Chairman's Message

Greetings from St. John Technical and Educational Campus ....!

Mankind has progressed and evolved tremendously from Stone Age and we are now living in the "Information Age" where technology is a crucial need of humanity. This technology is the greatest boon to our society and one of the major industries in this regard is Information Technology (IT).Information technology has become a vital and integral part of every business plan as well as in our everyday life. It has the same impact on digital revolution that steam had on the industrial revolution.
"Information technology and business are becoming inextricably interwoven. I don't think anybody can talk meaningfully about one without the talking about the other." ------------ Bill Gates

Information technology has resulted in globalization, communication, cost effectiveness, inventory and data management, MIS, customer relationship management.Career in IT is considered one of the most high-paying jobs and is full of opportunities. Many companies now have IT departments for managing the computers, networks, programming, web development, software applications, design and operational tasks, technical support etc. This sector has been a major contributor to the growth of the economy of our Country. India has become one of the major IT job capitals of the World generating 2.5 million jobs. The IT industry is growing faster than any other industry in India and it sustains the potential to make this Country, a global IT superpower.

Innovation is the key to development in this field. As research and development go hand in hand, it is very important for India to improve skills and research, which will provide a further impetus to the IT sector. We at St. John College of Engineering and Management appreciate the teaching faculty of IT Department for their effortsand dedicationthat has led to the growing popularity & interest of the IT field as a great career option among the students fraternity. Apart from academics the skill based trainings conducted under STEP activities will surely make the students industry ready and employable.

Mr. Albert W. D'Souza
Chairman

Principal's Message

It gives me immense pleasure to pen a few words as prologue to in-house magazine 'MegaByte' of Department of Information Technology. This magazine is exclusively meant for churning out the latent writing talent which bears immense potentiality of sharpening student's communication skill as part of their over all personality development. I congratulate all the contributors and the editorial board for bringing out such an alluring magazine.

'MegaByte' is step towards technical awareness. Empowerment of students for their all round development through education is our cherished motto. This magazine offers a challenge to students to write technical article on current technology and opportunity to share their knowledge with faculty and students.

While foraying in the competitive life, realizing your dreams, Honesty and integrity should be your second names. As said by E. O. Wilson –"You are capable of more than you know. Choose a goal that seems right for you and strive to be the best, however hard the path. Aim high. Behave honourably. Prepare to be alone at times and to endure failure. Persists! The world needs all you can give."

Dr. Satish Takalikar
B.E (Mech), M.Tech, Ph.D.
Principal

Message From Vice Principal

Modern technologies used in the engineering and manufacturing industry have a major impact on our life in past few years. Due to the rapid changes in the engineering and manufacturing industry have been drastic changes in the environment. Engineering Developments are resulting in resource depletion and environmental destruction. Today's ecological challenges have generated widespread support for sustainable programs across the globe. For the current generation of students, reducing our impact on the environment is a leading concern, and colleges and universities offer the ideal setting for developing innovative approaches to address such challenges. Progress increasingly depends upon educated minds: upon research, invention, innovation and adaptation. Educated minds and instincts are needed not only in laboratories and research institutes, but also in every walk of life. While education is not the whole answer to every problem, in its broadest sense, Environmental Education must be a vital part of all efforts to imagine and create new relations among people and to foster greater respect for the needs of the environment. Across the world, Engineers and Technocrats are ramping up efforts to continue to save water and energy and spread the environmental sustainability message learned from exciting challenge activities relating to six core topics viz. Energy Efficiency & Conservation, Water Conservation, Waste Reduction & Recycling, Alternative Transportation, Climate Change and Green Buildings. It is high time for human beings to take the 'right' action towards saving the earth from major environmental issues. If ignored today, these ill effects are sure to curb human existence in the near future.

I appeal to the students and faculty of Department of IT at St. John College of Engineering and Management to support the noble cause of making people aware of Environmental Sustainability in IT industry to increase awareness of remedial measures to important environmental issues to make our planet healthier, greener and smarter. I wish you the best in your future endeavours.

Dr. Atul Ayare
Vice Principal and
Dean(Academics)

HOD's Desk

It gives me great pleasure to present the First issue of MegaByte, by Department of Information Technology, SJCEM. I appreciate the efforts taken by students and staff of IT department. MegaByte provides a platform to students and staff to express their techinal knowledge.

The first issue of MegaByte comes up with technical article from students, faculty and industry experts, which is the first step towards Research and Development. Student will be made aware of current technological trends at the global scenario.

Student and faculty achievements highlighted in MegaByte will be motivational factor for other students to excel. MegaByte plays an instrumental role in providing exposure to the students to develop and showcase their written communication skill.

- Mrs. Anita Chaudhari

Vision

To be a student centred , innovative department preparing graduates to be efficient problem solvers, researchers, innovators and entrepreneurs to serve diverse communities and producing lifelong learners to become competent professionals in the dynamic field of Information Technology.

MISSION

To be the premier Information Technology department in providing:

1. Best infrastructure facility to achieve excellence in teaching learning process.

2. Technical Programs to enhance the student's knowledge in the latest technologies.

3. High quality undergraduate programs in order to prepare our graduates to become leaders in their profession.

4. Promote conducive ambiance for research and creativity

Program Outcome

1. An ability to apply knowledge of mathematics, science and engineering in IT Domain.

2. An ability to analyse and interpret data to provide an IT solution.

3. Design, document and develop IT systems using best practices that are required in Business Context.

4. Investigate problems / design experiments and interpret data to produce IT-based solutions

5. An ability to use the techniques, skills and modern engineering tools necessary for engineering practices in the field of Information Technology.

6. Apply contextual knowledge to health, safety and legal issues.

7. Know the benefits of IT solutions to society and environment for sustainable development.

8. An understanding of professional and ethical responsibility in business conduct.

9. An ability to work in teams as team member or a leader.

10. An ability to communicate effectively in verbal and written form.

Program Educational Objective

1.Make use of Engineering fundamentals in Information technology to solve engineering problems.

2.Engage in Research and development, encourage for higher studies and continue enhancing the technical skills.

3.Be a skilled team player or an entrepreneur in multifaceted streams/domains

4.Excel as Professional with ethical values for enrichment of society

Program Specific Outcome

1.Ability to analyze and understand the problem of a given system irrespective of its domains and provide solution by using the analytical and programmatic skills developed.

2.Ability to design, conceptualized, plan, develop and test any type of computer system, or algorithm, or application to solve real world problem.

3.Ability to build fault Tolerant, robust and secure protocols on a computer system, or databases, or website which make system more secure and easy to recover from a failure state.

Team MegaByte

JESSICA DIAS (SJCEM)
STAFF COORDINATOR

SURAJ MISHRA (TE IT)
CHIEF EDITOR

AFRID SHAIKH (TE IT)
CHIEF DESIGNER

JOYCE LEMOS (SJCEM)
STAFF COORDINATOR

ABHIJEET PANPATIL (TE IT)
EDITOR

ADITYA SHUKLA (SE IT)
DESIGNER

VASANT MESTRY (SE IT)
DESIGNER

Table of Content

Software-Defined Networking (SDN)

Over the last year, the hottest topics in networking have been software defined networking (SDN) and Network Virtualization (NV). There is, however, considerable confusion amongst enterprise IT organizations relative to these topics. There are many sources of that confusion, including the sheer number of vendors who have solutions that solve different problems using different solution architectures and technologies, all of whom claim to be offering SDN and/or NV solutions.

What is Software-Defined Networking (SDN)

Software-defined networking (SDN) is an approach to computer networking that allows network administrators to programmatically initialize, control, change, and manages network behaviour dynamically via open interfaces. The Open Networking Foundation (ONF) is the group that is most associated with the development and standardization of SDN. According to the ONF , "Software-Defined Networking (SDN) is an emerging architecture that is dynamic, manageable, cost-effective, and adaptable, making it ideal for the high-bandwidth, dynamic nature of today's applications. This architecture decouples the network control and forwarding functions enabling the network control to become directly programmable and the underlying infrastructure to be abstracted for applications and network services. The OpenFlow™ protocol is a foundational element for building SDN solutions."

The Need for a New Network Architecture

Some of the key computing trends driving the need for a new network paradigm include:

1. Changing traffic patterns
2. The "consumerization of IT"
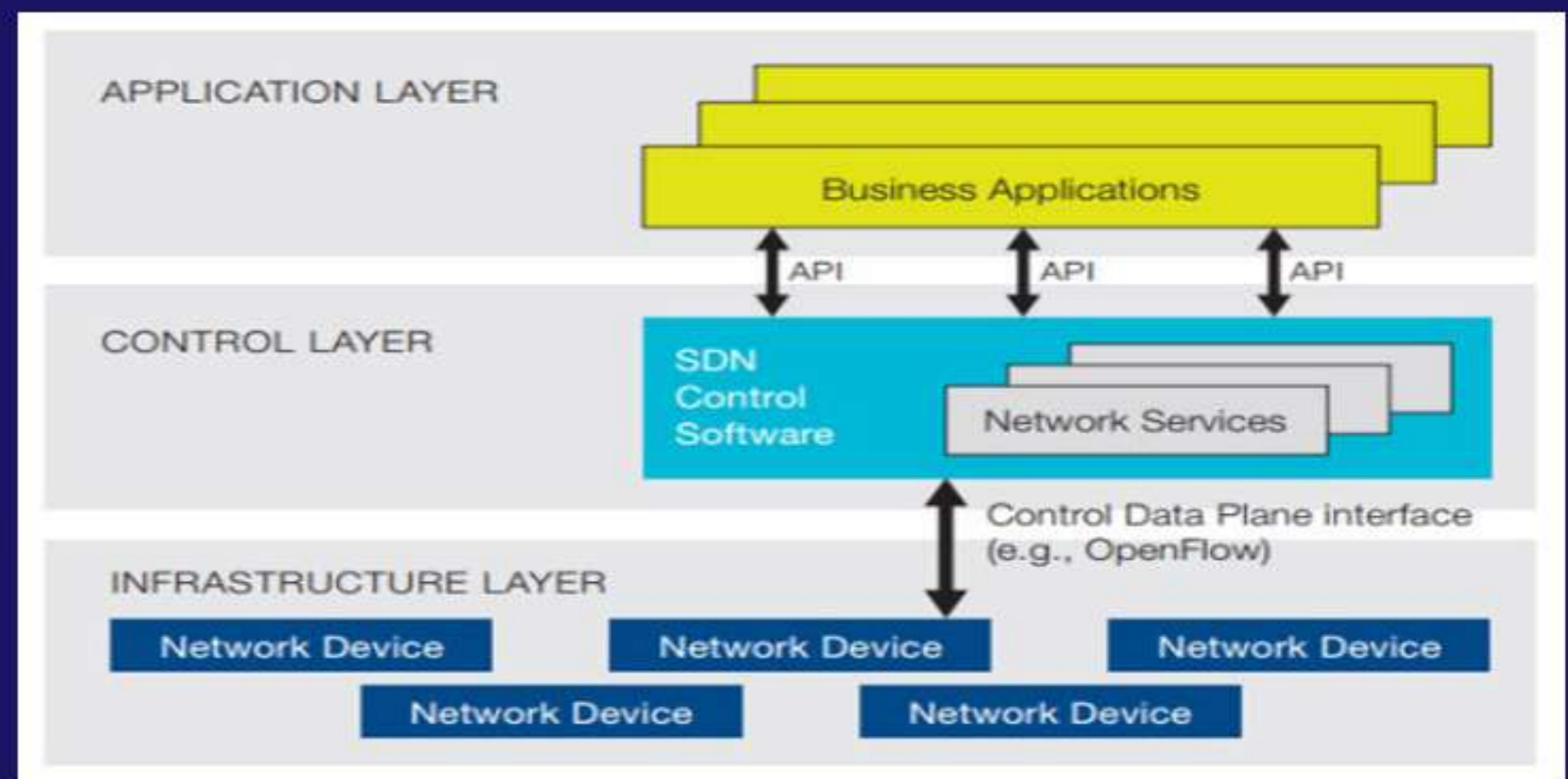3. The rise of cloud services
4. "Big data" means more bandwidth

Fig. Softwar-Defined Network Architecture

Software-Defined Network Architecture

Figure shown depicts a logical view of the SDN architecture. Network intelligence is (logically) centralized in software-based SDN controllers, which maintain a global view of the network. As a result, the network appears to the applications and policy engines as a single, logical switch. With SDN, enterprises and carriers gain vendor-independent control over the entire network from a single logical point, which greatly simplifies the network design and operation. SDN also greatly simplifies the network devices themselves, since they no longer need to understand and process thousands of protocol standards but merely accept instructions from the SDN controllers.

The OpenFlow protocol is implemented on both sides of the interface between network infrastructure devices and the SDN control software. OpenFlow uses the concept of flows to identify network traffic based on pre-defined match rules that can be statically or dynamically programmed by the SDN control software. It also allows IT to define how traffic should flow through network devices based on parameters such as usage patterns, applications, and cloud resources. Since OpenFlow allows the network to be pro grammed on a per-flow basis, an OpenFlow-based SDN architecture provides extremely granular control, enabling the network to respond to real-time changes at the application, user, and session levels.

Current IPbased routing does not provide this level of control, as all flows between two endpoints must follow the same path through the network, regardless of their different requirements.

Benefits of OpenFlow-Based Software-Defined Networks

• Centralized control of multi-vendor environments:
• Reduced complexity through automation:
• Higher rate of innovation:
• Increased network reliability and security:
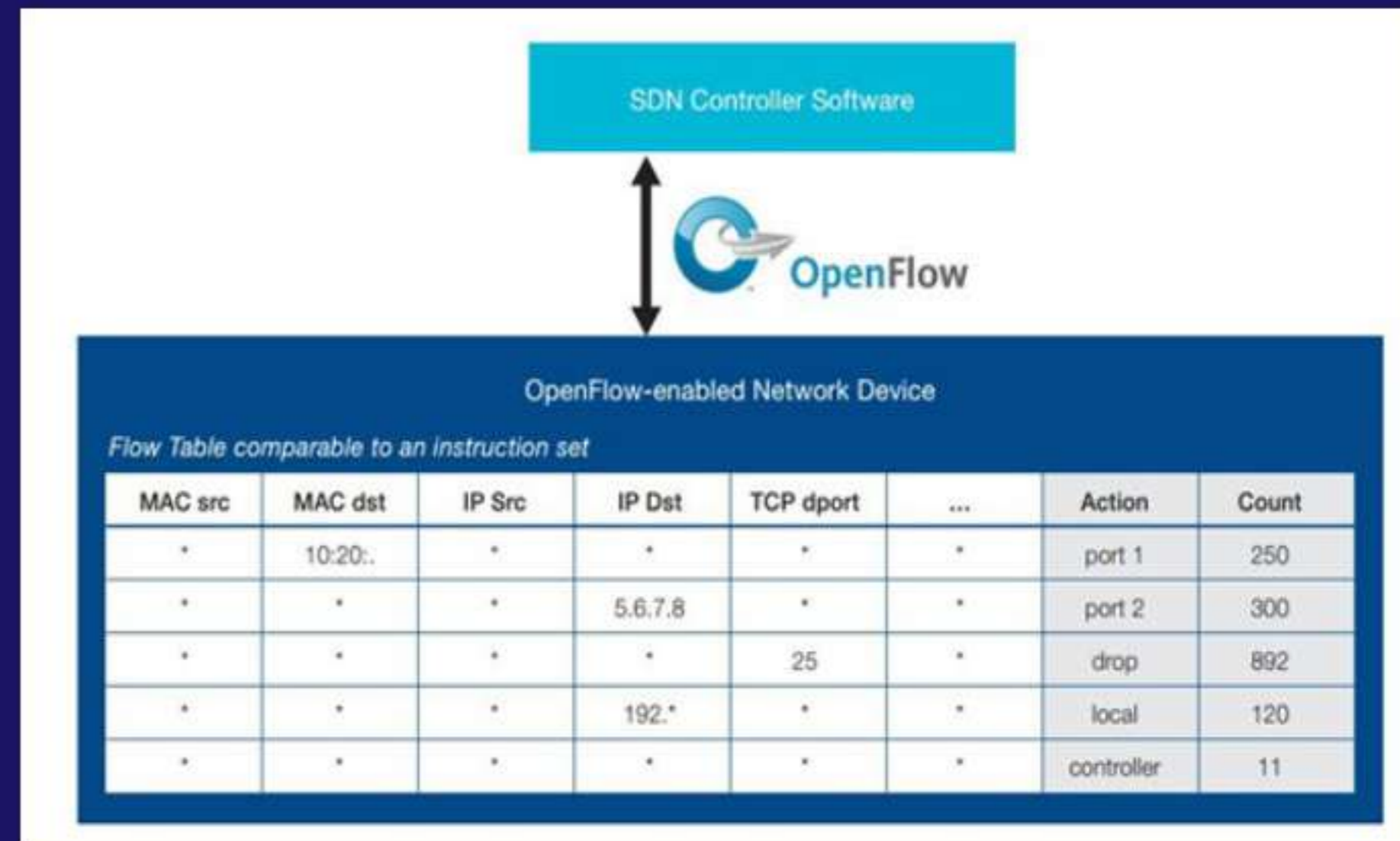• More granular network control:

Figure 2 OpenFlow Instruction Set

Conclusion:

Trends such as user mobility, server virtualization, IT-as-a-Service, and the need rapidly to respond to changing business conditions place significant demands on the network—demands that today's conventional network architectures can't handle. Software-Defined Networking provides a new, dynamic network architecture that transforms traditional network backbones into rich service-delivery platforms. By decoupling the network control and data planes, OpenFlow-based SDN architecture abstracts the underlying infrastructure from the applications that use it, allowing the network to become as programmable and manageable at scale as the computer infrastructure that it increasingly resembles. An SDN approach fosters network virtualization, enabling IT staff to manage their servers, applications, storage, and networks with a common approach and tool set. Whether in a carrier environment or enterprise data center and campus, SDN adoption can improve network manageability, scalability, and agility.

About Inniti:

Inniti is a "vendor agnostic" services focused organization specializing in Plan, Design, Implementation and Optimization services with 50+ years of cumulative experience across various networking and security technologies and industry verticals.
Specialties
Data Networks - Consult, Design, Implement , Optimize, Secure, Campus Networking - Wired & Wireless, Software Defined Networking, Multicast, Network Monitoring & Management, IP Telephony, Technology Trainings

Shantanu Narkar
Partner at Inniti
Network Solutions LLP
http://www.inniti.in
Mumbai, Maharashtra,
India

Apache Kudu

Apache Kudu Introduction:

Apache Kudu is a data storage technology that allows fast analytics on fast data. Cloudera kickstarted the project yet it is fully open source. Kudu provides fast insert and update capabilities and fast searching to allow for faster analytics. It sits between HBase and Impala with Parquet, attempting to remove the trade offs between quick scans and rapid random access.

Hdfs(GFS) excels at:

- Batch ingest only (eg hourly)
- Efficiently Scanning large amounts of data(analytics)

Hbase(Big Table) excels at :

- Efficiently finding and writing individual rows.
- Making data mutable

Huge gap exist when these properties are needed simultaneously.

Low-latency random access:

Unlike other storage for big data analytics, Kudu isn't just a file format. It's a live storage system which supports low-latency millisecond-scale access to individual rows. For "NoSQL"-style access, you can choose between Java, C++, or Python APIs. And of course these random access APIs can be used in conjunction with batch access for machine learning or analytics.

Kudu's APIs are designed to be easy to use. The data model is fully typed, so you don't need to worry about binary encodings or exotic serialization. You can just store primitive types, like when you use JDBC or ODBC.
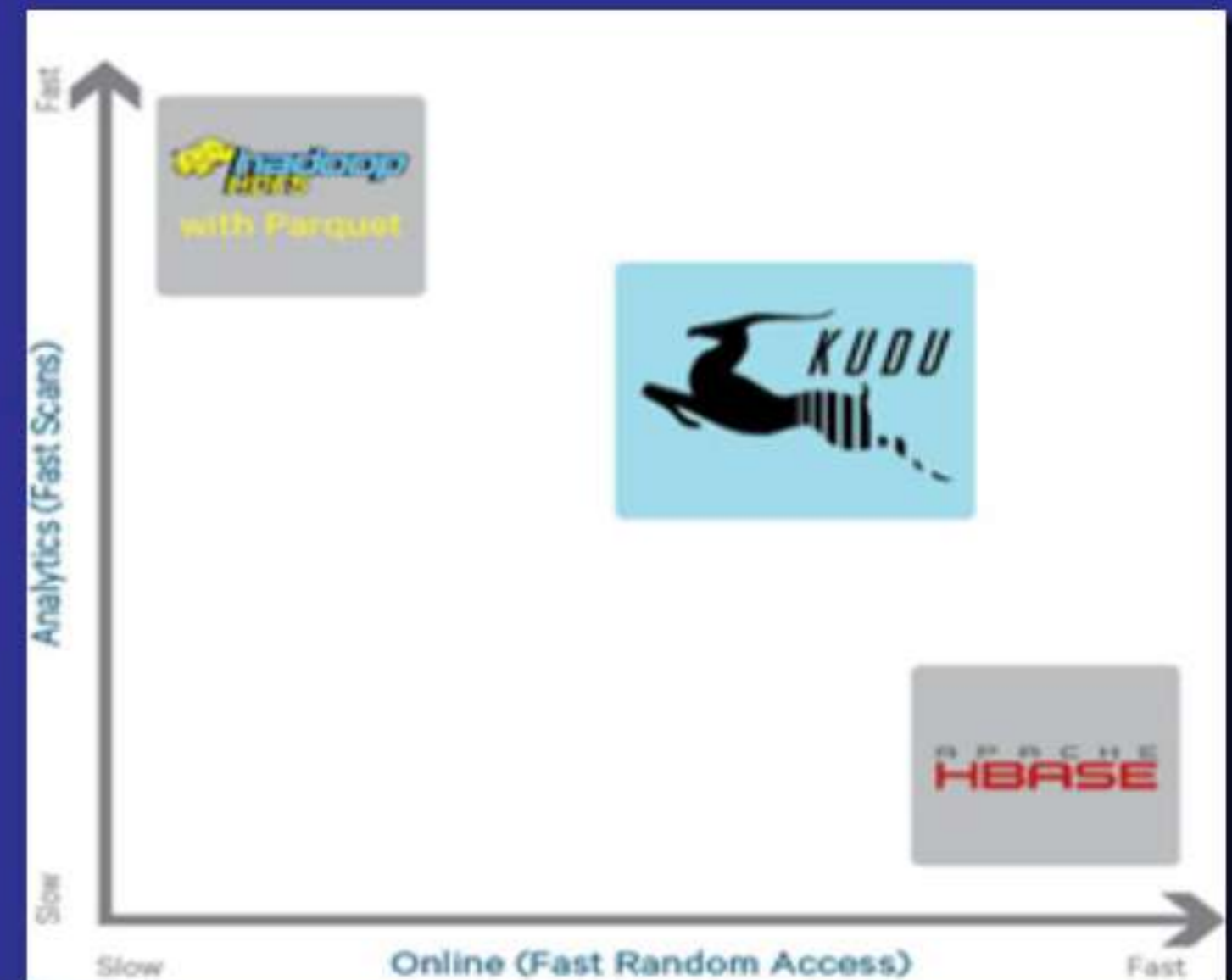
Kudu isn't designed to be an OLTP system, but if you have some subset of data which fits in memory, it offers competitive random access performance. We've measured 99th percentile latencies of 6ms or below using YCSB with a uniform random access workload over a billion rows. Being able to run low-latency online workloads on the same storage as back-end data analytics can dramatically simplify application architecture.

### *Kudu's design sets it apart. Some of Kudu's benefits include:*

* Fast processing of OLAP workloads.
* Integration with MapReduce, Spark and other Hadoop ecosystem components.
* Tight integration with Apache Impala (incubating), making it a good, mutable alternative to using HDFS with Apache Parquet.
* Strong but flexible consistency model, allowing you to choose consistency requirements on a per-request basis, including the option for strict-serializable consistency.
* Strong performance for running sequential and random workloads simultaneously.
* Easy to administer and manage with Cloudera Manager.
* High availability. Tablet Servers and Masters use the Raft Consensus Algorithm, which ensures that as long as more than half the total number of replicas is available, the tablet is available for reads and writes. For instance, if 2 out of 3 replicas or 3 out of 5 replicas are available, the tablet is available.
Reads can be serviced by read-only follower tablets, even in the event of a leader tablet failure.
* Structured data model.

Architectural Overview:

The following diagram shows a Kudu cluster with three masters and multiple tablet servers, each serving multiple tablets. It illustrates how Raft consensus is used to allow for both leaders and followers for both the masters and tablet servers. In addition, a tablet server can be a leader for some tablets, and a follower for others. Leaders are shown in gold, while followers are shown in blue.

Kudu network architecture
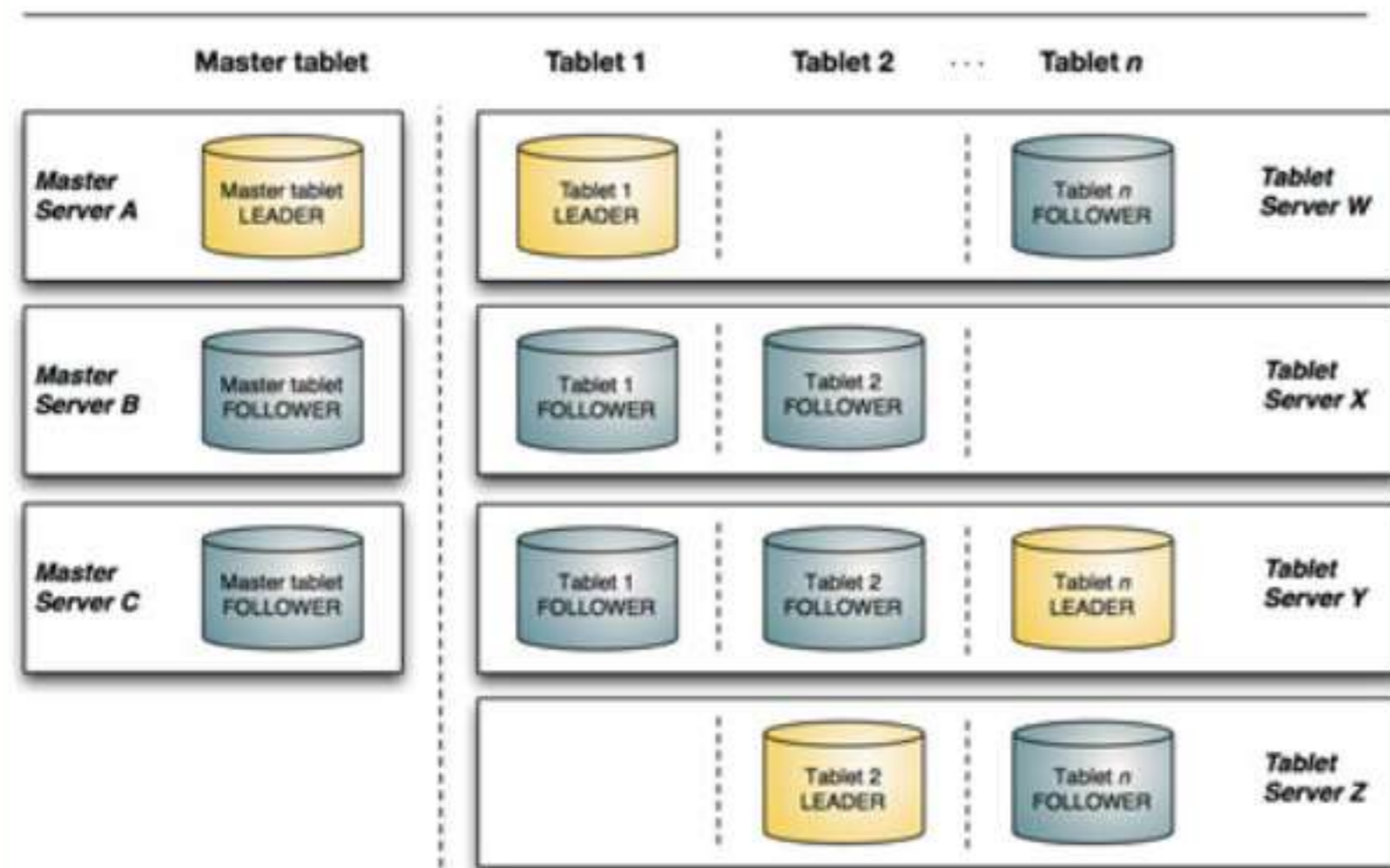
Example Use Cases:

- Streaming Input with Near Real Time Availability

- Time-series application with widely varying access patterns

- Predictive Modeling

- Combining Data In Kudu With Legacy Systems

Navin Chaganti

Big Data Senior Software Engineer, KPGM LLP, New York
MS Computer Engineering, University of Arizona
BE Instrumentation Engineering, VCET(Mumbai University)

When to use SQL and NoSQL

SQL Server and relational databases (RDBMS) have been the go-to databases for over 20 years. However, the increased need to process higher volumes, velocities, and varieties of data at a rapid rate has altered the nature of data storage needs for application developers. In order to enable this scenario, NoSQL databases that enable storing unstructured and heterogeneous data at scale have gained in popularity. For most developers, relational databases are the default or go-to option because a table structure is easy to understand and is familiar, but there are many reasons to explore beyond relational databases.

NoSQL is a category of databases distinctly different from SQL databases. NoSQL is often used to refer to data management systems that are "Not SQL" or an approach to data management that includes "Not only SQL". There are a number of technologies in the NoSQL category, including document databases, key value stores, column family stores, and graph databases, which are popular with gaming, social, and IoT apps.
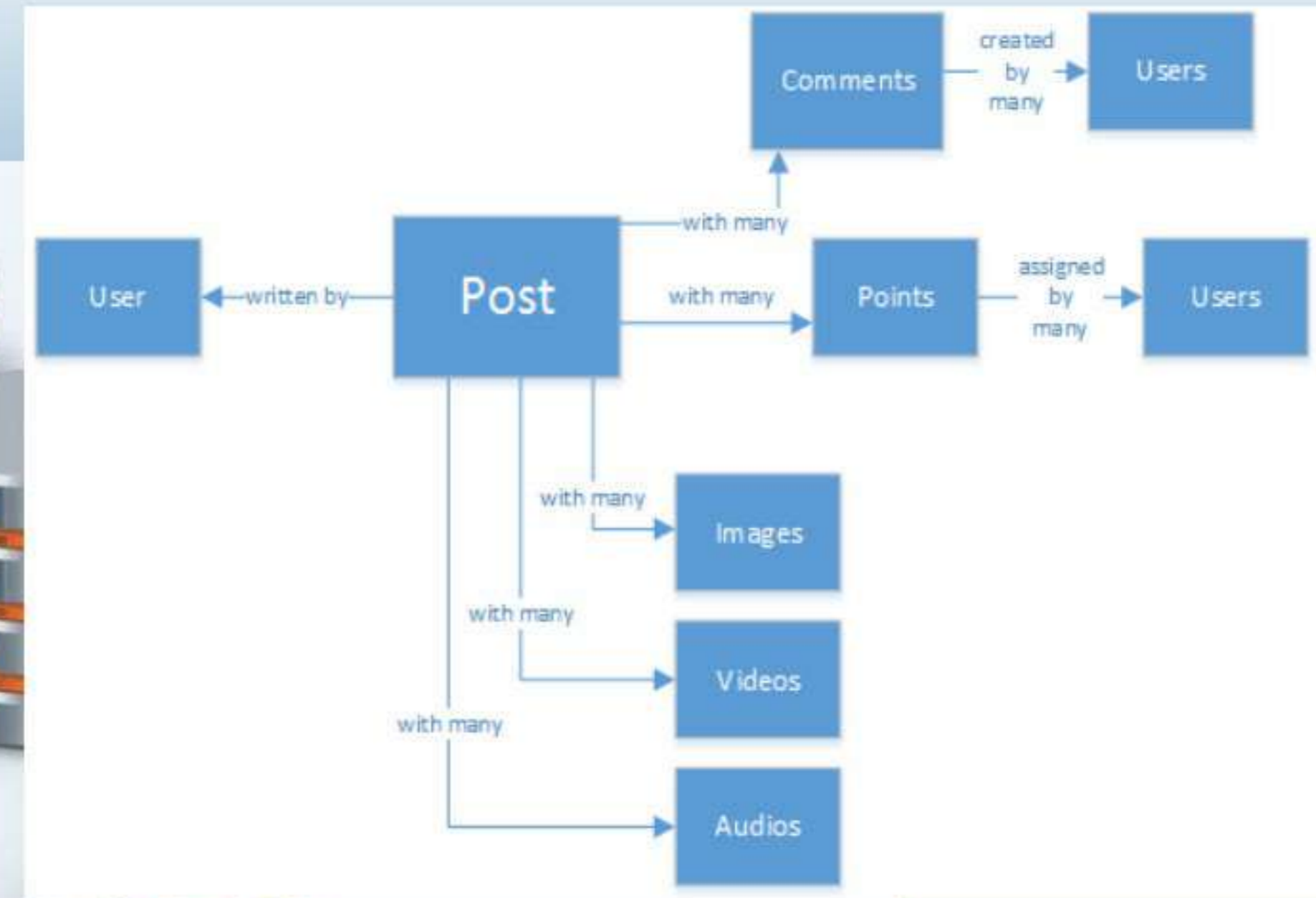
When to use NoSQL?

Let's imagine you're building a new social engagement site. Users can create posts and add pictures, videos and music to them. Other users can comment on the posts and give points (likes) to rate the posts. The landing page will have a feed of posts that users can share and interact with. So how do you store this data? If you're familiar with SQL, you might start drawing something like this:

So far, so good, but now think about the structure of a single post and how to display it. If you want to show the post and the associated images, audio, video, comments, points, and user info on a website or application, you'd have to perform a query with eight table joins just to retrieve the content. Now imagine a stream of posts that dynamically load and appear on the screen and you can easily predict that it's going to require thousands of queries and many joins to complete the task.

Now you could use a relational solution like SQL Server to store the data and query it using joins, as SQL supports dynamic data formatted as JSON - but there's another option, a NoSQL option that simplifies the approach for this specific scenario. By using a single document like the following and storing it in DocumentDB, you can increase performance and retrieve the whole post with one query and no joins. It's a simpler, more straightforward, and more performant result.

SQL vs. NoSQL- Which to Use?

The idea that SQL and NoSQL are in direct opposition and competition with each other is flawed one, not in the least because many companies opt to use them concurrently. As with all of the technologies previously discussed, there really isn't a 'one-system-fits-all' approach; choosing the right technology hinges on the use case. If your data needs are changing rapidly, you need high throughput to handle viral growth, or your data is growing fast and you need to be able to scale out quickly and efficiently, maybe NoSQL is for you. But if the data you have isn't changing in structure and you're experiencing moderate, manageable growth, your needs may be best met by SQL technologies. Certainly, SQL is not dead yet.

	NoSQL	SQL
Model	Non-relational	Relational
Data	Stores data in JSON documents, key/value pairs, wide column stores, or graphs	Stores data in a table
	Offers flexibility as not every record needs to store the same properties	Great for solutions where every record has the same properties
	New properties can be added on the fly	Adding a new property may require altering schemas or backfilling data
	Relationships are often captured by denormalizing data and presenting all data for an object in a single record	Relationships are often captured in normalized model using joins to resolve references across tables
	Good for semi-structured, complex, or nested data	Good for structured data
Schema	Dynamic or flexible schemas	Strict schema
	Database is schema-agnostic and the schema is dictated by the application. This allows for agility and highly iterative development	Schema must be maintained and kept in sync between application and database
Transactions	ACID transaction support varies per solution	Supports ACID transactions
Consistency & Availability	Eventual to strong consistency supported, depending on solution	Strong consistency enforced
	Consistency, availability, and performance can be traded to meet the needs of the application (CAP theorem)	Consistency is prioritized over availability and performance
Performance	Performance can be maximized by reducing consistency, if needed	Insert and update performance is dependent upon how fast a write is committed, as strong consistency is enforced. Performance can be maximized by using scaling up available resources and using in-memory structures.
	All information about an entity is typically in a single record, so an update can happen in one operation	Information about an entity may be spread across many tables or rows, requiring many joins to complete an update or a query
Scale	Scaling is typically achieved horizontally with data partitioned to span servers	Scaling is typically achieved vertically with more server resources

- **Mr. Godson D'silva (SJCEM)**
- **Ms. Jessica Dias (SJCEM)**
- **Ms. Joyce Lemos (SJCEM)**

MapD: World's Fastest Database Visual Analytics platform

People generally connect with Graphic Processing Units (GPUs) with imaging processing. Developed for video games in the 1990s, modern GPUs are specialized circuits with thousands of small, efficient processing units, or "cores," that work simultaneously to rapidly render graphics on screen.

But for the better part of a decade, GPUs have also found general computing applications. Because of their incredible parallel-computing speeds and high-performance memory, GPUs are today used for advanced lab simulations and deep-learning programming, among other things.

Now, Todd Mostak, a former researcher at MIT's Computer Science and Artificial Intelligence Laboratory (CSAIL), is using GPUs to develop an analytic database and visualization platform called MapD, which is the fastest of its kind in the world, according to Mostak.

MapD is essentially a form of a commonly used database-management system that's modified to run on GPUs instead of the central processing units (CPUs) that power most traditional database-management systems. By doing so, MapD can process billions of data points in milliseconds, making it 100 times faster than traditional systems. Moreover, MapD visualizes all processed data points nearly instantaneously — such as, say, plotting tweets on a world map — and parameters can be modified on the fly to adjust the visualized display.

"Making GPUs first-class citizens"

GPUs are designed specifically for parallel computing, with thousands of energy-efficient cores that can, for example, simultaneously determine the color of each pixel on a computer screen to render an image.

Today, some databases are being powered by GPUs. But these systems suffer from a major design flaw, Mostak says: "In most implementations, the data is initially stored on a CPU, moved to the GPU for a query, and results are moved back to the CPU for storage. Even if you speed up the computation time of a query [by using a GPU], you lose most of the speed by transferring from CPU to GPU and back."

Instead of storing the data on CPUs, MapD caches as much data as possible on multiple GPUs, so there's no moving back and forth between the different circuits and pulling from the hard drive, which saves a lot of time.

The trick, Mostak says, is giving each GPU its own buffer pool — portions of a database memory that temporarily caches the most recent data pulled from the hard. If a database then needs to query the same data point over and over, which is quite common, it accesses that data point in the GPU's ultrafast RAM, instead of pulling from the CPU or hard drive.

- Mr. Ankur Chavhan
(SJCEM)

Deep Leaning or Machine Learning, who is the best?

What is Deep Learning?

Deep learning (also known as deep structured learning, hierarchical learning or deep machine learning) is a branch of machine learning based on a set of algorithms that attempt to model high level abstractions in data. In a simple case, there might be two sets of neurons: ones that receive an input signal and ones that send an output signal. When the input layer receives an input it passes on a modified version of the input to the next layer. In a deep network, there are many layers between the input and output (and the layers are not made of neurons but it can help to think of it that way), allowing the algorithm to use multiple processing layers, composed of multiple linear and non-linear transformations.

What is Machine Leaning?

Machine learning is a type of artificial intelligence (AI) that provides computers with the ability to learn without being explicitly programmed. Machine learning focuses on the development of computer programs that can change when exposed to new data. The process of machine learning is similar to that of data mining. Both systems search through data to look for patterns. However, instead of extracting data for human comprehension -- as is the case in data mining applications -- machine learning uses that data to detect patterns in data and adjust program actions accordingly. Machine learning algorithms are often categorized as being supervised or unsupervized. Supervised algorithms can apply what has been learned in the past to new data. Unsupervised algorithms can draw inferences from datasets.There is a lot of confusion these days about Artificial Intelligence (AI), Machine Learning (ML) and Deep Learning (DL).

There certainly is a massive uptick of articles about AI being a competitive game changer and that enterprises should begin to seriously explore the opportunities. The distinction between AI, ML and DL are very clear to practitioners in these fields. AI is the all encompassing umbrella that covers everything from Good Old Fashion AI (GOFAI) all the way to connectionist architectures like Deep Learning. ML is a sub-field of AI that covers anything that has to do with the study of learning algorithms by training with data. There are whole swaths (not swatches) of techniques that have been developed over the years like Linear Regression, K-means, Decision Trees, Random Forest, PCA, SVM and finally Artificial Neural Networks (ANN). Artificial Neural Networks is where the field of Deep Learning had its genesis from.

Some ML practitioners who have had previous exposure to Neural Networks (ANN), after all it was invented in the early 60's, would have the first impression that Deep Learning is nothing more than ANN with multiple layers. Furthermore, the success of DL is more due to the availability of more data and the availability of more powerful computational engines like Graphic Processing Units (GPU). This of course is true, the emergence of DL is essentially due to these two advances, however the conclusion that DL is just a better algorithm than SVM or Decision Trees is akin to focusing only on the trees and not seeing the forest.

The current DL hype tends to be that we have these commoditized machinery, which given enough data and enough training time, is able to learn on its own. This of course either an exaggeration of what the state–of–the–art is capable of or an over simplification of the actual practice of DL. DL has over the past few years given rise to a massive collection of ideas and techniques that were previously either unknown or known to be untenable.

Deep Learning today goes beyond just multi–level perceptrons but instead is a collection of techniques and methods that are used to building composable differentiable architectures. These are extremely capable machine learning systems that we are only right now seeing just the tip of the iceberg. The key take away from this is that, Deep Learning may look like alchemy today, but we eventually will learn to practice it like chemistry. That is, we would have a more solid foundation so as to be able to build our learning machines with greater predictability of its capabilities.
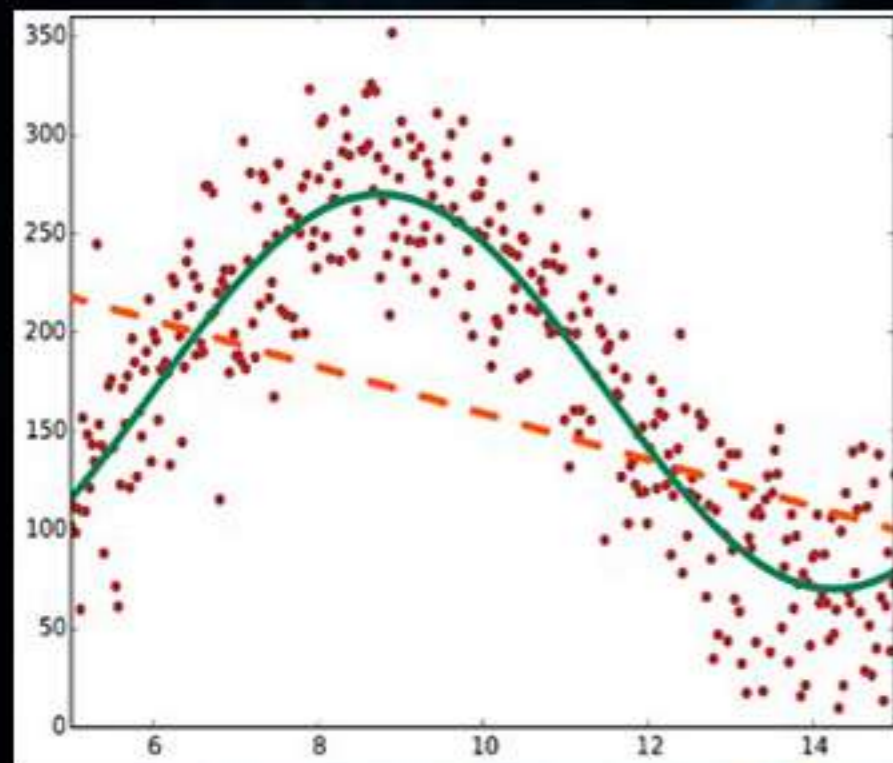
Fitting in Machine Learning
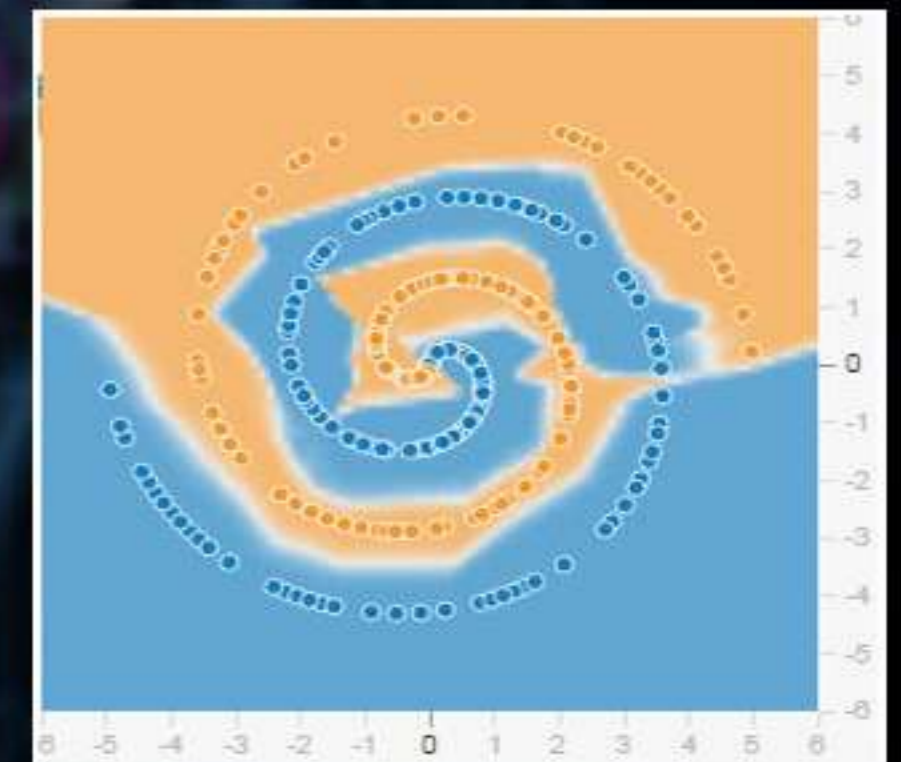
Fitting in Deep Learning

Mr. Jeril Kuriakose
(SJCEM)

TOP 8 OPEN SOURCE TOOLS FOR WEB DEVELOPERS

1. Bootstrap:

Bootstrap is an open source framework based on HTML, CSS and JavaScript. It is the most popular and widely used framework for developing responsive web applications,and is designed to produce faster and simpler websites. Bootstrap was first designed by Mark otto and Jacob Thornton in 2011.
Website:http://getbootstrap.com/

2. GitLab:

GitLab is an open source,web based Git repository manager. It provides feature like code reviews,access controls, issue tracking,activity feeds and wikis.GitLab has continuous integration and deployment built in, to help you test,build and deploy code.
Website:https://about/gitlab.com/

3.ReactJS:

ReactJS is an open source,declarative and efficient JavaScript library for designing user interfaces. React has adata binding feature that makes it one of the most popular JavaScript libraries React JS was developed by Facebook and written by software engineer, Jordan Walke.It is maintained by Facebook's product infrastructure and instagram's user interface teams.
Website:https://facebook.github.io/react

4.MongoDB

MongoDB is a free and open source database written in C++.It is document oriented database that stores documents in a collection. It is one of the leading NOSQL databases and uses JSON-like documents. It is an open format, schema less database,ideal for object oriented programming. MongoDB was designed by company called 10gen in 2007.

5.Syntactically Awesome Style Sheets(SASS)

Sass is a CSS pre-processor that helps in writing reusable,extensible and maintainable code. Sass contains features that include variables, mixing, and nesting of selectors,functions and expressions. Using Sass we can make large and complex style sheets easier to understand and maintain.It is an open source style sheet language.
Website:https://sass-lang.com/

6.Brackets:

Brackets is an open source,lightweight and modern text editor. It is platform independent editor with a focus on web development. It was designed by adobe systems,and is licence under the MIT licence It is written in HTML, CSS and JavaScript.
Website:https://brackets.io/

7.AngularJS

AngularJS is an open source,structural framework for designing dynamic applications. It is one of the most popular JavaScript based framework available today. Angular is designed to work well with data driven applications for which you need to keep updating your site,depending on the changes in data.AngularJS is designed by Google employee,Miskoheveryin 2012.
Website:https://angularjs.org/

8.Node.js

Node is an open source,multi-platform, and JavaScript runtime built around a chrome V8 engine for developing variety of web application. The Chrome V8 engine was designed to run JavaScript in the browser. Node has an event driven, non-blocking I/O model,which makes it lightweight and efficient. The initial release supported only Linux.

Mrs. Anita Chaudhari
Ms. Shraddha More
Ms. Brinzel Rodrigues

The Internet of things (stylised Internet of Things or IoT) is the internetworking of physical devices, vehicles (also referred to as "connected devices" and "smart devices"), buildings and other items—embedded with electronics, software, sensors, actuators, and network connectivity that enable these objects to collect and exchange data over internet.

In simple terms IoT is the way to provide the internet to things(real world object) to communicate with each other.

The Internet of Things – objects and appliances with embedded sensors and chips capable of communicating online – will result in 50 billion devices being connected to the internet by 2020, according to In 2014, the Gartner Hype Cycle also revealed that Internet of Things had overtaken big data as the most hyped technology (Gartner, Inc. is an American research and advisory firm providing information technology related insight for IT and other business leaders.). There can be no escaping the fact that it is quickly becoming a vibrant part of the business and IT landscape, something that holds much promise in years to come and which businesses should be using to their advantage.

Today we can see powerful examples of the Internet of Things coming to life and are beginning to see the possibilities a connected world might bring. From fridges and bathroom scales, to fitness bands and home thermostats, the amount of 'things' connected to the internet is really taking off.

Analytics technology has significantly evolved in the last few years and is now a key resource for making strategic and well-informed decisions. A good analytics framework, like the WNS Analytics Decision Engine (WADE), will inspire and enable organisations in becoming fact-based in the way they think and act to achieve their long-term growth targets. By implementing a sophisticated data management and analytics solution, organisations will be able to make sense of all of the new data becoming available.

The agricultural sector is one that has been quick a implementing analytical technologies. It has paid off as a lot of organisations are using insights from their analysed data to monitor crops in real time to improve the yield, quality of produce and to conserve the resources needed for farming. Utility companies have also embraced this new era, implementing smart meters to monitor energy, gas, and water consumption, and municipalities are launching "smart city" projects to help ease traffic congestion, improve waste management and control street lights.

Number of buyers already consider the use of analytics as crucial, a trend that will only grow in importance as the Internet of Things does, and this is something that we need more businesses to understand and to invest in if they want to be one step ahead of their competition. If the correct measures are put in place to understand and make the most of the data that the Internet of Things is bringing, no data should therefore go to waste, and the opportunities for businesses are endless by providing data analytics.

-Abhishek Mishra (BE IT)

WE THINK, SO WE "R"

R is a software environment for statistical computing and graphics. Many people who would describe themselves as programmers rather than statisticians have become involved with R. The R language is widely used among statisticians and data miners for developing statistical data and data analysis. R supports most of the data analysis techniques such as virtual data manipulation, statistical model, and charts. . R support beautiful and unique data visualizations to present multidimensional data in multi-panel charts, 3-D graphs. R provides programming features like data input such as data types, etc., data management such as variables, operators, built-in functions, data types, etc.,

R also provides facilities that make fitting statistical models very simple in statistics. R's statistics consists of correlation, frequency tables, regression diagnostics.

R users can install the package that contains the functionality they are looking for and start calling the functions in the package. R is so useful and helps to explain its quick acceptance, that statisticians, engineers and scientists can improve the software's code or write variations for specific tasks. Packages written for R add advanced algorithms, coloured and textured graphs and mining techniques to dig deeper into databases."The great beauty of R is that you can modify it to do all sorts of things." And you have a lot of pre-packaged stuff that's already available.R software can perform various techniques like Linear Regression, Logistic Regression, Clustering, Market Basket Analysis.

Advantages of R:
-R is the leading tool for statistics, data analysis, and machine learning. It is more than a statistical package; it's a programming language, so you can create your own objects, functions, and packages.

-R allows you to integrate with other languages (C/C++, Java, Python) and enables you to interact with many data sources: ODBC-compliant databases (Excel, Access) and other statistical packages (SAS, Stata, SPSS, Minitab).

-R supports extensions: R performs a wide variety of functions, such as data manipulation, statistical modeling, and graphics.One really big advantage of R, however, is its extensibility. Developers can easily write their own software and distribute it in the form of add-on packages.

Disadvantages of R:
-R has a steep learning curve,it does take a while to get used to the power of R,but no steeper than for other statistical languages.

-The quality of some packages is less than perfect, although if a package is useful to many people, it will quickly evolve into a very robust product through collaborative efforts.

Many R commands give little thought to memory management, and so R can very quickly consume all available memory. This can be a restriction when doing data mining. There are various solutions, including using 64 bit operating systems that can access much more memory than 32 bit ones.

-Aishwarya Kadam (BE IT)
-Priyank Kantharia (BE IT)

What Happens to Communities When Streetlights Join the Internet of Things?

From Streetlight to Smart Light

If you put sensors on a streetlight, it morphs into an "intelligent light" with capabilities Edison never dreamed of. Intelligent lights help cities gather information that officials can use to deploy services efficiently, save money, and run cleaner and greener overall.

"We're going to transform the streetlight from a pole that sits 30 feet up in the air to a sensor beacon," said Austin Ashe, global product manager of intelligent cities at Current.

The lights contain built-in sensors including cameras, thermometers, and humidity gauges, as well as a powerful processor. Information gathered from the lights is sent to Predix, cloud-based platform that instantly crunches data and sends the city actionable results in real time.

Extending Capabilities

San Diego is one of the first cities to take advantage of Current's technology. Like most urban areas, the city suffers from traffic jams and parking problems. By using sensor-embedded LED streetlights to improve parking enforcement, the city reduced traffic by up to 30 percent and saved more than $350,000 annually in energy and maintenance costs.

San Diego and other pilot cities are just the start. In the future, data from streetlight sensors could automate and connect city systems in new ways, solving once-stubborn problems with little human intervention.

Sensors might also reveal problems city managers don't know about, such as dangerous street corners where accidents have yet to occur, but where sensors show cars barely avoiding collisions. Alerted to the problem, city engineers might make changes to prevent accidents.

Streetlights Can Even Help Fight Crime

Current is working with ShotSpotter to create streetlights that can detect the sound of gunfire and send the location of the incident to police stations, dispatch centers and officers' smartphones. Cameras in the streetlights can take photos automatically when a shot is detected, helping police identify suspects.

Although ShotSpotter has been around for years, putting the technology into streetlights instead of single-purpose sensors enables cities to expand its presence at minimal cost.

Smarter Lights, Smarter City

With the addition of sensors, streetlights can be the backbone that supports city departments, helping them deliver services efficiently, cut costs, increase revenue, enhance safety and solve environmental problems.

As Christiansen said: "Yesterday, your lighting fixture was a light bulb. Tomorrow, the possibilities are endless."

When humble light fixtures are outfitted with sensors and connected to the cloud, they can unleash truly brilliant ideas for cities, buildings and factories.

-Pravin Chauhan (TE IT)

BookMyStuff

BookMyStuffs is evolutionary upgrade in offline marketing, if implemented. it will give same offline shopping experience but at high speed and more conveniently. Buying daily goodies from local shops, malls, and nearest general store will only be matter of few clicks.

Usually people buy goodies while returning to home from their workplaces. It is really tedious to visit different shops after being exhausted at work. Similarly, on holiday's, people spend their entire day in shopping instead of enjoying precious moments with family.

In festival seasons, it becomes even more difficult to move around market. In concept of BookMyStuffs, every business from low income profile general store to high income profile malls, will have a separate department named "FastLane". All general store, local shops and malls will upload their quotation to BookMyStuffs database through a web interface with ease. Since shops will be in local area packaging and shipping will be done very quickly unlike online shopping.

User will need to use website or android app for viewing and selecting products from shops they like. Once the list is ready, user will make order request which will be forwarded to "FastLane" of shops. User can choose payment method, either online or offline (at shop, while receiving package). Once the request is successfully sent, user will get a token id.

Upon receiving request, "FastLane" workers will create a package of listed products, create a bill. Each package will have user detail along with token id and invoice.

Once order is placed, user will need to visit shop to receive package. High profile shop may give home delivery option also. User will need to show token id at shop.

If user has not paid bill via online services, user will pay directly to shopkeeper while receiving package.

But what if user does not come to receive package? If user does not come to receive package in 24hrs, "FastLane" worker will open the package and return products to warehouse. In case of online payment, 80% will be returned to users account.

As users are going to use BookMyStuffs on daily basis we are going to have tons of record in database. Each entry will have product type and its quantity purchased and other necessary details. This large dataset can be used by data analyst to analyzing and business intelligence.

By observing the patterns in dataset, analyst can predict the future sell of products, it is possible to predict any product which will be more in demand in upcoming months or years.

Not only companies but government also can take advantage of it. This prediction will warn about future shortage of any crop product in market. Government can encourage farmers to grow those crop products in their farm. This will help to deal with sudden shortage of supply in market. Because of this, hopefully, we won't see sudden hikes in prices of products. Also, if we are doing transactions online government will have record of deals, and it will help Income Tax department to collect taxes from vendors.

BookMyStuff take offline shopping to next level

-Suraj Mishra
-Afrid Shaikh
-Abhijeet Panpatil
[TEIT]

Contact Lens Computer: Like Google Glass, without the Glasses

Soft contact lenses could display information to the wearer and provide continuous medical monitoring or those who find Google Glass indiscreet, electronic contact lenses that outfit the user's cornea with a display may one day provide an alternative. Built by researchers at several institutions, including two research arms of Samsung, the lenses use new nano materials to solve some of the problems that have made contact-lens displays less than practical.

A group led by Jang-Ung Park, a chemical engineer at the Ulsan National Institute of Science and Technology, mounted a light-emitting diode on an off-the-shelf soft contact lens, using a material the researchers developed: a transparent, highly conductive, and stretchy mix of graphene and silver nanowires. The researchers tested these lenses in rabbits—whose eyes are similar in size to humans'—and found no ill effects after five hours. The animals didn't rub their eyes or grow bloodshot, and the electronics kept working. This work is described online in the journal Nano Letters.

Park wants to make contact lenses that have all the functions of a wearable computer but remain transparent and soft. "Our goal is to make a wearable contact-lens display that can do all the things Google Glass can do," he says. To make it work, they needed a transparent, highly conductive material that was also flexible. The transparent conductor of choice in conventional rigid electronics, indium tin oxide, is brittle, and it must be deposited at high temperatures that would melt a contact lens. Organic conductors, graphene, and nanowires are flexible and transparent, but they're not conductive enough.

Park, working with Sung-Woo Nam of the University of Illinois at Urbana-Champaign, found that sandwiching silver nanowires between sheets of graphene yielded a composite with much lower electrical resistance than either material alone. The material also transmits 94 percent of visible light, and it stretches. The researchers make these conductive sheets by depositing liquid solutions of the nanomaterials on a spinning surface, such as a contact lens, at low temperatures.

Working with researchers at Samsung, they coated a contact lens with the stretchy conductor, then placed a light-emitting diode on it. Although it would be an exaggeration to call this a display, since there is just one pixel, it's possible this kind of material will be a necessary component in future contact-lens displays, says Herbert De Smet, who works on electronic contact lenses at Ghent University in Belgium but was not involved with the work.

Nam believes medical applications of electronic contact lenses may be even more promising than eyeball-mounted displays. He is currently using the graphene-nanowire conductors to make bio sensors that could monitor health conditions by sampling the chemistry of the eye's tear film. And De Smet's group is developing lenses that can actively filter light to compensate for vision problems.

-ADITYA SHUKLA
-VRUSHALI SHIRODKAR
(SE IT)

Li-Fi

What is Li-Fi?

Light Fidelity or Li-Fi is a Visible Light Communications (VLC) system running wireless communications travelling at very high speeds.Li-Fi uses common household LED (light emitting diodes) lightbulbs to enable data transfer, boasti- ng speeds of up to 224 gigabits per second.The term Li-Fi was coined by University of Edinburgh Professor Harald Haas during a TED Talk in 2011. Haas envisioned light bulbs that could act as wireless routers.

Li-Fi vs Wi-Fi

A computer network or data network is a telecommunication network which allows computers to exchange data. In computer networks, networked comput- ing devices exchange data with each other using a data link. The connections between nodes are established using either cable media or wireless media.

- While some may think that Li-Fi with its 224 gigabits per second leaves Wi-Fi in the dust, Li-Fi's exclusive use of visible light could halt a mass uptake.

- Li-Fi signals cannot pass through walls, so in order to enjoy full connectivity, capable LED bulbs will need to be placed throughout the home. Not to mention, Li-Fi requires the lightbulb is on at all times to provide connectivity, meaning that the lights will need to be on during the day.

- What's more, where there is a lack of lightbulbs, there is a lack of Li-Fi internet so Li-Fi does take a hit when it comes to public Wi-Fi networks.

How it works

Li-Fi and Wi-Fi are quite similar as both transmit data electr- omagnetically. However, Wi-Fi uses radio waves while Li-Fi runs on visible light.

An LED lightbulb is a semi-conductor light source meaning that the constant current of electricity supplied to an LED light- bulb can be dipped and dimmed, up and down at extremely high speeds, without being visible to the human eye.

The future of Li-Fi

In 2015, Li-Fi pioneers pureLIFI joined forces with French lig- hting company lucibel and made certain Li-Fi enabled products. Plus, with faster connectivity and data transmission it's an interesting space for businesses. The integration of internet of things devices and Li-Fi will provide a wealth of opportunities for retailers and other businesses alike.

Li-Fi is reportedly being tested in Dubai, by UAE-based tele- communications provider, du and Zero1. Du claims to have succ- essfully provided internet, audio and video streaming over a Li-Fi connection.

What's more, reports suggest that Apple may build future iPhones with Li-Fi capabilities. A Twitter user found that within its iOS 9.1 code there were references to Li-Fi written as 'LiFi- Capability' hinting that Apple may integrate Li-fi with iPhones in the future.

-JATEEN VEDAK (SE IT)
-RAJ VARTAK(SE IT)
-MAYURESH SONAR(SE IT)

Faculty achievements

1] Mr. Godson D'silva presented a paper on "Smart Ticketing system for railways in smart cities using Software as a Service (SaaS) Architecture" at "IEEE International conference on I-SMAC (IoT in Social, Mobile,Analytics and Cloud) 2017", SCAD Institute of Technology, Palladam, Tamilnadu, India held on 10th -11th Feb 2017.

2] Mr. Godson D'silva, Ms. Shraddha More and Mr. Jeril kuriakose presented a paper on "Real World Smart Chatbot for Customer Care using a Software as a Service (SaaS) Architecture" at "IEEE International conference on I-SMAC (IoT in Social, Mobile,Analytics and Cloud) 2017, SCAD Institute of Technology, Palladam, Tamilnadu, India held on 10th -11th Feb 2017".

3] Mr. Ankur Chavhan published a paper on "Behaviour existing between Web Usage Mining and Data Mining" at "International Journal of Research in Advent Technology, Vol.4, Issue 10, October 2016(Journal)".

Faculty achievements

4] **Ms. Joyce Lemos presented a paper on "Search Engine Optimization To Enhance User Interaction" at "IEEE International conference on I-SMAC (IoT in Social, Mobile, Analytics and Cloud) 2017, SCAD Institute of Technology, Palladam, Tamilnadu, India held on 10th -11th Feb 2017".**

5] **Ms. Dhvani Shah presented a paper on "IoT based Multifunctional Robot using Raspberry Pi" at "International Conference On Recent Advances in Computer Science and Information Technology, held on29th Jan 2017" organized by IRaj, pune.**

6] **Mrs. Anita Chaudhari, Ms. Brinzel Rodrigues and Ms. Shraddha More presented paper on "Two Factor Verification using QR-code: A Unique Authentication system for Android Smartphone Users", "Automated IOT based system for Home Automation and Prediction of Electricity usage and Comparative Analysis of various Electricity Providers: SmartPlug" and "Digital Forensic Investigation using Subject-based Semantic Document Processing" at "International Conference on Contemporary Computing and Informatics ,IEEE, 2016. 14-17 December 2016" organized by AMITY university, Noida.**

Faculty achievements

Book Publication :

1] Mr. Godson Michael D'silva, Published a Book with title "Online Signature Recognition using Software as a Service Architecture" under LAP Lambert Academic Publishing on 12 th November 2016 with ISBN-978-3-659-97716-9.

2] Ms. Dhvani Shah, Published a Book with title "IOT based Biometrics SaaS using Raspberry pi on Azure platform" under LAP Lambert Academic Publishing on 8th Feb 2017 with ISBN-978-3-330-03315-3.

Resource Persons :

1] Mr. Jeril Kuriakose and Mr. Godson Michael D'silva invited as a Resource Persons for conducting tutorial in IEEE Tutorials on "Big Data Analytics" on 3rd Feb 2017 under International Conference On Emerging Trends & Innovation In Ict (ICEI-2017) at Pune Institute of Computer Technology.

Faculty achievements

Other Achievements :

1] Mrs. Anita Chaudhari, Ms. Shraddha More, Ms. Brinzel Rodrigues, Mr. Godson D'silva, Ms. Jessica Dias took ISTE Membership(Lifetime).

2] Ms. Brinzel Rodrigues Attended one day Training Programme on Harassment of Women at Workplace (Prevention, Prohibition and Redressal) Act,2013 ,conducted at University of Mumbai by Women Development Cell University of Mumbai and Maharashtra State Commission for Women on 13th February 2017.

Research Grants :

1] Mr. Godson Michael D'silva Received a "Microsoft Azure Research Award" of USD $20,000 from Microsoft on 11th November 2016 to carry out research activities in the domain of Cloud Computing, Big Data Analytics and Machine Learning.

2] Mr. Godson Michael D'silva Received a "IBM Bluemix Academic Initiative Grant " from IBM on 15th Febuary 2017 for 1 Year to teach students market-ready skills available on IBM Bluemix Cloud for FREE.

Our Stars

1] **Hackathon Team presented a project on "Smart Ticketing system for railways in smart cities using Software as a Service (SaaS) Architecture" in Vartak College Vasai held on 7th April 2017 and was awarded 1st rank.**

2]**Ms. Jessica John, Mr. Anoop Kunjumon and Mr. Lukose Pannapara presented a paper on "Smart Ticketing system for railways in smart cities using software as a service" in IEEE international conference on I-SMAC (IoT in Social, Mobile, Analytics and Cloud) by SCAD Institute of Technology at Coimbatore, India, held on 10th and 11th February 2017.**

Our Stars

3]Mr. Abhishek Mishra, Mr. Mandar Kulkarni, Mr. Pranjal Barabde presented a paper on "IoT based Multifunctional Robot using Raspberry Pi" in International Conference on Recent Advances in Computer Science and Information Technology, held on 29th January 2017 and were awarded by "Best Presentation and Content" award.

4]Mr. Somil Koul (SE IT) stood second in "Vivaxious Dance Competition" held in Viva College, Virar.

5]Mr. Abhishek Mishra (BE IT) completed internship in Websites and Software solutions company, Pune for 3 months from 25th October 2016 to 10th January 2017 in web development domain on HTML, CSS, Java, PHP technologies.

Our Stars

6] Mr. Ajay Yadav, Mr. Hardik Thakor, Mr. Sushant Sule, Ms. Priyanka Purohit, presented project on "IoT Based irrigation using raspberry pi" at "Projectmania" organized by "St. Vincent Pallotti College of Engineering and Technology, Nagpur" held on 27th and 28th January 2017 and were awarded forth rank.

7] Mr. Amit Bhoir, Mr. Aditya Gawad, Mr. Sanket Bane, Ms. Sanjyot Raut, Ms. Malvina Lopes presented a project on "IoT based Pollution detection" at "Projectmania" ,organised by "St. Vincent pallotti college of engineering and technology, Nagpur" held on 27th and 28th January 2017 and were awarded sixth rank.

For Smart India Hackathon 2017 Coding competition organized by Government of India under the initiative of Smart India, Two Groups from IT Department submitted their Proposed Solutions for Ministry of Railways and Ministry of HRD, and team hackathon secured 6th Rank.

2015-2016 Placement

Student Name	Company
Sana Gaikwad	Persistent
Jitesh Golatkar	Persistent
Manasi Pawar	Persistent
Pradnya Shidhaye	Persistent
Shraddha Upadhyay	L& T Infotech
Jyotsna Singh	L& T Infotech
Jidesh Nair	L& T Infotech
Pratik Purohit	Paramatrix Technologies
Tanmay Colaco	Neebal Technologies
Amit Patil	Zycus
Mukesh Choudhari	Protegrity
Akshita Rastogi	Protegrity
Jennifer Moraes	Mphasis
Margriet Britto	Convergys
PV Jishu	Quinnox
Saurabh Pimpale	Reliance Jio
Rahul Mehata	Tally Solutions Pvt. Ltd
Kundan Panchal	Allerin Technologies

2015-2016 Placement

Student Name	Company
Denma Lobo	Directl
Nikhil Borse	ECW
Sahil Chitre	ECW
Aneesha Mathew	ECW
Anjali Gupta	ECW
Pooja Vishwakarama	In Solution Global Pvd.Ltd.
Pranav Ambre	Majesco Ltd
Jatin Achenkunju	Majesco Ltd
Pradnya Shidhaye	Persistent
Bipin Thomas	Syntel
Shivam Mishra	Trigyn software Ltd
Siddhi G Govekar	Ugam
Ajay Jaiswal	Ugam
Sneha Rajan	India A Parenting
Tejas Joshi	Ikya Burman Capital
Dinesh Chaudhari	Pac kT
Anuj Sadanandan	Ugam

2016-2017 Placement

Student Name	Company
Ancy Abraham	Amazon
Arvin Mathias	Amazon
Harshit Patel	Amazon
Pranjal Barbade	Amazon
Ruchita Nikam	Amazon
Gaurav Joshi	Ugam Solutions
Jessica John	Ugam Solutions
Leroy Saldanha	AGC Transact
Mandar Kulkarni	AGC Transact
Abhishek Mishra	Virtusa Polaris
Angha Mudrale	FSS
Anup Kunjumum	SoGo
Nivedita Jha	Nucsoft Technologies
Payal Shahapurkar	Bitwise Inc
Rajan Jha	Majesco