NEW HORIZON COLLEGE OF ENGINEERING

DEPARTMENT OF INFORMATION SCIENCE & ENGINEERING

2015 - 16

INFOTECH PATRIKA - A Half- Year Publication

About the Department:

Information science and Engineering department focuses on current Information Technology trends, and Domain Specific Applications. The program facilitates the evolution of skills in students to help them attain a higher degree of knowledge, global competency and excellence, for the betterment of the society. The Department of Information science and Engineering at NHCE was established in the year of 2001 and offers graduate and PhD programs. The four year B.E degree equip the students to meet day- to- day Technological advancements of the ever dynamic IT field through adept training on various subjects of curriculum of Information Science and engineering and beyond. The department offers B.E program through autonomous scheme from the year 2015. The department has a total intake of over 380 students with a very good team of highly qualified and talented faculty members including Professors, Associate Professors and Assistant Professors.

Information Science and Engineering course at New Horizon College of Engineering is designed to meet industry standard and cope up with the emerging technology. There is a great emphasis on holistic learning to help the students to make significant contributions at all levels and to meet the expectations of stakeholders. The department is well known for its research excellence in various competitive areas of Information Science. Students are made to involve vigorously in research activities. The department provides industry collaborated courses for the students.

Should You Use An IoT Platform Or Build Your Own?

IoT is the next big thing in the business world and if you have made up your mind about getting your business on board with IoT, you are headed in the right direction. The question now is whether you should make use of an IoT platform or create your own IoT solution. The answer to that question will depend on your specific business requirements, but just to float an opinion, most businesses are better off with an IoT platform that can do the heavy lifting, while the business itself, can focus on its core value proposition.

The Basic Difference

An IoT platform is a full-fledged solution that a company has already developed, covering all aspects of IoT integration right from inter-device communications to data collection and analytics. From adding new features to fixing bugs and rolling out updates, the IoT platform takes care of it all. Creating a DIY IoT solution yourself would mean that you would need to use your own research, experience and resources to create a solution that lets all your products communicate with each other, and process all of those millions of messages and data yourself. You would need a highly trained, specifically skilled team in-house to help you take care of just the IoT part. Now, unless you already have the requisite skills or such a team, you may not want to shift the focus from your core value to the creation of an IoT solution. Creating an IoT solution from scratch would cost you time, money and quality. Here are some of the factors you should consider before deciding if you should go with an IoT platform or build a DIY solution:

1. **Time to Market :**If your goal is to ship an IoT ready product, your entire product launch will have to wait until the IoT systems are fully functional. In-house IoT systems can typically take anywhere between 6 to 12 months to complete, and that is without any major setbacks. That's how long you will have to keep the entire assembly line waiting, while your competitors hop on to an IoT platform and jump right ahead to the next step. Using a platform brings down your time to market drastically, keeping you ahead in the game.

2. **Talent:** You may have to hire a team of in-house IoT professionals or train your existing tech teams on IoT. And do bear in mind that IoT is a fairly nuanced technology that requires a high level training and skills. Training or hiring new professionals will be a time intensive process with a high price tag. You need a minimum of three to five people to not just build but also secure and maintain you IoT solution.

3. **Scalability:**Scalability is one of the most important factors you need to think of when deploying an IoT solution. As your business grows, the volume of data will grow. The number of messages being exchanged will grow, as will the traffic, complexity and workload.

Having a platform means that the platform will have to worry about scaling up when need be. Building your own custom IoT solution will mean that the in-house team will have to keep

scaling up as the business needs grow. The team will have to seamlessly manage increased workload right from batch processing and real-time streaming to fixing issues and rebuilding if need be.

4. **Privacy and Security :** With the proliferation of IoT, security threats have a much larger surface area to play with. Keeping your products and devices secure from malware is a consuming task that requires great detail to attention. IoT platforms have the expertise and resources required to keep the entire platform secured. Building your own would require that you invest heavily in the security of your IoT solution too. Any slip in the security cold mean major repercussions to your business, a risk not worth taking for a serious consumer facing business.

5. **Data collection and analysis:** IoT involves huge volumes of data that are transmitted every day. All of this data can yield actionable insight only when high quality analytical tools are used. Once again, a full-fledged IoT platform has the tools to extract relevant insights from the reams of data, while building your own solution would mean you need to do the intensive research for <u>finding the right analytical service</u> from the different ones available in the market. You also need to develop ways to store, secure and protect all that data on your own. Plus, if the analytics aren't top notch, all the effort of developing the IoT solution would do you little good after all.

As India is making a fast progress directed towards a digital world, making headlines in initiatives like smart city or a dedicated center of excellence for Internet of Things being announced by PM Narendra Modi, the country is evidently stepping towards a better connected world. The IoT ecosystem is accelerating at a faster pace and there are many companies mushrooming up in the area of IoT building new products and solutions across all the verticals.

With this, the demand for skilled professionals in the area has gone up many folds opening up a plethora of opportunities for the aspirants. Many mid sized companies have especially contributed to an increasing demand for the workforce, which along with MNCs have led to tremendous job creation in the field. With a rise in sensors, chips, Industrial IoT and a connected everything, there has been a rise in newer job titles such as network engineer, IoT product engineers, IoT cloud architect, IoT solftware support, IoT solution architect, to name a few. That's not all, with robots and automation taking a center stage at many industries, there are also possibilities of creation of job titles such as robot coordinators in the future.

As Internet of Things is hitting the products and services side of it, creating job opportunities like never before, IoT India magazine brings a detailed study, which enlists details such as top trends in IoT, hiring across cities, tools & skills, salaries and much more.

Titled "IoT India Jobs Study 2017", it is a must read for professionals keen on building a career in IoT industry.

Top Trends in IoT jobs-

- On an average, there are almost **26** new job openings around IoT that are posted each day in the country.
- While, it is difficult to ascertain the exact number of IoT jobs openings; by our estimates, close to **2,500** positions related to IoT are currently available to be filled in India.
- Compared to worldwide estimates, India contributes just 8% of open jobs opening currently. The no. of jobs in India are likely to increase much faster vs. the rest of the world as more IoT projects get outsourced to India due to lack of skills across the world.
- 10 leading organizations with the most number of IoT opening this year are – Cisco, Amazon, Wipro, Happiest Minds, L&T, SAP Labs, Accenture, IBM, Bosch & GE.

IoT jobs by cities-

- In terms of cities, Bengaluru accounts for around **51%** of IoT jobs in India.
- Chennai comes a distant second contributing **15%** IoT jobs in India.
- Approximately **12%** of IoT jobs are from Delhi/NCR.
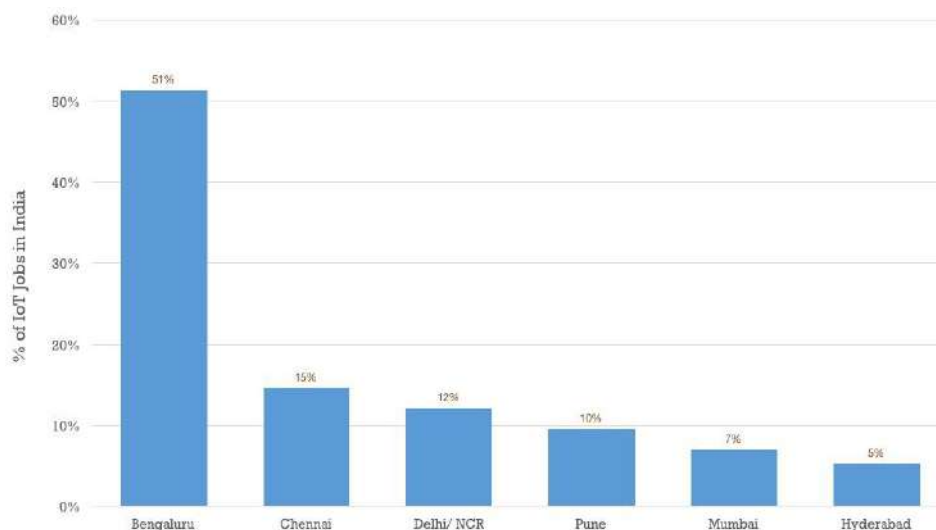
IoT jobs by industry-

- Telecom sector continues to be the biggest influencer in IoT job market. **37%** of all jobs posted on IoT were from the Telecom sector.
- **14%** of IoT jobs were in Engineering/ Industrial product/ Utilities sector.

- Semiconductors / Electronics sector contributes **13%** of all IoT jobs.
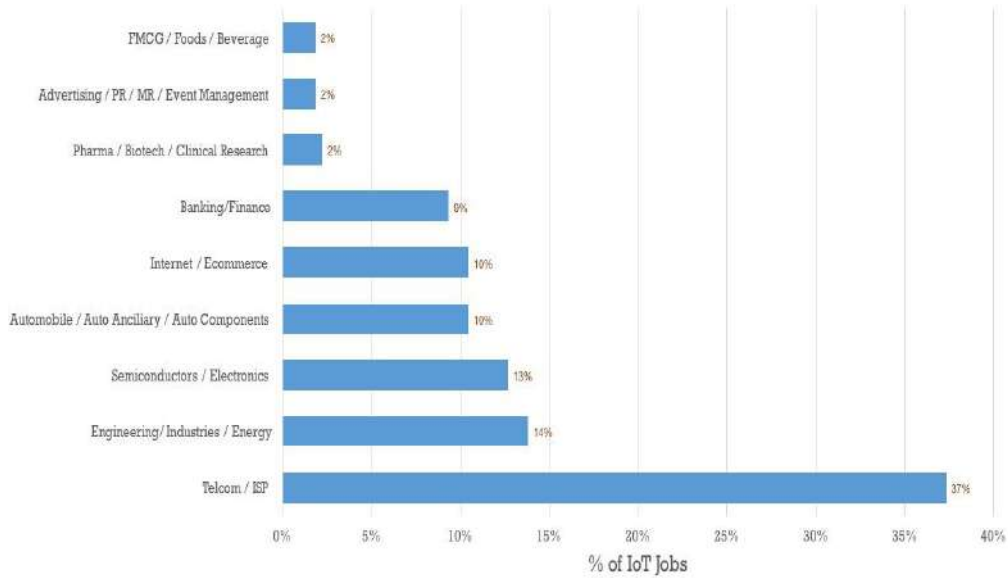
Experience requirement by IoT jobs-

- Around **32%** of IoT requirements are looking for candidates with less than 5 years experience.
- Only **3%** IoT jobs are for freshers.
- **68%** IoT job openings are for professionals with more than 5 years job experience.
  - **Prof. Vandana C P**

How Blockchain Will Revolutionize IoT

Blockchain is an incredible software innovation that allows for transparent record-keeping and infinite possibilities in the world of financial transfer and record management. If you have read the news at all in the last two years, you will have undoubtedly seen a reference to Blockchain. It is the main proponent behind Bitcoin, the skyrocketing cryptocurrency, and has a profound effect and influence over the modern tech market.

There is no one involved in the industry that is not excited about Blockchain since it affects everything from banks to hospitals. The platform itself is based on the idea of inexpensive record-keeping and accounting. Almost everyone involved in the tech industry is excited for whatever innovation can be birthed from this new peer-to-peer system.

For most individuals, the specifics of the Blockchain are still confusing and granted since it is new to the world. However, one does not need to be an expert to be excited for this innovative technology that will allow companies and individuals to create crypto currencies and accounting programs that will revolutionize their respective Industries. Delayed programming of payments has the potential to upend the current transportation industry and allow for a safer and more reliable alternative to shipping and receiving goods.

What is not talked about often is how it will affect the Internet of Things. In this upcoming age we will see an entirely new world comprised of products that are all interconnected and sustained by one another. Everybody's car will be a WiFi hotspot and everybody's bike will have a GPS in it. When every part of your life is connected to the internet it can be quite the bog down on the system.

Blockchain seeks to fix this inevitable issue by creating programmable software and easy to access records that will make the entire process faster and safer than it ever was. Instead of an individual having to keep track of everything they have ever done or had, through Blockchain technology, they can keep their records safe and easy to access. In The Internet of Things age Blockchain has become an even more prominent figure as everyone seemingly hopes to get involved.

Because it is open source there is no entry point too low or too high for the service. Programmers from all over the world are absolutely enraptured by the potential of Blockchain in the new age. More and more high-profile businesses are beginning to keep their records easier to maintain and safer with Blockchain like Sony and JPMorgan Chase.

Even though some have skepticism, Blockchain has proven to be safe and accurate. In The Internet of Things this will help products and services retain your information so that it can be used across multiple devices and services. This will keep your identity secure as well as

providing ease of access and use to all of the products in your life. This has sparked interest in technological development for programmers and tech industry heads.

The Internet of Things will see a large impact due to Blockchain. Blockchain would allow for companies to keep your records across multiple devices and out of criminal hands. It would also allow supply change to operate more efficiently and with better trust as they can delay payment until delivery and track where their goods have gone. While the individuals involved in the transaction stay anonymous, the goods that are transacted are not. In Internet of Things this will allow for an individual to keep track of what they have spent and where they have spent it. This will also keep an individual's credentials safe and grant them a peace of mind that is not afforded by analog systems.

Blockchain will in time usher in a future only dreamed about in movies or seen in the stars. If you want to get involved there are number ways to do so but make sure that you have a powerful computer. Even though it is open source does not mean it is easy to use. However, it is an exciting innovation that can completely change the way we interact with the world around us.

- Mr. Halesh M

Honeywell Introduces Indoor Navigation for Connected Buildings

Honeywell, a global Connected Buildings technology developer, has announced several new capabilities for its Honeywell Vector Occupant App. these features will give Smart Building occupants more control over their experiences within a building with the swipe of a screen.

The most significant new feature is indoor navigation, which uses GPS-like technology to help users find their way around complex buildings that are difficult to navigate without directions. The indoor navigation feature has been demonstrated in the Minneapolis Skyway System, a complex interlinked network of enclosed pedestrian walkways spanning 80 city blocks.

The walkways protect Minnesotans from the winter elements and summer humidity, allowing them to comfortably walk between more than 30 buildings in downtown Minneapolis.
"For anyone who's not a local, and for even some who are, finding your way around the skyway system can be a big challenge," said Steve Cramer, president and CEO, Minneapolis Downtown Council. "With our initial use of the Honeywell Vector Occupant App, we've seen an immediate impact. The interactive map makes it really easy and intuitive to know exactly where you're going, and how to get there."

In addition to the indoor navigation feature, the app also now includes a location-based feature to rate spaces, allowing those within a building to highlight comfort issues to building

staff for quick resolution. Both features combine mobile device capabilities with IoT-enabled building connectivity to help improve a user's experience inside a building.

"Much of a building's success hinges on how happy and satisfied its occupants are. They're the lifeblood of an organization, and their experience within a building is what keeps them coming back," said John Rajchert, president, Building Solutions, Honeywell Home and Building Technologies. "The Honeywell Vector Occupant App has given users more power to shape their building experiences from their smartphones. Now, we're adding even more features to deepen the connections between occupants and the spaces around them so they can be as comfortable as possible, and can more easily and efficiently move about a building." The Honeywell Vector Occupant App is part of Honeywell's Connected Services portfolio, which leverages the connectivity of buildings to improve how they operate and the experiences they offer for those who visit and work within them.

- Gautham G, Krithika V Rao, Nagadevika H

Digital Transformation of Healthcare: IoMT Connectivity, AI, and Value Streams

The Digital Transformation (DX) of Healthcare is imminent. A number of key advances in technology as well as digital transformation best practices are paving the way for a watershed year in Healthcare. In addition to the staggering and continuously rising cost of Healthcare, silos within Healthcare value streams as well errors in diagnostics and inconsistencies in patient data are some of the pervasive challenges in the healthcare industry. Consider this. Medical errors are the third leading cause of death in the United States!

These formidable challenges of Healthcare impact our pocketbooks *and* wellness. However, the Digital Transformation of Healthcare is also becoming a reality with tremendous benefits to patients, providers, *and* payers. More specifically, three complimentary technologies are now the pillars for Healthcare DX:

1.*Internet of Things Connected Wellness and Medical Devices*: This year also at CES 2018 there were 200 Digital Health technologies focusing on Wellness and Medical Devices with concrete benefits for the consumer. In addition medical devices are becoming increasingly intelligent, connected, and robust for delivering optimized healthcare services. There is even an acronym for it: Internet of Medical Things (IoMT) that aggregates connectivity of medical devices with Information Technology (IT).

2. *Artificial Intelligence in Healthcare:* AI for discovering patterns from connected healthcare monitoring devices as well as patient transactions are providing tremendous opportunities for preventive care. There are many different types of AI preventive care models. In addition to aggregating and mining models from patient data another benefit of AI in healthcare is to opt for a system of continuous learning within the system itself. Furthermore, the knowledge harvested from various medical sources including patients, connected devices, and medical staff such as doctors and nurses, can be digitized and automated. The combination or even "champion challenge" between care options mined and discovered from patient data vs. the knowledge of experts (e.g. doctors and nurses) provides increased opportunities in optimizing the patient care.
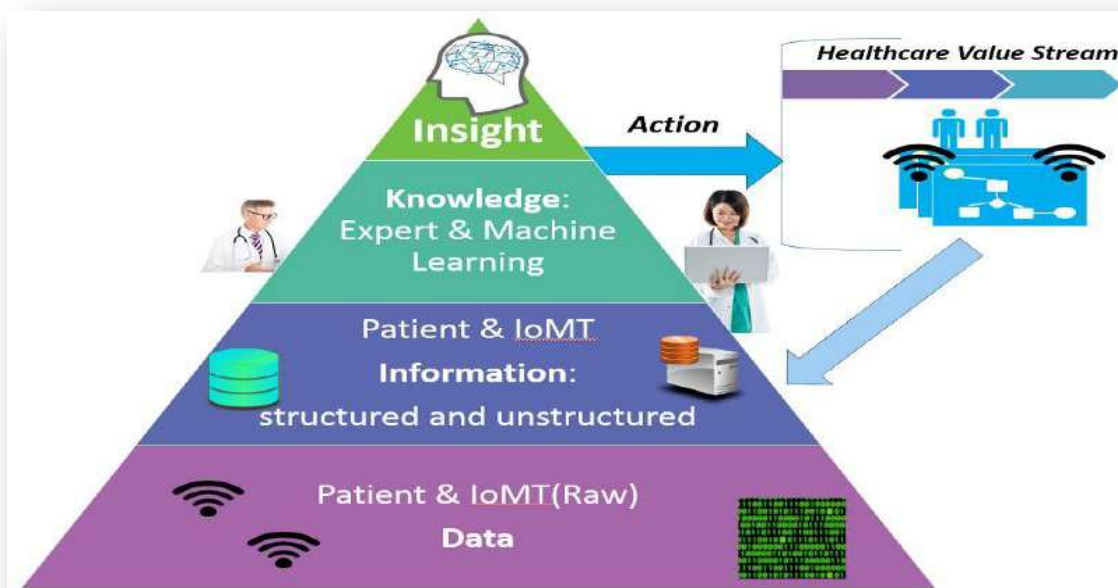
3. *Digitization of Healthcare Value Streams:* Wellness monitoring and connectivity on the patient (outpatient or in the care facility—such as the hospital) are good and important building blocks. However, to solve these pervasive challenges, the end-to-end values stream for the patient has to be captured and digitized. Value Stream efficiency and optimizations in Healthcare are increasingly leveraging intelligent Business Process Management and Dynamic Case Management. For repetitive work, Healthcare is also leveraging Robotic Automation. All categories of Healthcare work are being either automated or augmented and assisted through AI. Categories of Healthcare work include repetitive work (e.g. entering patient data), knowledge or cognitive work (doctors, nurses), and AI assisted work for all categories of medical workers.

The applications as well as the implication of IoMT, AI, and value stream automation for healthcare are tremendous. Here are some examples of Healthcare applications with tremendous benefits to the patients as well as Healthcare providers and payers.

- Anusha, Ashika, Namratha

Biometrics for Internet of Things (IoT)

Internet of Things (IoT) is a disruptive technology which is poised to take on the global market through digital transformation.

Recently, Apple unveiled its iconic iPhone X calling it to be the future of the "Smart Phone" with its new feature called 'Face ID' to unlock the phone without a home button. Apparently, the Face ID uses the infrared system to scan users face, to unlock the new iPhone X which is quite concerning as the phone uses unimodal biometric authentication system.

The serious spoof I see here in having a unimodal authentication system is that, in today's day and age, the phone has become an integral part or the single 'thing or device' which acts to be a lifeline or backbone of one's life. The device shares and stores all the personal and confidential data or information related to that individual. In this digitized world, the modus operandi of performing either business related tasks or personal activities are all done through the phone or via mobile apps.

In such a scenario it becomes critical for the Industry to ensure that the device or thing is enabled with the multimodal biometric authentication system. Let me elaborate how and why it is imperative. If my banking app were to use the same authentication of facial id which is meant only for unlocking my phone screen, then it poses a huge risk of security threat which will lead to unauthorized access of my data & information leading to cybersecurity crimes.

To avert such dangerous loopholes in the system, I believe that the Industry needs to consider enabling Multimodal biometric authentication system. This authentication system will provide the user the complete control in authenticating independently for every individual thing or device or app which they interact frequently. If one device gives authentication to another thing, then there is a security breach. Again, here the industry will need to embed a simple computing mechanism which will enable the decision-making capability within an individual thing or at the device level. This will address the filtration of data right at the thing itself reducing the overwhelming volumes of data getting collected for analytics in the cloud.

The US Senator AI Franken has also written a letter to Tim Cook concerning the Face ID technology's eventual uses that may not be contemplated by its customers. They have

requested Apple to share more information on Face ID and where and how it intends to store the faceprints of its users as well as to the law enforcement requests for that very data that are sure to come.

Similarly, Samsung's Galaxy Nexus in 2011 had this kind of technology first, although it was easily fooled by pictures of people's faces and had to call it off as it realized that this technology of unimodal biometric authentication posed a huge security concern which was sure to be misused or abused.

If you consider a manufacturing plant there are various industrial assets which will need to have exclusive access for its operator to operate it. In the event any third-party or another operator needs access, there will be an access management in place for authenticating the user ensuring hundred percent protection of the R&D, Blueprints, etc. related confidential information from the security breach.

As IoT proliferates, the market is expected to grow from USD 170.57 Billion in 2017 to **USD 561.04 Billion by 2022** and the **connected 'Things' to reach 20.4 billion by 2020**. It also predicts **IoT spending to increase to \$2.5 million a minute**, with 1 million new IoT devices being sold every hour by 2021. The significant growth in the number of connected devices opens up for risks in Data Security and Privacy. Hence comes the dire need for Multimodal Biometric Authentication System.

Hence, I strongly recommend of using the Multimodal biometric system to overcome the limitations of the Unimodal biometric system of authentication. The next important aspect is that an individual need to have independent authentication to the Edge Platform. This will allow the user to authenticate the data which needs to be made available in the cloud either for further analysis or use by the respective authorities in the Industry.

- Akshay, Deepak, Harshitha

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