burritos the size of our faces." Even the most traditional anti-transhumanists should be able to get down with that.

-Milit Betai
(TE IT)

Deep Web



Ever wondered what people meant when they referred to the deep, dark, hidden corners of the Internet? Everyone seems to be aware of this seemingly distant place that can be accessed while you sit in your own home. What is it, though?

The parts of the web that have been protected, hidden or are not indexed by search engines comprise the Deep Web. This includes several illegal pages, government pages, underground websites, unseen content and more. The massive amount of this information cannot be fathomed as it represents **96%** of the entire internet. This means that if you like millions of other people in the world have never accessed the invisible web in your entire lifespan of net usage, you have not seen a very large majority of the internet. One of the reasons the Deep Web has remained so elusive is the fact that it is **completely anonymous.**

An official definition for the deep net is the pages of the web that cannot be found by a simple query on a search engine. While this includes pages that are deliberately hidden, this also includes the pages that may not have been deemed relevant by their host websites. Although an argument can be made that pages like private blog posts are part of the deep net, the darker content of it is several times more inaccessible. It is not actually illegal to use the deep web, even though it may be used for illegal purposes. This misconception has also perpetuated the fear of the **dark web.**

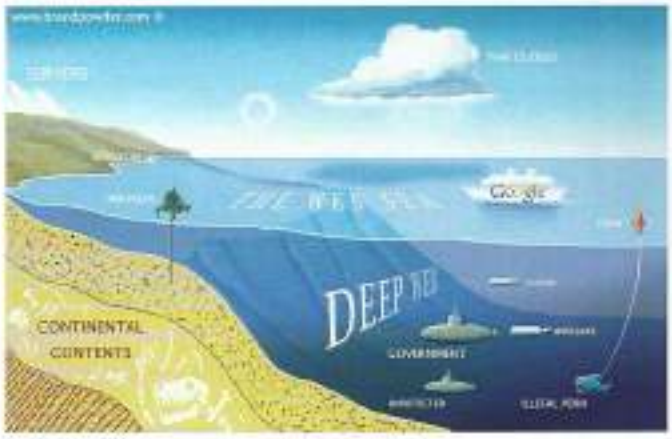
While there is a lot of speculation on the matter, it is true that the anonymity of the deep web allows for crimes to be committed and gotten away with more easily. For example, a popular rumour is that money laundering and professional, unethical hackers form a big part of the dark net. There was actually a highly successful but also terrible website built in the dark web that was famous for the movement and trading of illegal goods and drugs known as the **Silk Road**. This site was notorious for its felonious actions and was taken down soon after.

To track services like this and to have secured communications, the US Navy created Tor, also known as **The Onion Router.** Tor is software that installs into your browser and sets up the specific

connections you need to access Dark Web sites.

Critically, Tor is an encrypted technology that helps people maintain anonymity online. It does this in part by routing connections through servers around the world, making them much harder to track. Tor also lets people access underground web sites. Instead of seeing domains that end in .com or .org, these hidden sites end in .onion.
This service was created with the purpose of observing and securing information trafficking across borders. However, it soon became easy for a regular person to use this service. While there is a fear that it could fall into the wrong hands, TOR has been instrumental in taking down some of the central hubs of illegal trade like the Silk Road.

Thus even with all the problems that Tor can create, it has proven to be extremely beneficial. Due to the moral justification of it. The Onion Router continues to stay up despite all the demerits it provides. At the end of the day, just because something can be used for illegal purposes, it should not necessarily be deemed a bad thing. View it as a tool to perform a task. A hammer can be used to kill a person, but the hammer is not bad. It is just a tool. It depends on the user whether it is used legally or not.



Another myth that people believe to be true is that the Deep Web is a portal of data that the big companies don't want you to have.

Companies need to upload and archive all their documents, images and odd movies on the internet but they do so on a non-reachable private platform like the Deep Web so as to maintain security. Even the biggest conspiracy theory buff would find that sort of data boring.

In conclusion, the Deep Web is a vague, ambiguous place. However if you were to research this for yourself, it would be apparent that most news headlines tend to sensationalize the Dark Web and its seedier side, and rarely mention the untapped potential of the Deep Web. It's worth remembering that there's a whole lot more to the Deep Web than the obvious criminal element. As engineers find better, faster ways to catalog the web's stores of data, the internet as a whole could transform our society in amazing ways.

-Saloni Mehta
(SE IT)

GitHub

Ever wondered what the power of all the programmers working together and helping each other in their projects would be like? Well, GitHub aims to do just that.

At the heart of GitHub is the software Git, which was created by **Linus Torvalds** while working on developing Linux, an open source software. An open source project is the one in which the source code is made freely available by the owner for anyone to work on, edit and contribute. Linux is the prime example of this.

When the source code is freely available, anybody with the knowledge of coding can study the code, modify it and understand how it works. While working on Linux, many developers were working simultaneously and contributing towards it. To make the work more efficient, Linus Torvalds created a **'version control system'** or a software that could track all the changes made by developers and named it 'Git'.

Git in simple terms, is a change tracking software on which GitHub is based. When many people are working on a single project, the changes and contributions made by each developer are different. Git manages to track all of these changes which can be later unified or **'merged'** into one source code.

As, Git became popular and developers started preferring it over the existing version control systems because of its efficiency, a developer named **Tim Preston Werner** made a website that simplified and embedded Git into it, this made coders to collaborate on projects over the internet. This was the birth of the website 'GitHub'.

So, what exactly is GitHub?

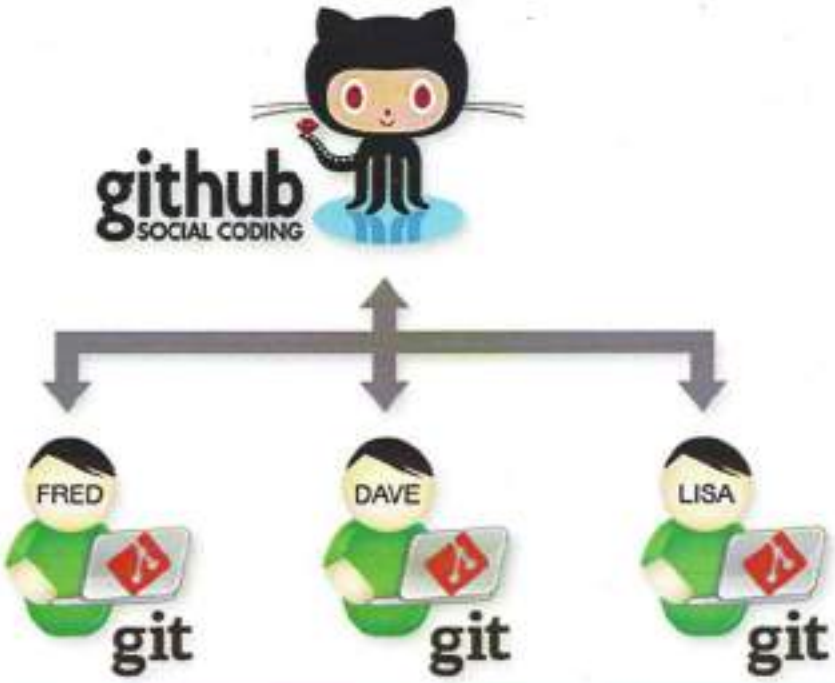
GitHub as the name suggests, is based on the software 'Git' and is a 'hub' or a host of repositories or simply a platform for people to host and collaborate on projects.

Repository is the basic unit of GitHub, or simply a single project. It contains all the data related to the project. It can contain files, folders, images-in short all the things that the project requires. GitHub is more of a social way of programming and working together, helping each other in their projects.

How exactly does GitHub function?

The working of GitHub is simple which has made it so popular among developers and various designers.

A person say John starts a project, he realizes he won't be able to do it alone and may need help. John then, writes an **'issue'** or an area of concern in his project where he needs help.Now, to safeguard his main code, he creates another duplicate of the source file, this is called **branching.**



The main branch which contains the original source file is called the master branch and the other branch which is a duplicate of the master can be named anything, let's say in this case it is named 'Test'.

Now, another developer browsing through GitHub comes across John's project, if the user wants to modify someone else's project, he has to create a copy of that project in his computer, this is called **forking**. Let's say for the example's sake the user modifies a bit of code in the 'Test' branch and **'commits'** those changes, 'commits' is a technical term for saving changes made to the original code, and he gives a brief explanation about the changes he made. To incorporate the changes made in the 'Test' branch here, into the main 'master branch' or the original source code, user has to send a **'pull request'.**

After the pull request is sent, the differences between the two branches is shown, which can be further discussed. The host, John here, can **'merge'** the pull request, this simply means that he will incorporate all the changes made in the 'Test' branch into the master branch. After which, the 'Test' branch can be deleted. And *Voila!* John has successfully used GitHub to solve his problem.

GitHub also started catering to the needs of the corporate world by starting **'GitHub Enterprise'** which offers many extra features that can help companies work proactively like enhanced security and authentication, being a few of the lot.

"That's what our vision is- to make it easier for people to work together than to work alone", Preston- Werner, the founder of GitHub, told in an interview. GitHub has become the biggest place for open source projects to develop and it still shows great potential, if nothing else, GitHub has become the coolest place for coders to hang out.

-Najeeb Qazi
(SE Comps)

Words of Wisdom

Manoj S. Chouthai is a Global Chief Information Officer (CIO) and enterprise CTO with several decades of experience in IT. He was recently named as the Chief Information Officer for Reliance Industries Limited. Prior to joining RIL, Mr. Chouthai was the Group CIO and CTO at PSEG in New Jersey. While at PSEG, he also served as the chair of the technology sub-committee for the Supreme Court of New Jersey. In 2008, Mr. Chouthai was named 'CIO of the Year' by the New Jersey Technology Council. He was also elected to the 2009 Computerworld Premier 100 IT Leaders list. Mr. Chouthai received a Bachelor of Engineering in Electrical Engineering from Walchand College of Engineering, a Master of Science degree in Information Systems from the Courant Institute of Mathematical Sciences at New York University (NYU), and a Master of Business Administration degree from the Stern School of Business at NYU.

"It is indeed a privilege to be able to communicate with young talent that is preparing to venture into the professional world. As you get closer to your graduation, all of you will get to a stage where you have to decide whether or not to pursue further education or, get into the professional workforce. Unfortunately, I cannot offer you a simple answer, since each of you has a unique background and has different needs and expectations from life – something only you will be the best judge of. However, I can share my own story with you and hope tha it'll provide you with a perspective. After graduated with a B.E. Degree, I received job offer from a leading firm in India an entered the IT work force as a Managemer Trainee. I spent a decade gaining valuabl experience working in various facets of th IT industry spanning: Applicatio developments, telecommunications networkings, database design management, infrastructure managemer and project management. This first decad of my career provided me with a stron foundation of the various diverse aspect of Information Technology. As time wer by, the technology landscape evolved fro the Mainframe to Client-Server to th Network. This made me realize that needed to upgrade my foundationa technical skills in order to remai technically relevant. So, I went back t school and earned my MS degree. The M degree enabled me to evolve from a individual contributor role into management role within the technolog function. Similar to the experiences of a l of technical professionals who get into management role, after a few years, I to went through a phase where I had to decid whether to stay on the technical track or t migrate onto the management track. Aft a lot of soul searching and thought, I cam to the conclusion that I liked managing an coaching people and more importantly, enjoyed the ability to lead technolog driven business transformation. effectively communicate with busines executives, I needed to learn the necessa

vocabulary and skills. So, I went back to school again and pursued my MBA. While this is the path that enabled me to progress in my career, I also realize that, this is not the only path to become a successful CIO or CTO. I know of several very successful technology executives, leading the IT departments in Fortune 500 companies, coming from backgrounds as diverse as engineering, finance, liberal arts etc. The one thing, however, that they all have in common, is good judgement and a strong passion to deploy technology solutions to solve business challenges and generate value.

Going forward, you will enter into a very different world of technology compared to the world I entered when I was young. Technology evolution is causing a radical and structural change in our personal and professional lives. We are amidst a digital evolution and the business and IT worlds are merging together rapidly. All of you, as future leaders, will require a firm grasp of both business and technology. Mobility, Cloud, Social Media and Big Data/Analytics are changing the velocity of decision making and simultaneously, causing disruptions in the business models of most major companies. As a result, the business leaders of tomorrow must not only have a good command of finance, accounting, economics, marketing etc. It is 'Imperative' that they have an equally sound foundation in Information Systems & Technology.

As you start your career, I would strongly encourage all of you to think of the following:

1. Develop your strengths and minimize your weaknesses so they do not obstruct your progress.
2. Develop a flexible and resilient attitude.
3. Invest time in learning how the business makes money.
4. Cultivate the skills that help you to figure out how technology can improve the bottom line of the firm.
5. Think of yourself as a "Problem Solver" and not just the developer, the analyst, the database designer etc.
6. Every assignment or project that you work on is an opportunity to learn something new - it is important to develop a mechanism to capture and then leverage those learnings in other assignments.
7. Along with technical skills, it is even more important to have Ethics, Integrity and Respect for each other.
8. Work hard, work smart and focus on excellence in whatever you decide to do.

Finally, what matters most is the ability to achieve a balance between your professional and personal life, figure out a way to have fun and enjoy the journey.

Thank you."

-Mitali Shroff
(SE IT)

Startups

Any time is a good time to start a company.

RON CONWAY
FOUNDER OF SV ANGEL

You'll often see people of different types and ages these days who are creating their own businesses instead of working for someone else's. You can call them entrepreneurs but I like to refer to them as luminaries. All that they have to begin with is an idea, which may not always be inspiring. The process by which they take this idea and make it a reality is the journey you should tune in to.
This begins with an obvious question: What exactly is a startup? A startup company is a company or temporary organization designed to search for a repeatable and scalable business model. These companies, generally newly created, are in a phase of development and research for markets. In the late 1990s, the most common type of startup company was a dotcom. This period soon came to be known as the dotcom bubble. Although many of these ventures were unsustainable due to a lack of revenue there were a handful of internet startups that did survive when the dotcom bubble burst. Internet bookseller Amazon.com and internet auction portal eBay are examples of such companies.

The next obvious question that arises: Wha does it take to make a successful startu company? To answer this, we speak t **Sanjay Mehta,** one of the entrepreneur who contributed to the very same dotcor bubble and has since been responsible fo two successful startups. He has th following business model for any startup. If you want to create a startup, there ar things that you need to know an remember. You need to be aware o different factors and ask yourself th following questions:

Have you studied, in depth, the vertical th you wish to get into?
You must have a clear understanding o your idea. Be it a product or a service, yo must know everything there is to kno about it. You should be aware of how it executed, by whom it is executed and wha purpose it serves.

What is the market size?
Once you have your product or service mind, you need to know your audience. Yo must be aware of the market that you a catering to as the entirety of your sellin plan is based on that.

Will it scale with technology or wi on-ground presence?
Once the initial market is set, you mu ponder over whether this group expandable. If it is you must know wh means to use to expand it. Will technolog like social media build your market or is physical reminder like a billboard going reach the extensions you're looking at?

What are the entry barriers?
Does a similar product or service already exist? Is there a different service that has the same functionality? When people bid for items at an auction, no one remembers the second highest bidder's name. If you're vying for the same audience as someone else, make sure there is something that sets you apart from the competition.

Is the model simple enough for a consumer to understand?
If your unique factor for the business is too complex, the market won't be paying heed to what you have to say about it. People prefer to go with simplicity and if you're spending too much time explaining why they should choose you, ultimately no one does choose you.

Are you ready to ramp up in a hurry?
The perfect opportunity for you to launch your idea is not going to be waiting for you to notice it. You must strike while the iron is hot and release your creation as and when the timing seems right. In order to do that, however, you must be ready for a complete launch. Therefore, make sure you're prepared in advance.

Is the revenue piece clear?
Clarity is required as far as the revenue stream is concerned. A successful business requires a good income and if you are unable to gauge where the money may or may not come from, you will find it difficult to cater to that person, seemingly ruining the business.

Is it fundamentally cash positive?
Will it be profitable? Every startup needs money to get it from the ground up. However, for the startup to be successful, it must generate enough revenue for there to be cash at hand. If the startup is drowning in debt or even simply making ends meet, it is not successful.

These are some tips that you may find useful if you are trying to build a startup. If you have clear answers for these questions, you can be sure to see success soon.

-SALONI MEHTA
(SE IT)

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Big Data

Take a look at this tweet, this is the first tweet in history by Twitter Co-Founder Jack Dorsey 2006 (Yes, he has spelt twitter wrong). Now, every second, on an average, around 6,000 tweets are tweeted on Twitter, which corresponds to over 350,000 tweets sent per minute, 500 million tweets per day and around 200 billion tweets per year. Each of these tweets could be different from the other, unique in its own way, depending on the individual user. The same goes for Facebook statuses, Google searches, Amazon and Ebay product searches, etc.

"Every two days we create as much information as we did up to 2003"
-Eric Schmidt, ex-CEO of Google.

This results in the creation of extremely large, random and unstructured data sets which are very difficult or nearly impossible to predict. These data sets are called using an all encompassing term-Big Data. We are talking about data in range of few terabytes to few petabytes or higher.
A **UCLA** study shows that social media like Twitter can use Big Data to monitor HIV and drug-related behavior.

Big data analysis played a large role in **Barack Obama's** successful 2012 re-election campaign!
Amazon handles millions of back-end operations every day, as well as queries from more than half a million third-party sellers from around the world now that's a lot of data.
Facebook handles 50 billion photos from its database.
Decoding the **human genome** originally took 10 years to process, now with a large set of data like this easily accessible, it can be achieved in less than a day!

India's UID project or Aadhar is called the world's largest Data Management project by Forbes. This project involves storing the identities of 1.2 billion residents, which includes their fingerprints, photographs and iris scans.

Big Data has the following characteristics:
Volume: This goes without saying. The sheer size of the data generated is very important in this context. It determines whether the data can be considered as 'Big Data' or not.

Variety: Tweets, statuses, searches are so random and unstructured that there is a measure of the degree of variety in data that contributes to the scale and reach of big data.

Velocity: This refers to the very speed of generation of data or how fast it is processed. It is a challenging task to meet the demands of users as technological advancement in recent times has increased the speed of processing to an astonishing level.

Variability: This tells us about the inconsistency in the data, which hampers the process of categorizing the data.

Complexity: After all, an ultra-fast moving, enormously large set of data, which also happens to be completely random - is complex.

All the above characteristics make Big Data very difficult to process or analyse by the traditional data processing techniques.

So, how do you scale a mountain of data?
The Answer:
One step at a time and with the right equipment.

The technology involves mapping of the data one step at a time and data categorization creates smaller sets of data which are easier to handle. To achieve this, a framework like Apache Hadoop can be used. Apache Hadoop is a set of algorithms which allows storing of Big Data, and processing it, in a very efficient and fast manner. It stores Big Data by using **Hadoop Distributed File System** or HDFS and processes it by using Hadoop Map/Reduce codes. HDFS stores large files (range of gigabytes to terabytes) across multiple machines. **Finding and analysing the data that matters is like finding a needle in a haystack except that the haystack needs to be found first, out of millions of other haystacks.** Therefore the HDFS splits files into large blocks of 64-128 MB and distributes them in nodes, then **MapReduce** comes in. The HDFS achieves reliability by replicating the data across multiple hosts. The default replication value is 3, data is stored on three nodes. The MapReduce engine sits on top the file system, which consists of one **JobTracker,** to which client applications submit MapReduce jobs. The JobTracker pushes work to TaskTracker nodes, striving to keep the work close to the data. A rack-aware file system, JobTracker knows which node contains the data, and nearby machines. If the work cannot be hosted on the data residing node, priority is given to nodes in the same rack. This reduces network costs and delays in transferring large amounts of data.

Prominent users of Hadoop include Yahoo! Facebook and cloud service providers like Microsoft Azure. In Marketing, Big Data management using Hadoop is used for **'recommendation machines'** like Netflix and Amazon by taking previously bought products and searches of each customer and compared to millions of others. Ebay uses data warehouses of 7.5PB-40PB Hadoop cluster for search, consumer recommendations and merchandising.

The world has indeed changed dramatically since the first tweet by Jack Dorsey. The Big Data technology is set to exponentially become more pronounced. Coming of 'The Internet of Things' into mainstream usage will propel the relevance of Big Data.

- Aditya Bhatt
(SE Comps)

Hololens

Has Microsoft suddenly pushed us into the age of "Star Trek" and "Minority Report"? For those confused about what's actually going on with the company's new head-mounted gadget, here's the rundown. Microsoft has a vision for the future, and it involves terms and technology straight out of science fiction. Microsoft's HoloLens, which the company unveiled at its Redmond, Wash, Headquarters, is a sleek, flashy headset with transparent lenses. You can see the world around you, but suddenly that world is transformed with 3D objects floating in mid-air, virtual screens on the wall and your living room covered in virtual characters running amok.

Microsoft's HoloLens is not actually producing 3D images that everyone can see. Instead of everyone walking into a room made to reproduce 3D images, Microsoft's goggles show images only the wearer can see. The company is not trying to transport you to a different world, but rather bring the wonders of a computer directly to the one you're living in. Microsoft is overlaying images and objects onto our living rooms.

You can walk around and talk to others without worrying about bumping into walls. The goggles will track your movements, watch your gaze and transform what you see by blasting light at your eyes. And since the device tracks your location, you can use hand gestures – presently, it's only a mid-air click by raising and lowering your finger to interact with the 3D images. The goggles also has a camera that looks at the room, so the HoloLens knows where tables, chairs and other objects are. It then uses that information to project 3D images on top of and even inside them place virtual dynamite on your desk and you might blow a hole to see what's inside.

With Skype video chatting, HoloLens users can let others see through their eyes to help with tasks. These companies and the hardware they're creating imagine a world where hand gestures, 3D images and images superimposed on reality are the next-generation tools for productivity, communication and everything else we use gadgets and the internet for.

Technology companies have long promised to bring us the future now, reaching ahead 5 or 10 years to try to amaze consumers with the next big breakthrough. We're not even close to those scenarios yet, but we're taking tiny steps in that direction. Companies like Facebook, Google and Microsoft are now attempting to move that fiction toward reality. If these devices work the way tech luminaries hope they can, such dreams may be reality sooner than we think.

-Aanchal Dhurka
(SE IT)

Predicting the Future

Predicting the future is hard and risky. Predicting the future in the computer industry is even harder and riskier due to dramatic changes in technology and limitless challenges to innovation. Nine technical leaders of the IEEE Computer Society **Hasan Alkhatib** of SSN Services LLC; **Paolo Faraboschi** of HP Labs, Spain; Eitan Frachtenberg of Facebook; **Hironori Kasahara** of Waseda University; **Danny Lange** of Microsoft; **Phil Laplante** of Pennsylvania State University; **Arif Merchant** of Google; **Karsten Schwan** of Georgia Tech; **Dejan S Milojicic**, IEEE Computer Society President 2014 joined forces to write a technical report, symbolically surveying 23 potential technologies that could change the landscape of computer science and industry by the year 2022.

In particular, this report focused on 3D printing, big data and analytics, open intellectual property movement, massive-ly online open courses, security cross-cutting issues, universal memory, 3D integrated cuits, photonics, cloud computing, computational biology and bioinformatics, device and nanotechnology, sustainability, high performance computing, the Internet of Things, life sciences, machine learning and intelligent systems, natural user interfaces, networking and interconnectivity, quantum computing, software defined networks, multicore and robotics for medical care. This article focuses on a few of the mentioned fields.

Device and Nanotechnology

"Imagine your life being saved by a custom-designed medical machine made from particles 50,000 times as small as a single strand of your hair."

-GT-Nanotech

More generally, nanotechnology is about manipulating systems at the level of atoms, molecules and larger structures. Current technology shows the capability of rearranging atoms on a silicon substrate to spell a word or of moving them around to show a sketch or cartoon.

Nanotechnology is appearing in products like sunscreens and makeup, in automobile tires, vaccines and even cameras that can be swallowed and digested. The state of the art remains far from the active nanotech envisioned in sci-fi stories, but by 2020, we are likely to see an increased use of nanotech-based devices in controlled settings. In medicine, swallowing little pills containing cameras may well be routine parts of office visits, with digestive processes removing them after some time but will we have injection

of nanotech into our bloodstream, to say, better map the heart and the blood vessels connected to it or to trace blood vessels in the brain?

There are many challenges in realizing the nanotech visions articulated above. There are ethical and privacy issues concerning "constant monitoring" by millions of tiny devices. There are dangers from long-lived nanoparticles, both in terms of potential unknown interactions with the human body and in terms of external influences able to use them for damaging rather than repairing human bodies. The popular press has already taken up this issue, worrying about nanoparticles entering the food chain or nanoparticles in sunscreen interacting with the human body.

Pill Camera

Natural User Interfaces

After years of being the Next Big Thing on the technology horizon, NUIs are rapidly becoming mainstream. Interactions between human and machine become more natural and intuitive when people can use touch, gesture and speech to interact with their computing devices.

Hardware prices are falling rapidly and capabilities rising at an even faster pace and these developments are making it easier to embed sensors, extreme processing power and connectivity into devices and surroundings. The software that runs these technologies is the result of years of research into computer vision, machine learning, big data, user interfaces and speech recognition and natural language processing.

Life Sciences

Life Science industry sectors include pharmaceuticals, biotechnology, chemicals, medical devices, medical products and technology and healthcare services.

For the future of healthcare, this means

- Instant and expert diagnostic advice.
- Personal preventative health advice.
- Enhanced bedside care.
- Big data analysis of clinical trials and unstructured research data.

Big data in health and medicine will pull together databases with patient's' outcomes, leading to a translation of research results directly into medical practice without delay. Healthcare once consisted solely of killing germs, but tomorrow's regimens will be guided and adjusted using relevant biomarkers specific to individual patients.

In this report, several technologists evaluated technology areas they believe have the potential to disrupt the world we see today. However, the benefit of technology is what we make of it. Like many times in the past, technology is an enabler. It is up to the human race to leverage it in the best possible way to advance human society.

-Lamiya Kothari
(SE IT)

CSI Events

Python : The CSI student chapter of D.J. Sanghvi started off i year by conducting a workshop on Python on 22nd Septembe 2014. It was a one-day event conducted by Dhruv Baldawa 'Enthought Co-operation' that taught students user-friendly ar easy to learn language. It was attended by 110 students of o college (including the TE's and SE's of various departments).

Technical Paper Presentation : CSI collaborated with ACM for the first time under ICACTA hold a very informative seminar on Technical Paper Presentation. It was conducted by Dr. An A. Deshmukh, HOD-EXTC. on 22nd September, 2014 With over 100+ final year studen attending the seminar, and with a chance to get the papers published in leading publicatio like Elsevier at an international level, there would be very few opportunities better than this.

Node.js : The node.js workshop is one of the classic events held by DJCSI on 27th and 28th February, 2015, becoming the cynosure as soon as it was announced. Node.js® is a platform built on Chrome's JavaScript runtime for easily building fast, scalable network applications. It was conducted by Vivek shah, an alumnus of our college who is also a developer at Games 24X7. The students had in no time created an elegant todo list application.

Inspirational Talk : We recently had an inspirational talk w the co-founders of StupidSid, our very own alumni Jine Bagadia, Kashyap Matani, Sumeet Jain and Tumul Buch on March, 2015 where they got to know a bit more about h StupidSid came to be, their journey the challenges they fac but most importantly their inspiration.

Photoshop : Photoshop event was conducted by the CSI student chapter of DJ Sanghvi College on 9th October, 2014. During the course of the event, students were taught all about the basic features of Adobe Photoshop. Towards the end of the workshop, students were also taught the basics of creating a business card for any event.

Android Lecture Series : Android lecture series was conducted by Mr Chintan Shah of B for all the second year students interested in Android Application Development on 16th a 19th March, 2015.

Codeshastra : For the very first time in DJ Sanghvi, a competition was held on 24th and 25th January, 2015 which allowed students to use their development skills to make useful and marketable products! Yes, it was one of our flagship events called CodeShastra and it was in collaboration with an NGO called Muktangan who provided certain problem statements. More than 100 students took competition. Each team chose one of the problem statements given. The event comprised of two days of intense coding to solve these problems. The judges in this competition were an esteemed panel of experienced software developers who mentored the students during the course of the competition. They are:

Vinay Gaba, Business Technology Analyst at Deloitte U.S. India offices,
Siddharth Naik, Deputy manager at Innovation Centre, Godrej and Boyce Mtg. Co. Ltd.,
Amit Upadhyay, VP Engineering at Browser Stack and
Anirudha Choudhari, Co-Founder and Director at WonderBiz Technologies.

Codemania : For the first time at D.J. Sanghvi, DJCSI collaborated with DJTRINITY- our annual college festival to conduct, a national level competitive programming contest, Code Mania, providing an extremely prestigious position and an excellent learning experience to its winners as well as its participants. Held on 8th March (Round 1:online) and 12th March (Round 2: on site), Codemania turned out to be an immediate success.

Round 1 had 205 teams competing from around 37 colleges. We received participation from 5 international (Czech Republic, Ireland, Peru, Belarus, USA) and 200 national colleges.

Round 2 saw 32 shortlisted teams competing for the first position. Winners received cash prizes as well as vouchers worth Rs.4000.

Consumer Electronics Show

International CES, more commonly known as the Consumer Electronics Show (CES), is an internationally renowned electronics and technology trade show, attracting major companies and industry professionals worldwide. The annual show is held each January at the Las Vegas Convention Center in Las Vegas, Nevada, United States. Unfortunately, the show is not open for the local public, giving this exclusive opportunity to certain privileged members and youtubers who really work hard to keep the people updated about the new tech in the market.

The show hosted this year in January (2015) was just a while ago and it truly created a furor in the tech community because of a cornucopia of new gadgets and innovations burgeoning out of the minds of certain geniuses and prodigies present in highly reputed companies like HTC, Sony, Canon, Samsung and many more. This year the inflow of ideas were experienced by thousands of visitors as compared to last year. When we see an exhibition of such products across acres of land we are normally dumbfounded by the enormity of the hard work and diligence that goes behind the actual making of the same. This year there were several products that truly promise a well established and secure future in not only the electronics world but also in the car industry.

First on the list that had the most intriguing and radical design was the LG GFlex-2. The self healing capabilities of the phone has become even better through the help of

constant developments on it and a expected the bend continues to mystif people out of their seats and the truth ye continues to remain uncanny.

The 'Tesla Model –X' is one of the classies designs that anyone can ever find in th battery operated zone market. This car i the only one which has falcon wing door which are found in no car as of yet. Th BMW i-3 and i-8 were also displayed at th exhibition flashing high performance an snappy features. The 'Z-BOARD-2' is als great product that was tried and tested b many at the convention which is actually magnificent electric skateboard that work on body motion.

The revolutions brought about by th present tech community are exuberant t look at and we, as the pioneers of th future have to see to it that this electroni world doesn't dwindle away in front of ou eyes. We have to constantly try to come u with better solutions and provide mor support and ebullience to th tech-enthusiasts. The famous quote fro B.F. Skinner says it all "The real proble is not whether machines think but whethe men do".

-Tirth Mehta
(TE Comps)

Emotion Sensing

A video game can get repetitive. If you play it several times, it can get boring and very predictable. The initial excitement and exasperation slowly fades away. Then you go ahead and buy another one to enjoy that initial feeling. Innately, you know it's going to fade away, but you don't care at that time, you'll buy yet another game, no matter what.

What if there was a game that maintains a consistent level of excitement? A game which responds to your emotions and automatically changes it's gameplay? The moment you get bored, it gets faster and more exciting! Now that kind of game would stay in your console for quite some time, wouldn't it? So how can a game do this?

Engineers at Stanford, with the help of Texas Instruments made a video game controller that directly taps into your autonomous nervous system, checking for signs of prolonged excitement or boredom.

The autonomous nervous system is responsible for fluctuations in your heart rate, respiration rate, body temperature, perspiration and other key bodily processes. By measuring these physiological signs, the controller's sensors instantaneously sends signals to the custom made console.

There's even an accelerometer to measure how frantically a person shakes the controller. Next, a custom-built software compares the intensity of the gameplay with the disposition of the player and makes 'adjustments' accordingly.

To maximise excitement, the game can speed up, or send more 'zombies' to kill. "We can also control the game for children. If parents are concerned that their children are getting too wrapped up in the game, we can tone it down or remind them that it's time for a healthy break." said Corey McCall, the leader of the game controller project.

The controller received a ton of applause when McCall presented it in a Las Vegas Consumer Electronics Show in January last year. Technology like this could take not just gaming to new heights, but can also introduce new concepts and perspectives.

How about a radio that automatically plays an uplifting song when you're depressed? Perhaps an alarm that rings loudly in your car if you get sleepy while driving it? That could prevent many road accidents. The applications of these smart sensors are practically limitless.

-Aditya Bhatt
(SE Comps)

Linux

In 1991, the Linux kernel 0.01 was released and uploaded to an FTP server by Linus Torvalds in Helsinki. It consisted of only 10,239 lines of code. Today, the Linux kernel contains over 14 million lines of code. Linux is a 'UNIX-like' operating system that was designed to provide computer users a free or very low-cost OS comparable to traditional and more expensive UNIX systems.

HOW IS LINUX BETTER FOR CODERS?

Linux is free: No matter how many computers you install it on, the cost remains zero.

Community support: The community support of Linux is unparalleled, mainly because there is no clear demarcation between developers and the rest of the community.

Bash Scripting: Many of the utility line commands that come with Linux (or that can be installed) work like highly-functional blocks that can do specific tasks. With a Bash script, you can put thos blocks together to create somethin making it a great productivity tool.

Independent distributions and ease switching: A distribution (Distro) contai thousands of tools, office softwa multimedia and games. Most distros ke user data on a separate partition, so y can flit between distros easily keeping yo settings, emails etc.

Interoperability: Linux plays well with oth systems. It recognises that there's a pla for Windows and Mac OS X and will inst alongside them and share files with them

Linux Is A Desirable Skill: An increasin common item found in programming j descriptions is familiarity with Lin Adoption of Linux can give you competitive advantage later on.

WHY ARE COMPANIES SWITCHING LINUX?

Companies value the following features the Linux platform:

High Availability: of a Linux server. E when you install and upgrade the version the platform, you don't need to reboot server.

High Security: With Linux, you no lon need antivirus software installed. It's highly secure system and the glo development community is consta looking for ways to enhance the securit

The arguments were that end users need retraining if they switch over to a desktop interface. Ubuntu's Unity desk interface is user friendly and m

easily understood by end users than Windows 8.1. On the support front, hardware support for Linux used to be extremely limited. That is simply not the case anymore.

DEVICES & COMPANIES THAT USE LINUX

The Linux OS is not just for nerds. Though you may not realize it, chances are you have a version of Linux running right under your nose.

Google: The search giant had its engineers cook up a customized version of Ubuntu nicknamed "GooBuntu". Android, the mobile operating system (OS) currently developed by Google is based on the Linux kernel.

Raspberry Pi: The business card sized computer designed for electronic projects as well as desktop computing which is economical and is fully functional is a landmark in Linux development.

Amazon: the online retail giant uses Linux as well. It shaved millions of dollars from its technology costs by switching to the Linux OS. Kindle, the e-book reader's software platform also runs on the Linux OS.

Wikipedia: the online encyclopedia, is another staunch supporter of Linux. Ubuntu powers the servers that produce up to 10 billion page views a month on Wikipedia.

Other Industries: McDonalds, Pizza Hut, Twitter, Panasonic, IBM, NASA, New York Stock Exchange – all use Linux. OLX and Just Dial relied on Linux for developing applications that have a huge database. Oscar-winning movies Titanic and Avatar were edited and the graphics were created using Linux only.

WHY SHOULD WE CHOOSE LINUX OVER WINDOWS?

Security: Being the most widely used OS, hackers target Windows frequently. Microsoft

releases security patches through its Windows Update service approximately once a month (critical updates are made available earlier). Due to regular kernel updates and a firewall at the heart of the kernel, a Linux computer can devote all its resources to running your programs, without being bogged down by security programs.

Full access to source code: Linux belongs to the GNU Public License, thus, users can access (and alter) any part of the code. Unless you are part of a very select group, you will never lay eyes on code making up the Windows OS.

Licensing freedom: With Linux, you can download a single copy of a Linux distribution (or application) and install it on as many machines as you like. With the Microsoft license you are bound to the number of licenses you purchase.

Commodity hardware: Even "out-of-date" systems will run Linux well. There's no hardware upgrade madness that follows every new version of the software that's released.

Thus we see that the world of Linux is a rapidly expanding area for progress and while transitions are never easy, this is one transition that's definitely worth making.

-Mitali Shroff
(SE IT)

Optical Cloaking

Invisibility is such a mysterious and breathtaking concept, to count the number of movies, shows and stories that have revolved around it would take years. The dreams of millions of fanboys could become reality in some distant future, and we are surely and steadily moving towards it. No more need of spells and potions to do the trick, because science is here! So let's put on **'The Ring'** and let's find the safe paths to **Mordor.**

Experimentation on cloaking has been going on from 1990s. Using the science behind the our sight, we see an object due to light rays scattering after hitting it and scattered light is sensed by our eyes which gives the 3D, color and texture to the object. Cloaking uses this concept, if we can somehow make light rays to bend around an object and not get scattered, then the object would be as good as non-existent. It wouldn't come in sight because no reflected or scattered light is reaching our eyes.

There are various method to achieve invisibility, the major one being using metamaterials. **Metamaterials** are not something out of a sci-fi movie, but they are man- made, their properties can be highly altered and they work in the way desired. Using metamaterials, scientists have been able to achieve invisibility at the level of microwaves which have the largest wavelength in the electromagnetic spectrum.

Even plasma can be theoretically used to render an object invisible, plasma has the property to absorb certain bandwidths of waves, but this method is too expensive as generating plasma in thin air is not feasible. The most recent and convincing method has been developed at the **University of Rochester,** researchers have invented a cloaking device that uses lenses to make an object invisible. A system of four lenses are used, placed at a calculated distances apart, this cloaking device is capable of multidimensional cloaking. The object would be hidden, viewed from any angle.

It is even scalable to any size, large objects can be cloaked too, using this fairly cheaper and more plausible alternative. The only disadvantage the device has, is that cloaked region is more like a doughnut, the on-axis region cannot be cloaked or blocked. This device though, not suitable for sneaking in and around *Hogwarts*, could be used by surgeons to look through his hands and see what he is working on, thus, eliminating blind spot.

-Najeeb Qaz
(SE Comps)

Interview

Dilkush Patel graduated from DJ Sanghvi College of Engineering in 2011 with a BE in Information Technology. He was one of the few brilliants minds in his batch recruited for Microsoft GTSC in Bangalore in 2011. He was appointed as a Developer Support Engineer for industrial giants regarding Business Intelligence tools and soon promoted to a Technical Advisor. He is currently working at Ibexi Solutions as a Business Intelligence Consultant.

The Journey from DJ Sanghvi to Microsoft I think it was superb. The day I was placed was one of the most amazing moments of my life; there were a lot of mixed emotions experienced. The first day in the Microsoft office was the only time I was nervous in these four years. Working in big companies has its own perks. One of them is, you get to work with some of the brightest people and you make a lot of connections which will help you over time. In these three and a half years, I never felt that my work was a chore which was pretty amazing.

Your work is DBA-centric, so what attracted you to this field?

My work was majorly related to Business Intelligence(BI) tools of Microsoft. Truly speaking I hated DBA sort of work and I didn't want to work on anything related to DBA however once I worked with the team and product, I did not hate it that much. I must say the BI team I worked with was one of the best I had seen in that building. I enjoyed my work because it required me to be innovative, to think, come up with new ideas, after all we are not machines made to execute commands.

What were the challenges you faced in your projects and how did you manage to overcome them?

I think there were plenty which ranged from working on some of the very niche technologies which few people had knowledge of in the team, working with some real crazy clients, and managing almost 30 different cases at same time, the nature of job was very versatile and volatile. How did I handle it? Nothing special it is your passion which drives you to finish your work (if you like your work). Sometimes work was so intense I would get nightmares if I didn't complete the task the same day I was assigned. As I mentioned before I like working on tasks not many people have knowledge of and that has led me to learn lots of niche technologies.

What is your focus area as BI consultant?
I specialise on Microsoft BI toolset however I work on anything and everything which comes my way. We build solutions for Insurance companies which helps them with their reporting and data science needs.

What projects are you currently working on?
At Microsoft it was support cases from Industrial clients who were companies using Microsoft products for their business. I was working in BI (Business Intelligence) team so cases were related to BI tools and technologies. I can't name the clients but almost 90% of big companies' use Microsoft tools so I can say I have worked with almost all giant companies of United States.

What belief has stuck by you through your engineering and career?
Do what you love and give in your 100%, be different, standout from the rest but most importantly put your family and friends first they are your core.

One advice you would give your 'FE self'.
I would say believe in yourself and trust your instincts, they know better.

A few subjects you think the students need to focus on in their engineering days?
Most important is Communication skills. I think we are pretty raw when we are in college and that way of communication does not work in industry, the way you present yourself to the world is imperative.From a technological point of view I will say algorithms and OS related topics for developers I think most of the subjects are pretty important, you might not use them all in your job but you hardly get what you plan for so knowing your engineering will prepare you to be ready for whatever comes in your way.

IBEXI

What should students keep in mind during their interviews?
All the knowledge you've gained over the years come into the spotlight, but it's crucial to be calm and collected. Bluff to an extent, they can always see through.

What is more important mastering one language or dabbling in a few?
Never focus on a single language. Master the algorithms and have extensive capability of solving problems. Once you know how to solve a problem you can code in any alien language. If you don't know how to solve a problem knowing the language is of no use. Aptitude and attitude matter.

To end with a quote,
"Pursue something so important that even if you fail world is better off with you having tried."

-Lamiya Kothari
(SE IT)

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