KSR INSTITUTE FOR ENGINEERING AND TECHNOLOGY

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DEPARTMENT OF INFORMATION TECHNOLOGY

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DIGITIMES

IOTS

KSR INSTITUTE FOR ENGINEERING AND TECHNOLOGY

Vision

To become a globally recognized Institution in Engineering Education, Research and Entrepreneurship.

Mission

M1	Accomplish quality education through improved teaching learning process
M2	Enrich technical skills with state of the art laboratories and facilities
M3	Enhance research and entrepreneurship activities to meet the industrial and societal needs

DEPARTMENT OF INFORMATION TECHNOLOGY

Vision

To produce competent Information Technology Professionals and Entrepreneurs with ethical values to meet the global challenges.

Mission

MD1	Impart quality education with ethical values in Information Technology through improved teaching learning process
MD2	Provide an ambient learning environment using state of the art laboratories and facilities
MD3	Encourage research and entrepreneurship activities to meet the dynamic needs of Information Technology industry and society

Program Educational Objectives (PEOs)

PEO	Key Words	Description
PEO 1	**Core Competency**	Graduates will be successful professionals in career by applying the knowledge of mathematics, science and engineering with appropriate techniques and modern tools.
PEO 2	**Professionalism**	Graduate will exhibit soft skills, professional and ethical values and thrust for continuous learning to maintain professionalism in the IT industries.
PEO 3	**Higher Studies and Entrepreneurship**	Graduates will engage in higher studies and outshine as entrepreneurs through life-long learning which leads to societal benefits.

DIGITIMES

Editorial

We would like to wholeheartedly thank our honorable Chairman, **Lion.Dr.K.S.Rangasamy** and vice chairman **Mr.R.Srinivasan,** and Principal **Dr.M.Venkatesan** for their continuous encouragement and constant support for bringing out the magazine. We profoundly thank our Head of the Department **Dr.P.MeenakshiDevi** for encouraging and motivating us to lead the magazine a successful one right from the beginning. DIGITIMES serves as a platform for updating and enhancing upcoming technologies in Information Technology. We are also grateful to all the contributors and faculty coordinator to bring this magazine.

By,

Editorial Board

CONTENTS

INTERNET OF THINGS (IoT)

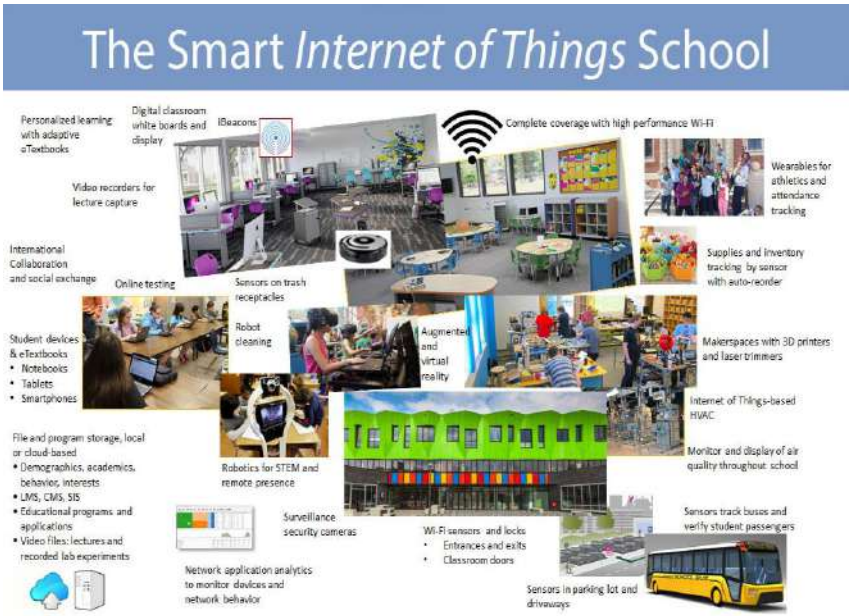
- The Internet of Things is a system of interrelated computing devices, mechanical and digital machines, objects, animals or people that are provided with unique identifiers.

- IoT wants to connect all potential objects to interact each other on the internet to provide secure, comfort life for human.

Wearable Tech

Smart Appliances

Healthcare



The Internet of Things is a network of multiple devices that communicate with each other without human involvement. This device-to-device communication mostly involves the collection of data and the processing of that data so that said devices can make their own decisions and act accordingly. Hence the name: Internet (connectivity) of Things (devices).

The Internet of Things is a simple concept that only requires three things to function:

- A way for devices to be interconnected,
- A way for devices to gather data,

- A way for devices to process that data and make decisions accordingly.

This interconnectivity has huge implications for efficiency and automation. When utilized properly, this no-humans-involved sort of self-device-management frees us up to spend our time elsewhere.

-Elangovan.S-III YEAR-IT

Various Names, One Concept

M2M (Machine to Machine)

"Internet of Everything" (Cisco Systems)

"World Size Web" (Bruce Schneier)

"Skynet" (Terminator movie)

APPLICATION AREAS OF IOT

Media

In order to hone the manner in which things, media and big data are interconnected, it is first necessary to provide some context into the mechanism used for media process. It has been suggested by Nick Couldry and Joseph Turow that practitioners in media approach big data as many actionable points of information about millions of individuals. The industry appears to be moving away from the traditional approach of using specific media environments such as newspapers, magazines, or television shows and instead tap into consumers with technologies that reach targeted people at optimal times in optimal locations. The ultimate aim is of course to serve, or convey, a message or content that is (statistically speaking) in line with the consumer's mindset. For example, publishing environments are increasingly tailoring the messages (advertisements) and content (articles) to appeal to consumers that have been exclusively gleaned through various data-mining activities.

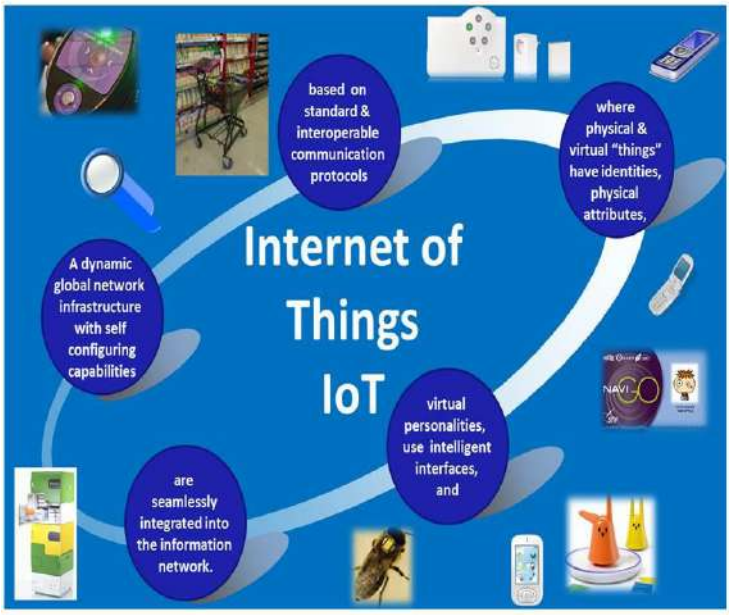
The media industries process big data in a dual, interconnected manner:

- Targeting of consumers (for advertising by marketers)
- Data-capture

Thus, the Internet of things creates an opportunity to measure, collect and analyse an ever-increasing variety of behavioral statistics. Cross-correlation of this data could revolutionize the targeted marketing of products and services.[64] For example, as noted by Danny Meadows-Klue, the combination of analytics for conversion tracking with behavioral targeting has unlocked a new level of precision that enables display advertising to be focused on the devices of people with relevant interests.[65] Big data and the Iota work in conjunction. From a media perspective, data is the key derivative of device interconnectivity, whilst being pivotal in allowing clearer accuracy in targeting.

Environmental Monitoring

Environmental monitoring applications of the IoT typically use sensors to assist in environmental protection by monitoring air or water quality, atmospheric or soil conditions, and can even include areas like monitoring the movements of wildlife and their habitats. Development of resource constrained devices connected to the Internet also means that other applications like earthquake or tsunami early-warning systems can also be used by emergency services to provide more effective aid. IoT devices in this application typically span a large geographic area and can also be mobile.



It has been argued that the standardization IoT brings to wireless sensing will revolutionize this area.

Medical and healthcare:

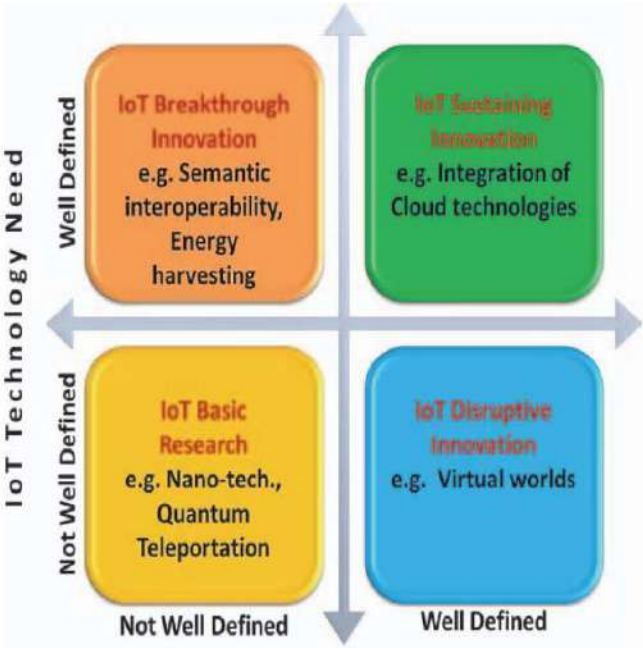
IoT devices can be used to enable remote health monitoring and emergency notification systems. These health monitoring devices can range from blood pressure and heart rate monitors to advanced devices capable of monitoring specialized implants, such as pacemakers Fit bit electronic wristbands or advanced hearing aids.

Some hospitals have begun implementing "smart beds" that can detect when they are occupied and when a patient is attempting to get up. It can also adjust itself to ensure appropriate pressure and support is applied to the patient without the manual interaction of nurses. Specialized sensors can also be equipped within living spaces to monitor the health and general well-being of senior citizens, while also ensuring that proper treatment is being administered and assisting people regain lost mobility via therapy as well. Other consumer devices to encourage healthy living, such as, connected scales or wearable heart monitors, are also a possibility with the IoT.More and more end-to-end health monitoring IoT platforms are coming up

for antenatal and chronic patients, helping one manage health vitals and recurring medication requirements.

Building and home automation:

IoT devices can be used to monitor and control the mechanical, electrical and electronic systems used in various types of buildings (e.g., public and private, industrial, institutions, or residential)in home automation and building automation systems.



-Priyadharshini,II IT

CHARACTERISTICS OF IOT

1. Intelligence – Knowledge extrac1on from the generated data
2. Architecture – A hybrid architecture supporting many others
3. Complex System – A diverse set of dynamically changing objects
4. Size considerations – Scalability
5. Time considerations – Billions of parallel and simultaneous events
6. Space considerations – Localization
7. Everything---as---a---service – Consuming resources as a

IoT PRODUCTS

1. **Helmet Concussion Sensor**

Shockbox is a sensor that attaches to protective helmets and uses accelerometers to measure the effect of a head impact. This information is sent to the smartphone of a parent or a coach via Bluetooth, which allows them to make critical decisions like whether they should be taken off the field. Available on both Android and iOS, this sensor-and-app combination also allows for the recording of symptoms after collisions in order to track the player's overall health.

2. Medical Alert Watch

The health of elderly relatives can be difficult to track, but it's even more difficult when they live on their own. Fortunately, you can now rely on **Lively** to help you there.

It's a smartwatch that allows remote health monitoring of your loved ones. The smartwatch can track steps taken as well as other kinds of daily activities, plus it provides an emergency assist button that alerts Lively to call in and check that everything is alright.

These features would be great on their own, but Lively also offers sensors that can be placed around the home so that the system can

learn what their normal habits are, like opening the refrigerator or taking their medication.

An online hub allows you to check on your loved ones by reviewing the collected information and looking for any potential changes in behavior that could be a sign of something more serious.

3. Dog Activity Monitor

As the market for health devices is so new, it may surprise you — but not shock you — to know that there is a smart device for monitoring your beloved dog's health.

The device from **Fitbark** is essentially a "Fitbit for Dogs", and the company even acknowledges this by allowing you to connect your own **Fitbit** account if you so wish. It allows you to measure your dog's activity and quality of sleep, providing theoretically useful data about their behaviors — something that can tell you more than a bark ever could.

4. Smart Running Shoes

The sportswear company, Under Armour, debuted a pair of game-changing running shoes at **this year's CES**. Where most fitness trackers are worn on the wrist, the **SpeedForm Gemini 2** running shoes have the tracking hardware built directly into the shoes themselves.

he shoes are able to do all the standard tracking like time, distance ran, and split times. Making use of their MapMyFitness acquisition, Under Armour has even made it so that the shoes integrate with MapMyRun to provide GPS data for your runs.

As for battery recharging, you won't need to worry about that. Under Armour claims that the battery for the smart technology will actually outlast the useful life of the shoes.

5. Smart Fitness Clothing

Each garment has built-in sensors which measure muscle activity using electromyography. This information is relayed to the "Iron Man" hub, which you can attach to your chest or leg.

The hub sends this information back to your smartphone allowing you to analyze your performance during different exercises and perfect your techniques. Finally! A way to help you build that superhero body that will match your high-tech attire.

6. One-Button Product Purchases

"Order at the click of a button!" Amazon has taken that phrase literally and produced physical branded buttons called **Amazon Dash** that link to products in your home.

Say you run out of laundry powder. You can press your Dash button for Tide and Amazon will reorder your Tide Powder

product for you. No need to sign onto the Web, fumble with payment methods, or retype credit card numbers.

7. Garden Sensor

Parrot, which has been making wireless devices since 1994, is well known for its **current range of drones**. However, they also make this rather awesome sensor, **Flower Power**, which you plant into the soil next to your flowers.

8. Smart Garage Controller

The **Garageio** smart garage door controller does what you would expect it to: open and close your garage door using nothing more than a smartphone app. It even promises to alert you if you leave your garage door open by mistake, but the real interesting feature is that you can grant garage door access to different people.

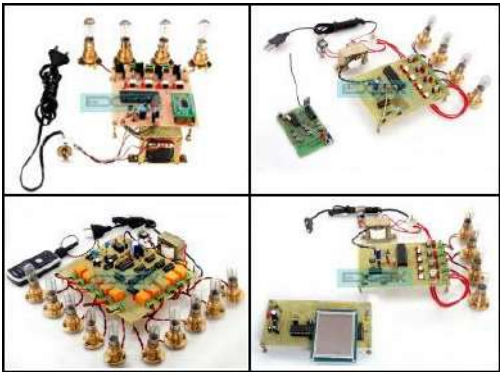
By

P.Dharani, III Year/IT

Home automation is the process of controlling home appliances automatically using various control system techniques. The electrical and electronic appliances in the home such as fan, lights, outdoor lights, fire alarm, kitchen timer, etc., can be controlled using various control techniques.

WIRELESS HOME AUTOMATION USING IoT

There are various techniques to control home appliances such as IOT based home automation over the cloud, home automation under WiFi through android apps from any smartphone, Arduino based home automation, home automation by android application based remote control, home automation using digital control, RF based home automation system and touch screen based home automation.

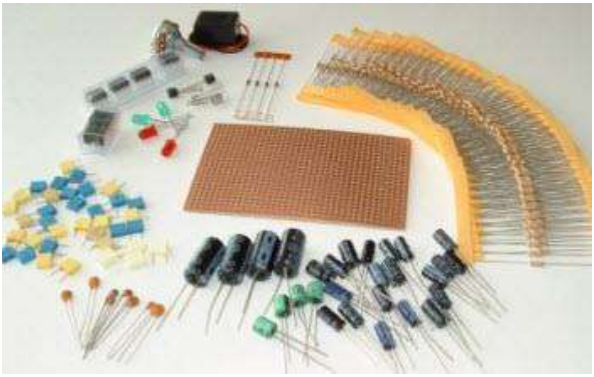


Various types of Home Automation Systems

Wireless home automation using IOT is an innovative application of internet of things developed to control home appliances remotely over the cloud. The home automation

system project can be developed by following simple steps shown below.

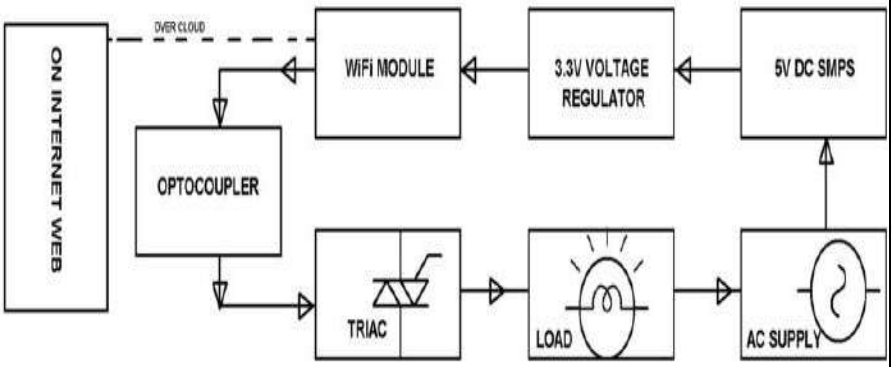
Required Components & Materials



Electrical and Electronic Components

The essential components and materials for home automation using IOT project can be listed as a Wi-Fi module, Opto-coupler, TRIAC, resistors, capacitors, diode, regulator, loads (home appliances). There are various eCommerce websites that are providing facility to purchase all the required components online such as a project kit consisting of individual components essential to design a particular project from www.edgefxkits.com, Edgefx also offers ready-made kit-plug and play type project kits and (Do It Yourself) DIY project kits for engineering students and electronic hobbyists.

Required Blocks for Home Automation Project



Home Automation using IOT Project Block Diagram

The home automation using IOT project consists of various blocks such as power supply, Optocoupler, WiFi module, TRIAC, voltage regulator, SMPS (Switch Mode Power Supply) and load.

Designing DIY Blocks of Home Automation System

There various modules and blocks used for designing home automation using IOT project such as WiFi module, voltage regulator, Optocoupler, TRIAC and so on.

Connecting the Home Automation Circuit

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The home automation using IOT project circuit can be connected using various electrical and electronic components, modules, blocks & connecting wires as shown in the above figure

By
K.Gokul, IV Year/IT

10 Real World Applications of IoT

1. Smart Home
2. Wearables
3. Connected Cars
4. Industrial Internet
5. Smart Cities
6. IoT in agriculture
7. Smart Retail
8. Energy Engagement
9. IOT in Healthcare
10. IoT in Poultry and Farming

IoT IN HEALTHCARE.

1. OpenAPS - closed-loop insulin delivery

One of the most fascinating areas in IoT medicine is the open source initiative OpenAPS, which stands for open artificial pancreas system.

Using the data feed from the CGM(continuous glucose monitor) and a Raspberry Pi computer, own software completes the loop and continuously alters the amount of insulin Dana's pump delivers.

2. Activity trackers during cancer treatment

The Memorial Sloan Kettering Cancer Center (MSK) and cloud research firm Medidata are testing the use of activity trackers to gather lifestyle data on patients being treated for multiple myeloma.

Patients will wear an activity tracker for up to a week prior to treatment and then continuously for several months over the course of multiple treatments.

The trackers will assist in logging activity level and fatigue, with appetite also being logged directly, and all data saved to Medidata's Patient Cloud ePRO app on their personal smart phones.

Using a variety of data gathered day-to-day through wearables or apps is a fairly obvious way that diagnosis and treatment can be improved for many conditions.

This is particularly the case for a disease such as cancer, for which the reaction to therapy plays an important and determinant part in prescribing the right treatment.

3. Connected inhalers

The most immediate use for IoT technology in healthcare is not to assist in diagnoses, though, but to ensure adherence. Adding sensors

to medicines or delivery mechanisms allows doctors to keep accurate track of whether patients are sticking to their treatment plan.

This provides motivation but also clarity for patients. Devices connected to mobile apps allow for patients to receive reminders, as well as to check on their own adherence.

4. Ingestible sensors

Proteus Digital Health and its ingestible sensors are another example of digital medicine.

Again, the chief purpose of this technology, trialled with an antipsychotic and a hypertension pill, is to monitor adherence. However, in this case, the pill dissolves in the stomach and produces a small signal which is picked up by a sensor worn on the body, which again relays the data to a smartphone app.

5. Connected contact lenses

Alcon (part of Novartis) has licensed Google's smart lens technology which involves non-invasive sensors embedded within contact lenses. The lenses may eventually be able to measure glucose levels of diabetes patients via their tears and then store the information in a mobile device, though Novartis backtracked on a plan to test the system.Novartis is also hoping to develop the smart lens to help those with presbyopia, helping to restore the eye's focus.

6. Depression-fighting Apple Watch app

Takeda is testing the use of an Apple Watch app to help patients with major depressive disorder (MDD), starting with a 30-patient trial.

The app, developed alongside Cambridge Cognition, is designed to monitor and assess cognitive function, with the trial set to examine how an app compares with traditional testing and self-assessment

when reporting mood and cognition.Both passive and active data is collected.

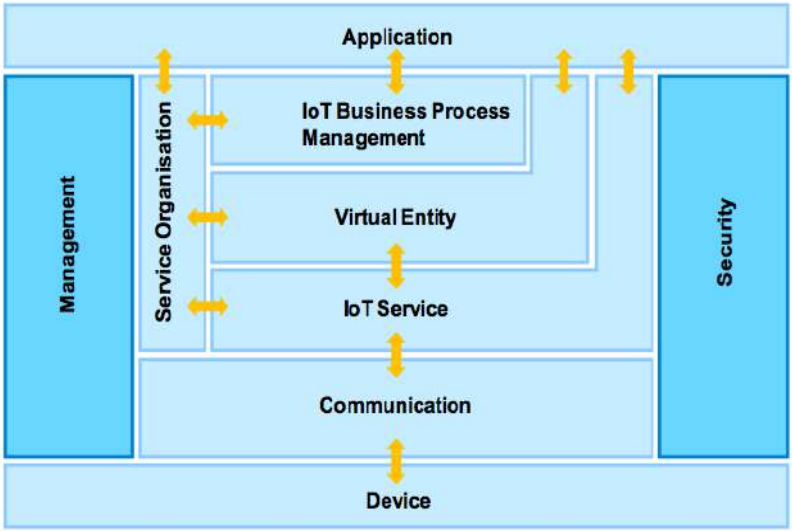
7. Coagulation testing

Roche launched a Bluetooth-enabled coagulation system that allows patients to check how quickly their blood clots.This is the first device of its kind for anticoagulated patients, with self-testing shown to help patients stay within their therapeutic range and lower the risk of stroke or bleeding.

Being able to transmit results to healthcare providers means fewer visits to the clinic.

.By

S.Vijay, IV Year/IT



INTERNET OF THINGS TECHNOLOGIES FOR 2017 and 2018

- **IoT Security** – Gartner predicts that hardware and software advances will make IoT security a fast-evolving area through 2021 and the skills shortage today will only accelerate. Enterprises need to begin investing today in developing this expertise in-house and also begin recruitment efforts. As many security problems are the result of poor design, implementation and lack of training, expect to see market leaders adopting IoT investing heavily in these areas.

- **IoT Analytics** – IoT analytics require entirely new algorithms, architectures, data structures and approaches to machine learning if organizations are going to get the full value of the data captured, and knowledge created. Distributed analytics architectures the capitalize on pervasive, secure Internet of Things (IoT) network architectures will eventually become knowledge sharing networks..

- **IoT Device Management** – The challenges of enabling technologies that are context, location, and state-aware while at the same time consistent with data and knowledge taxonomies

is an area. IoT Device Management will most likely break the boundaries of traditional data management and create data structures capable of learning and flexing to unique inbound data requirements over time.

- **Low-Power, Short-Range IoT Networks** – Low-power, short-range networks will dominate wireless IoT connectivity through 2025, far outnumbering connections using wide-area IoT networks.

- **Low-Power, Wide-Area Networks** – According to Gartner, traditional cellular networks don't deliver a proper combination of technical features and operational cost for those IoT applications that need wide-area coverage combined with relatively low bandwidth, good battery life, low hardware and operating cost, and high connection density.

- **IoT Processors** –Low-end 8-bit microcontrollers will dominate the IoT through 2019 and shipments of 32-bit microcontrollers will overtake the 8-bit devices by 2020. 16-bit processors ever attaining critical mass in IoT applications.

- **IoT Operating Systems** - Minimal and small footprint operating systems will gain momentum in IoT through 2020 as traditional large-scale operating systems including Windows and iOS are too complex and resource-intensive for the

majority of IoT applications. It's been my experience that these operating systems are excellent at exception- and event-driven tasks and can a few support the essential of multithreading as well.

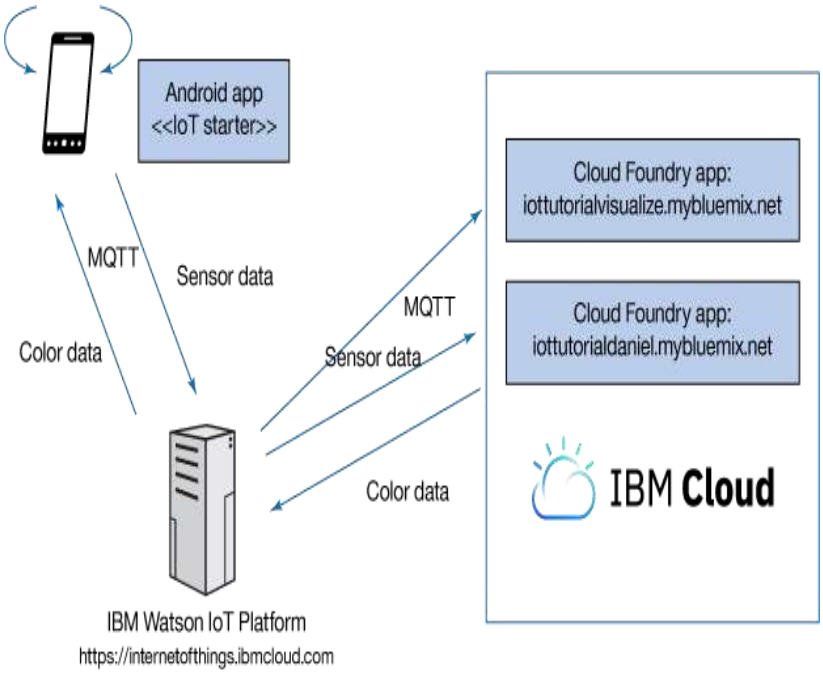
- **Event Stream Processing** - Some IoT applications will generate extremely high data rates that must be analyzed in real time. Systems creating tens of thousands of events per second are common, and millions of events per second can occur in some telecom and telemetry situations. To address such requirements, distributed stream computing platforms (DSCPs) have emerged.

- **IoT Platforms** –IoT platforms bundle infrastructure components of an IoT system into a single product. The services provided by such platforms fall into three core categories. These include low-level device control and operations such as communications, device monitoring and management, security, and firmware updates; IoT data acquisition, transformation and management; and IoT application development, including event-driven logic, application programming, visualization, analytics and adapters to connect to enterprise systems.

- **IoT Standards and Ecosystems** - Although ecosystems and standards aren't precisely technologies, most eventually materialize as application programming interfaces (APIs). Standards and their associated APIs will be essential because IoT devices will need to interoperate and communicate, and many IoT business models will rely on sharing data between multiple devices and organizations.

By

P.Hemalatha,III year/IT



EXAMPLES OF IoT

- A lightbulb that can be switched on using a smartphone app is an IoT device, as is a motion sensor or a smart thermostat in your office or a connected streetlight. An IoT device could be as fluffy as a child's toy or as serious as a driverless truck, or as complicated as a jet engine that's now filled with thousands of sensors collecting and transmitting data. At an even bigger scale, smart cities projects are filling entire regions with sensors to help us understand and control the environment.

- The term 'IoT' is mainly used for devices that wouldn't usually be generally expected to have an internet connection that can communicate with the network independently of human action. For this reason, a PC isn't generally considered an IoT device and neither is a smartphone -- even though the latter is crammed with sensors. A smartwatch or a fitness band might be counted as an IoT device, however.

By

M.Karthika, II Year/IT

A person who never made a mistake never tried anything new.

——Albert Einstein

INTERNET OF THINGS AND BIG DATA

The IoT generates vast amounts of data: from sensors attached to machine parts or environment sensors, or the words shout at our smart speakers. That means the IoT is a significant driver of big data projects because it allows companies to create vast data sets and analyse them. Giving a manufacturer vast amounts of data about how its components behave in real-world situations can help them to make improvements much more rapidly, while data culled from sensors around a city could help planners make traffic flow more efficiently.In particular, the IoT will deliver large amounts of real-time data. Cisco calculates that machine-to machine connections that support IoT applications will account for more than half of the total 27.1 billion devices and connections, and will account for five percent of global IP traffic by 2021.

By

G.Manibharathi, II Year/IT

I can't change the direction of the wind, but I can adjust my sails to always reach my destination.

—Jimmy Dean

INTERNET OF THINGS AND CLOUD

The huge amount of data that IoT applications generate means that many companies will choose to do their data processing in the cloud rather than build huge amounts of in-house capacity. Cloud computing giants are already courting these companies: Microsoft has its Azure IoT suite, while Amazon Web Services provides a range of IoT services, as does Google Cloud.

By

R.Yuvapriya, II Year/IT

INTERNET OF THINGS AND SMART CITIES

By spreading a vast number of sensors over a town or city, planners can get a better idea of what's really happening, in real time. As a result, smart cities projects are a key feature of the IoT. Cities already generate large amounts of data (from security cameras and environmental sensors) and already contain big infrastructure networks (like those controlling traffic lights). IoT projects aim to connect these up, and then add further intelligence into the system.

There are plans to blanket Spain's Balearic Islands with half a million sensors and turn it into a lab for IoT projects, for example. One scheme could involve the regional social-services department using the sensors to help the elderly, while another could identify if a beach has become too crowded and offer alternatives to swimmers. In another example, AT&T is launching a service to monitor infrastructure such as bridges, roadways, and railways with LTE-enabled sensors to monitor structural changes such as cracks and tilts.

The ability to better understand how a city is functioning should allow planners to make changes and monitor how this improves residents' lives.

Big tech companies see smart cities projects as a potentially huge area, and many -- including mobile operators and networking companies -- are now positioning themselves to get involved.

By

S Elangovan, III Year/IT

"To invent, you need a good imagination and a pile of junk."

— Thomas A. Edison

EIGHT IoT ANALYTICS PRODUCTS

Vitria IoT Platform

Vitria's IoT analytics platform enables to transform business operations and boost revenue growth through Faster Analytics, Smarter Actions, and Better Outcomes.

Tellient

Tellient's IoT Analytics gives the whole story with beautiful graphs for humans, organized data for machines, designed for the Internet of Things. Tellient's IoT Analytics helps manufacturers of smart connected devices know what those devices are doing so they can make them better.

ParStream

ParStream's Platform built for scale to handle the massive volumes and high velocity of IoT data. The Platform helps companies generate timely, actionable insights from IoT data by providing more innovative and efficient ways to analyze that data.

IBM IoT Platform

IBM Internet of Things Foundation provides simple, but powerful application access to IoT devices and data to help you rapidly compose analytics applications, visualization dashboards and mobile IoT apps.

Dell Statistica IoT Platform

'Dell Statistica', is capable of delivering wide range of solutions to various sectors say process optimization in manufacturing sector to fraud detection in banking industry and it even allows analytics on the gateway providing faster local insights.

Spunk IoT Platform

It offers a platform for operational intelligence that assists you to search, monitor, analyze and visualize machine generated big data from various websites, networks and other IoT devices. In recent announcement, Splunk is to deliver Real time Analytics and Visualization for AWS IoT Service.

Intel® IoT Analytics Platform

This beta cloud-based analytics system for IoT includes resources for the collection and analysis of sensor data. Using this service, jump-start data acquisition and analysis without having to invest in large-scale storage and processing capacity.

Pentaho IoT Platform

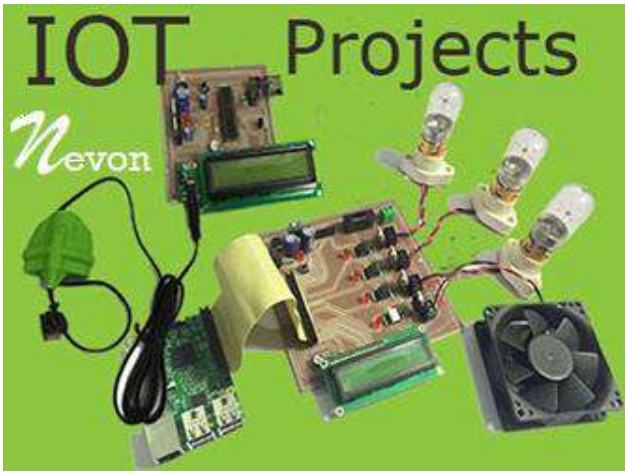
Pentaho provides the ability to blend operational data with data from IT systems of record and deliver intelligent analytics.

BY

S.Mohanraj, II Year/IT

IOT PROJECTS

IOT or internet of things is an upcoming technology that makes use of internet to control/monitor electronic/mechanical devices, automobiles and other physical devices connected to the internet. IOT gives user the ability to control more than digital things easily through a comfortable GUI over the internet.



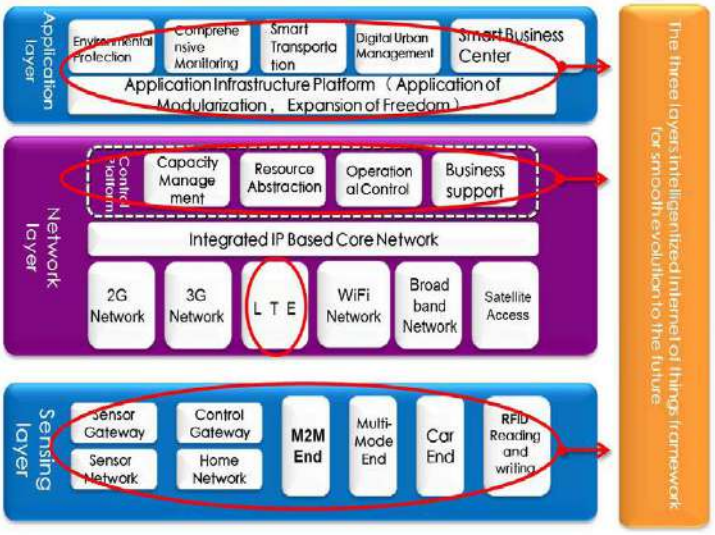
- Smart Dustbin With Iot Notifications
- Iot Smart Mirror With News & Temperature
- Iot Color Based Product Sorting Machine Project
- Iot Garbage Monitoring With Weight Sensing
- Iot Smart Energy Grid
- Iot Asset Tracking System
- Iot Based Icu Patient Monitoring System
- Biometric Attendance System Over Iot

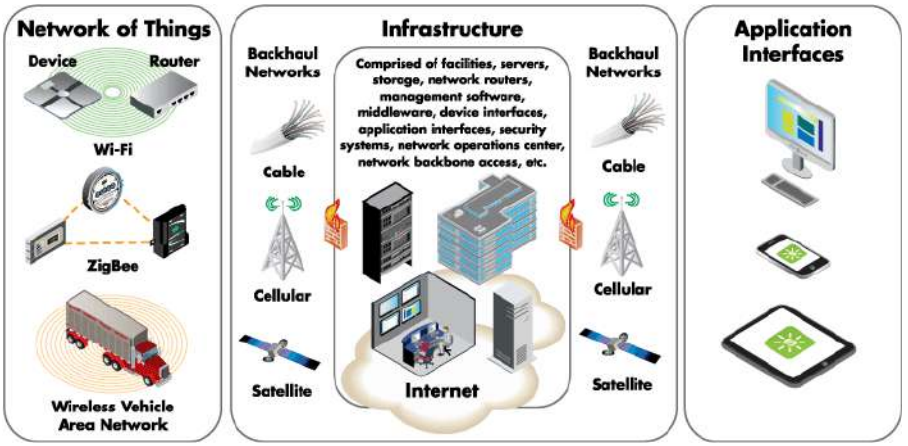
- Iot Gas Pipe Leakage Detector Insect Robot
- Iot Irrigation Monitoring & Controller System
- Iot Electronic Door Opener
- Iot Alcohol & Health Monitoring System
- Iot Liquid Level Monitoring System
- Iot Garbage Monitoring System
- Iot Based Home/office/industry Automation
- Iot Weather Reporting System
- Iot Based Antenna Positioning System
- Iot Based Fire Department Alerting System
- Iot Solar Power Monitoring System
- Iot Streetlight Controller System
- Iot Traffic Signal Monitoring & Controller System
- Iot Industry Automation Using Raspberry Pi
- Iot Underground Cable Fault Detector Project
- Iot Air & Sound Pollution Monitoring System
- Energy Meter Monitoring Over Iot
- Iot Based Person/Wheelchair Fall Detection
- Iot Patient Health Monitoring Project
- Iot Heart Attack Detection & Heart Rate Monitor
- Iot Based Toll Booth Manager System
- Iot Theft Detection Using Raspberry Pi

By

A.Godson,IV Year/IT

IoT ARCHITECTURE





SECURING IoT DEVICES AND GATEWAYS

The Internet of Things (IoT) introduces huge opportunities for businesses and consumers, especially in the areas of healthcare, warehousing, transportation, and logistics. Along with this widespread adoption, developers face new challenges to make sure that IoT applications are sufficiently secure because these applications handle a lot of sensitive data.

IoT security basics

IoT solutions involve a complex network of smart devices, such as vehicles, machines, buildings, or home appliances, that are embedded with electronics, software, sensors, and network connectivity, which enable these "things" to collect and exchange data. The "things" in the Internet of Things allows developers to provide a broad range of new services based on these cloud-enabled, connected physical devices. As IoT applications collect more and more previously unexposed—often private—data, and allow access to various control functions over the internet, security becomes a major challenge. Therefore, an IoT application must:

- **Prevent system breaches or compromises**.

Each tier of the IoT application must implement effective preventive measures to keep the hackers out. For example, you need to *harden* the device to make sure communication from the device to the cloud is secure.

- **Support continuous monitoring**.

Even the best secured systems still leave many vulnerabilities. Also, today's best secured solution (both hardware and software) might not be good enough to prevent attacks in the future. Therefore, you must supplement your security measures with continuous monitoring and constant upgrading of the system to protect against the latest forms of attack.

- **Beresilient**.

Finally, if a breach does occur, damage must be minimized and the system must recover as quickly as possible.

By

S.Pavithra, IV Year/IT

Nothing is impossible; the word itself says "I'm possible"!

—Audrey Hepburn

DEVELOPING SECURED IoT APPLICATIONS

Most IoT solutions consist of three main tiers. IoT solution components that run in each tier need to incorporate specific security measures to protect against various vulnerabilities.

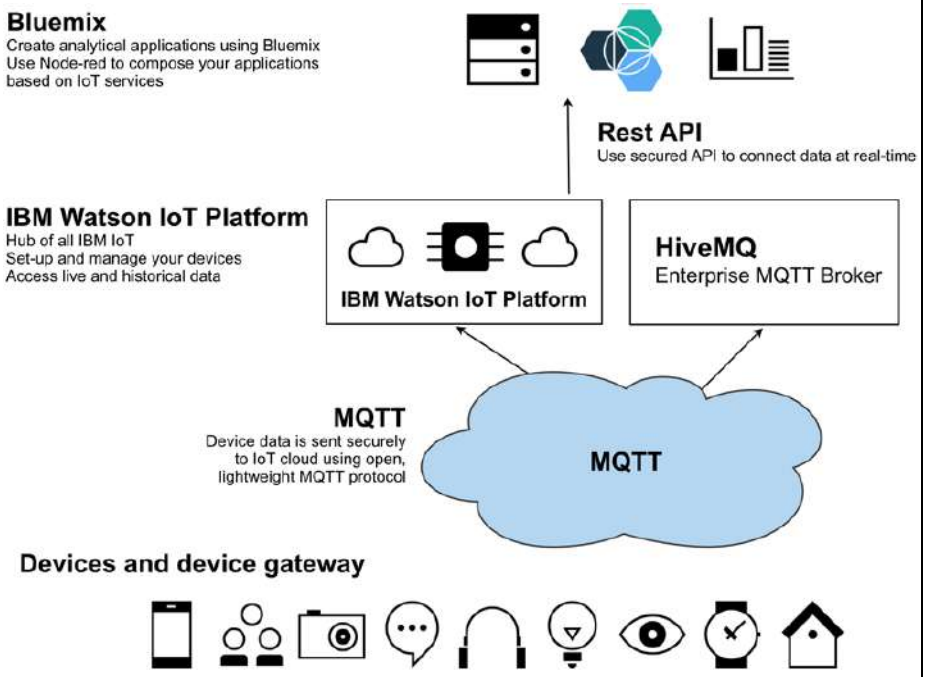
- **Devices/Gateways tier:** Protect against a "fake" server that sends malicious commands, or protect against a hacker that tries to listen to private sensor data being sent from the devices.
- **Network/Transport tier:** Protect against a "fake" device that sends false measurements that might corrupt the data that is being persisted in the application.
- **Applications tier:** Protect against the invalid use of data, or protect against the manipulation of analytical processes that are running in the application tier.

The application layer of an IoT device provides the largest attack surface to hackers. The application layer includes any application that has connectivity with the IoT device, which can include local web applications, cloud-based applications, and mobile apps.

Application security must be an intrinsic part of the software development lifecycle (SDLC) for all IoT applications,

particularly during the design, development, and testing stages. Within the planning or design stage of an IoT application, there must be a formal "top-to-bottom" assessment of the planned application's security and privacy requirements.

The diagram below shows the three tiers of a typical IoT application that uses IBM Watson IoT Platform in the network/transport tier and the IBM Cloud platform in the application tier.



By

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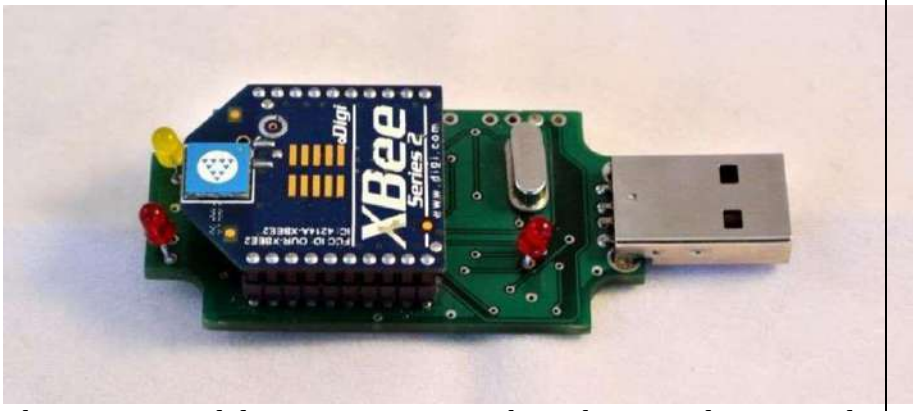
IoT − HARDWARE

The hardware utilized in IoT systems includes devices for a remote dashboard, devices for control, servers, a routing or bridge device, and sensors. These devices manage key tasks and functions such as system activation, action specifications, security, communication, and detection to support-specific goals and actions.

IoT − Sensors

The most important hardware in IoT might be its sensors. These devices consist of energy modules, power management modules, RF modules, and sensing modules. RF modules manage communications through their signal processing, WiFi, ZigBee, Bluetooth, radio transceiver, duplexer, and BAW.



The sensing module manages sensing through assorted active and

passive measurement devices. Here is a list of some of the measurement devices used in IoT:

Devices	
accelerometers	temperature sensors
magnetometers	proximity sensors
gyroscopes	image sensors
acoustic sensors	light sensors
pressure sensors	gas RFID sensors
humidity sensors	micro flow sensors

Wearable Electronics

Wearable electronic devices are small devices worn on the head, neck, arms, torso, and feet.

Smartwatches not only help us stay connected, but as a part of an IoT system, they allow access needed for improved productivity.

Current smart wearable devices include:

- **Head** – Helmets, glasses
- **Neck** – Jewelry, collars
- **Arm** – Watches, wristbands, rings
- **Torso** – Clothing, backpacks
- **Feet** – Socks, shoes

By

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IoT − SOFTWARE

IoT software addresses its key areas of networking and action through platforms, embedded systems, partner systems, and middleware. These individual and master applications are responsible for data collection, device integration, real-time analytics, and application and process extension within the IoT network. They exploit integration with critical business systems (e.g., ordering systems, robotics, scheduling, and more) in the execution of related tasks.

Data Collection

This software manages sensing, measurements, light data filtering, light data security, and aggregation of data. It uses certain protocols to aid sensors in connecting with real-time, machine-to-machine networks. Then it collects data from multiple devices and distributes it in accordance with settings. It also works in reverse by distributing data over devices. The system eventually transmits all collected data to a central server.

Device Integration

Software supporting integration binds (dependent relationships) all system devices to create the body of the IoT system. It ensures the necessary cooperation and stable networking between devices. These applications are the defining software technology of the IoT network because without them, it is not an IoT system. They manage the various applications, protocols, and limitations of each device to allow communication.

Real-Time Analytics

These applications take data or input from various devices and convert it into viable actions or clear patterns for human analysis. They analyze information based on various settings and designs in order to perform automation-related tasks or provide the data required by industry.

Application and Process Extension

These applications extend the reach of existing systems and software to allow a wider, more effective system. They integrate predefined devices for specific purposes such as allowing certain mobile devices or engineering instruments access. It supports improved productivity and more accurate data collection.

By

S.Mohana priya,III Year/IT

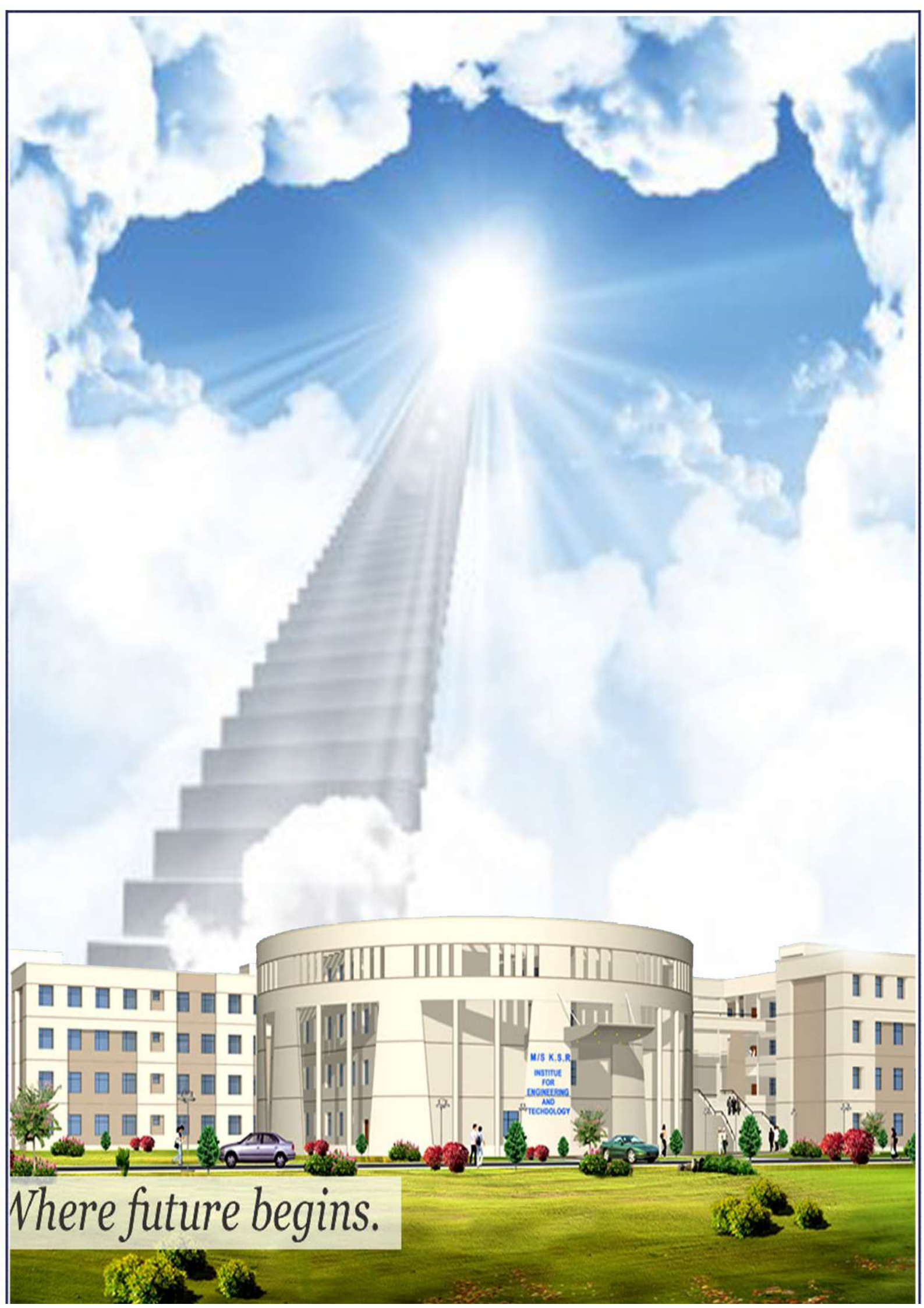

IOT ANALYTICS
Insights that empower you to understand IoT markets
10 IoT predictions for 2018
1 "Vertical vs. Horizontal" IoT Platforms War
2 Refinement of IoT cloud and data lake creation strategies
3 China emerges as leading IoT adopter
4 Few new IoT success stories
5 More connectivity options for IoT device makers
6 Increased use of Analytics & AI
7 Some consumer IoT devices will violate GDPR rules
8 Firms get "real" about blockchain
9 "IoT for sustainability" will become a new theme
10 Blockchain-based artificial edge intelligence (BAEI) hits the mainstream*

Program Outcomes (POs)

PO1	**Engineering Knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the IT enabled solution of complex engineering problems.
PO2	**Problem Analysis:** Identify, analyze and provide solutions to the problems reaching substantiated IT enabled conclusions.
PO3	**Design/Development of Solutions:** Design solutions for complex engineering problems and design system components or processes that meet the desired needs within realistic constraints.
PO4	**Conduct Investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	**Modern Tool Usage**: Create, select and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	**The Engineer and Society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	**Environment and Sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	**Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.
PO9	**Individual and Team Work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	**Communication:** Communicate effectively on engineering activities with the engineering community and with society.
PO11	**Project Management and Finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	**Life Long Learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes(PSOs)

PSO1	**Programming Skill**	Work as Software Engineers for providing solutions to real world problems using programming languages and open source software.
PSO2	**Web Designing Skill**	Ability to use the web designing skill to establish new solutions for the societal needs.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