

Smart Cities

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Introduction to Smart cities

Content:

- About Smart cities
- Definition of smart cities.
- Objective
- Component of smart cities system

Smart Cities

- Smart city was introduced in 2008 by IBM with the theme of “Smarter Planet Initiative”.
- In 2009, the concept of smart cities was carried out,
- After the year of 2009, many countries like- **UAE, SOUTH KOREA, and CHINA** begin to invest heavily for research and formation of these smart cities.

Smart Cities:

→ In case of india, proposed smart cities are:

KOCHI IN KERALA

AHMEDABAD IN GUJARAT

AURANGABAD IN MAHARASHTRA

MANESAR IN DELHI NCR

Smart Cities

- Smart city is an urban area
- The different type of data collection sensors are used to provide information and to manage property and resources efficiently.
- The data is collected from citizens and devices.
- The collected data is processed and analyze to manage
- Traffic and transportation systems, power plants, water supply networks, waste management, information systems, schools, libraries, hospitals, and other community services

Smart Cities

- Represented by the strategic, systematic and coordinate implementation of modern ICT application.
- Cities will have sustainable economic development
- Benefits everyone including citizens, businesses, government and the environment.

Objectives

A major objectives of smart cities is:

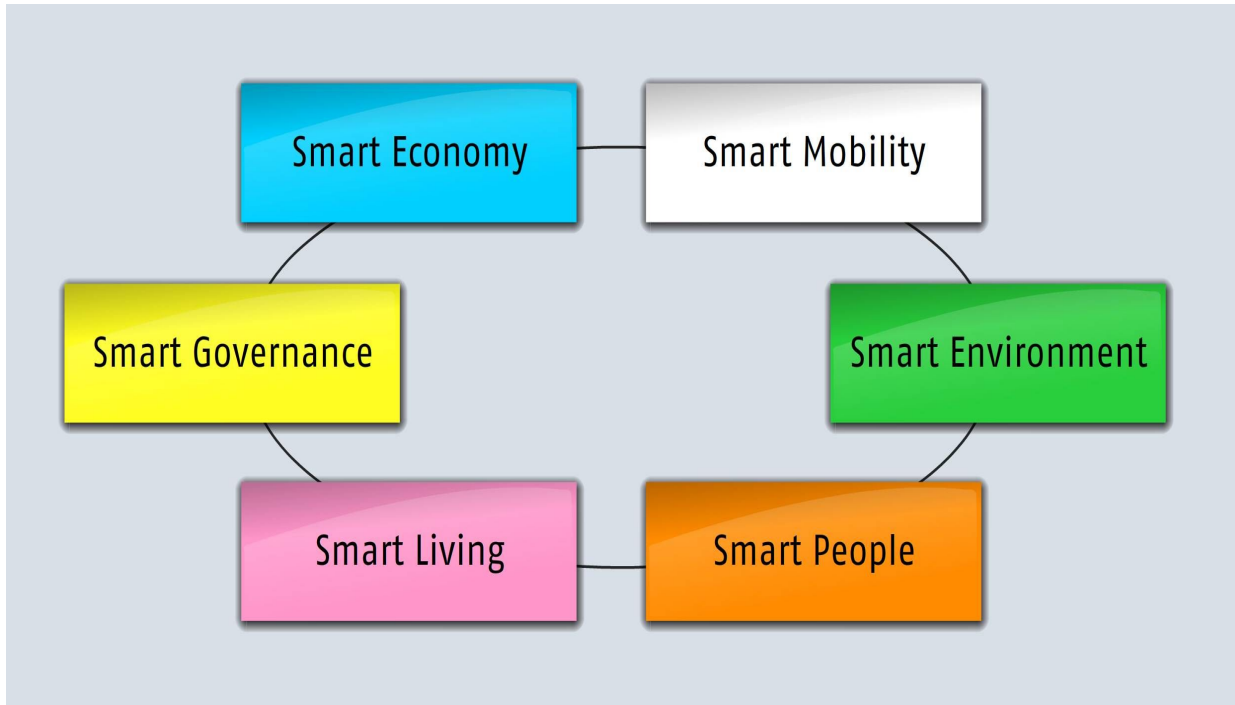
Triple sustainability :

- a. Social
- b. Economic
- c. Environmental issues

It is achieved by :

Modern ICT , the internet and expansion of data which enhance the working and living condition of citizens.

Smart City System



Smart City System

→ Smart People-

1. Higher education
2. Creativity skills
3. Ability to learn lifelong
4. Open mindedness
5. Public life participation
6. Flexible to adapt new changes

Smart City System

→ Smart City Economy-

1. High Productivity
2. Flexible worker market
3. Low Unemployment rate
4. High business activities
5. More commercial services

Smart City System

→ Smart Mobility-

1. Developed infrastructure such as bridges, highways, metros
2. Intelligent transportation system
3. More transport safety
4. High network availability everywhere

Smart City System

→ Smart City Environment-

1. Beautiful Natural Environment
2. Low Pollution
3. Non- renewable resource management
4. High use of natural resources such as wind energy, tidal energy, solar energy.
5. Healthy and Protected environment

Smart City System

→ Smart Government-

1. Participation of citizens with authorities in decision making
2. Availability of all public utilities : electricity, gas, water and sewerage.
3. Transparent Political strategies
4. E-Governance

Smart City System

→ Smart Living-

1. Diverse Cultural facilities
2. Educational facilities
3. Tourist attractions
4. Health condition
5. Housing quality
6. Leisure Facilities : cinemas, sports arenas, public libraries, and multiplexes

Smart cities

Present and future

Content:

- Smart city-Present and Future
- Stakeholder
- Platform
- Smart city-Multi Level Architecture

Smart City-Present and Future

- In **1900**, only **14%** of the world population lived in an urban area.
- Nowadays more than half of the planet's population exist in cities and this number is expected to reach **70% in 2050**.
- By 2025, there will be at least **40** megacities

Stakeholder:

- It is physical or legal entity empower by the city' authorities to use , manage and contribute to the smart cities physical and social infrastructure.
- Two group of stakeholder-
 1. Direct stakeholder
 2. Indirect stakeholder

Stakeholder:

1. Direct stakeholder - city as a customer

It include citizens, city authority, government management, infrastructure, service delivery, local enterprise etc.

2. Indirect stakeholder - enable city as a customer

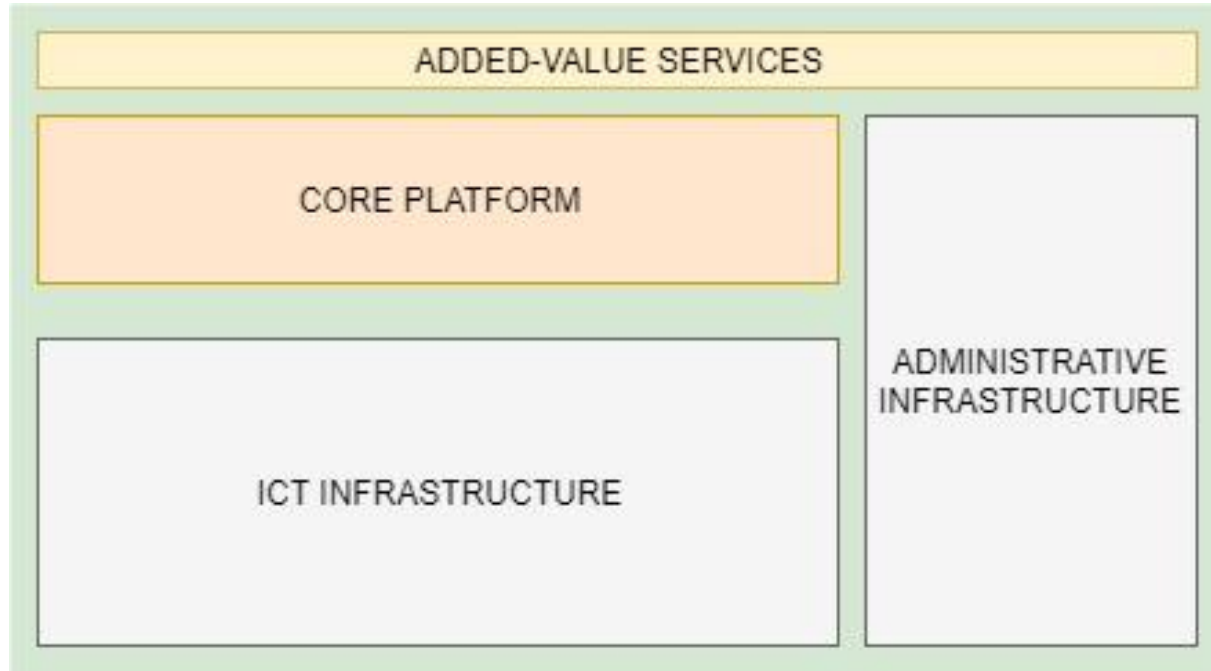
It include technology and application provider, system integration, infrastructure services providers and operators,

Smart City Platform:

Smart city platform-

- It is high level architecture of the future smart city.
- This platform provide both production and consumption of added value for all the involved participants, ranging from humans to smart devices.

Smart City Platform:



Smart City Platform:

1. ICT infrastructure-

- It integrate different infrastructure layers.
- It have ability to exchange and use information between stakeholder.
- It consist of all physical and software component for data gathering, processing ,communication, such as a sensor ,IOT gateway, Cloud processing and software services.

Smart City Platform:

2. Core platform

- It is combiner to integrate all the smart functionality and enabling their seamless functioning.
- It include-
 1. Complex coordinated activities.
 2. Incentive management.
 3. Monitoring and data analytics.etc

Smart City Platform:

3. Value added services-

- It act as brain of smart city
- It manage the infrastructure and facilitate the value generation process.
- It offer better services to their citizens.

For example-mobile delivery interference, billing and collection,, operator services, application development.

Multi-Level Smart City Architecture

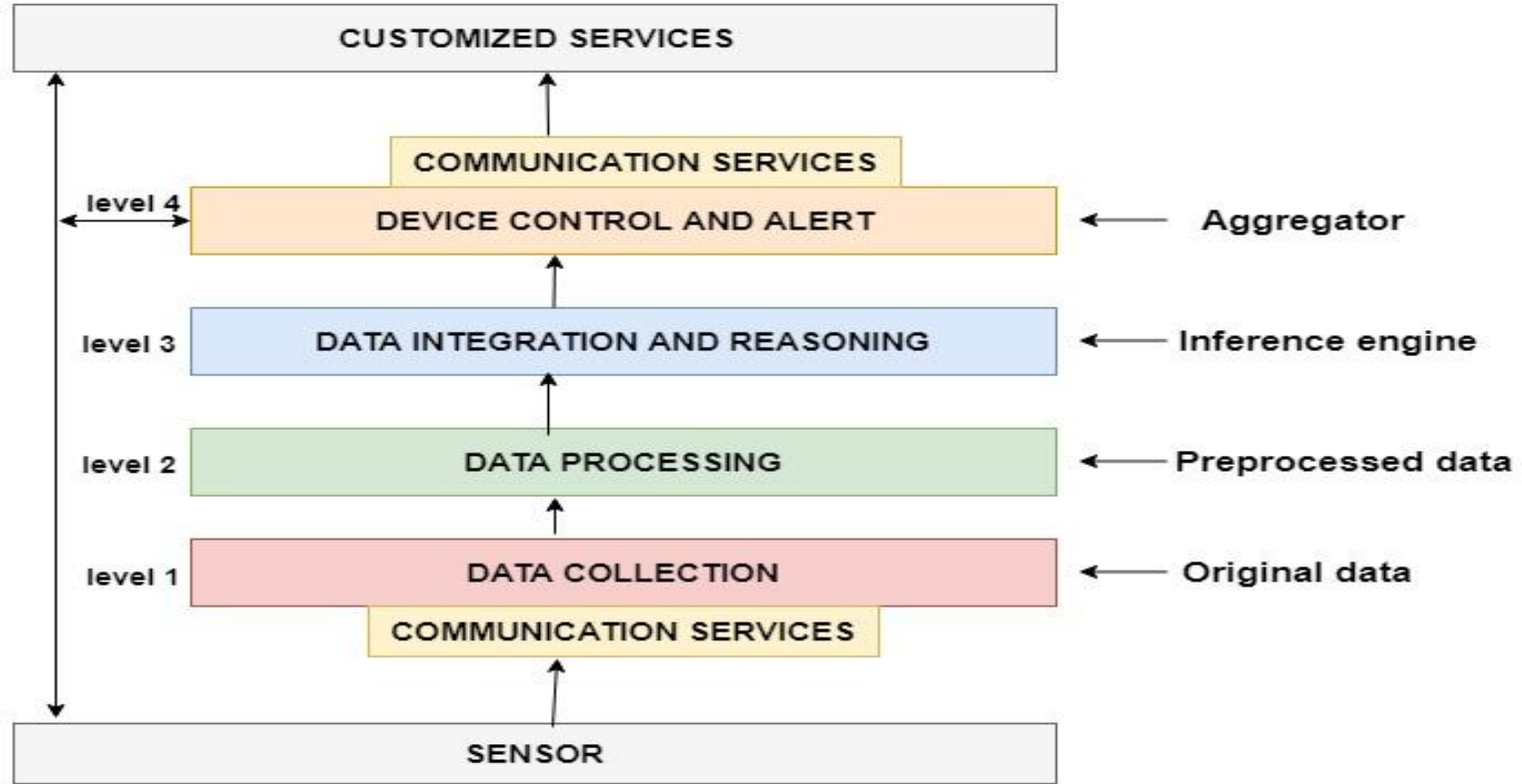
- is projected to help the interaction between wireless sensor network and ICT(Information and communication technology).
- help to expand the very large amount of data and information by using different technologies.

Multi-Level Architecture:

→ Four levels are consist:

1. Data collection
2. Data processing
3. Data integration and reasoning
4. Device control and alerts

Multi-level Architecture:



Multi-Level Architecture:

Sensor - is a primary source of information generation, in which raw data is sensed by sensor node and then transfer to the level 1

- **DATA COLLECTION-** raw information is collected from sensor
- **DATA PROCESSING-**convert the collected information in different format.
- **DATA INTEGRATION AND REASONING-**integrate the data using different technologies
- **DEVICE CONTROL AND ALERT-**utilized the data in many ways such as input ,output, alert and warning messages.

The customized service or data is transfer to different devices of smart city

Technologies Of Smart City

Content :

1. Big data
2. IoT
3. 5G
4. Autonomous vehicle technology
5. Cloud computing
6. ZigBee
7. Satellite communication.

Technologies Of Smart Cities:

1. **Big data:** big data are too big in terms of

1. High volume

2. Velocity

3. Variety

→ Big data plays an important role in processing data collected through IoT devices,

→ Data is analyzed by sensor that is installed all over the city.

Technologies Of Smart Cities:

2. IoT (Internet of things) :

- IoT is one of the most important infrastructure in smart cities,.
- It provide user customized services with the combination of wireless and wired internet network.
- Data is collected by various IoT devices which is send and receive by other smart devices.
- IoT technology use various devices such as smart phones and sensors to monitor, manage and control the smart cities.

Technologies Of Smart Cities:

3. 5G:

- It stand for 5th generation of wireless cellular network.
- Aim of this network is to reach the high speed with low power network and low delays
- It Provide
 1. Faster data speed,
 2. Much higher data capacity
 3. Better coverage

Technologies Of Smart Cities:

4. Autonomous vehicle technology

- This technology enable automobiles to execute safe and efficient commands automatically to operate.
- Variety of embedded sensor will used to make decision and to manage vehicle's physical control element ..

such as- steering, acceleration, breaking and signaling system

Technologies Of Smart Cities:

4. Autonomous vehicle technology

- For example-[CV2X Technology](#), it allow wireless exchange of data among vehicles traveling in the same domain for safety improvement.
- It offer important benefits to social welfare- [saving lives, reducing crashes, fuel consumption, and pollution,](#)

Technologies Of Smart Cities:

5. Cloud computing -

- It is an information technology
- It is enable to share pooled computing resources over the internet with multiple user.
- Users can access it from anywhere and from any device.
- It adjust the allocation of resources according the need of user.
- It is a hardware independent framework designed for future growth and development of smart cities.

Technologies Of Smart Cities:

6. ZigBee:

- Zigbee is wireless technology.
- Designed with using sensor and control devices.
- This technology also integrated with radio and microcontroller.
- It uses high level communication protocol to create wireless personal area network (WPAN)
- It is simple and less expensive technology

Technologies Of Smart Cities:

7. Satellite communication:

- It is used for monitoring and mapping direction.
- It has ability to broadcast multiple points and also to makes efficient signal delivery on earth.
- Satellites will be used in a number of ways in smart cities, from data communications and telecommunications to broadcasting.

Requirement of Smart City

Content:

- Requirement of smart city
- Wireless technology
- 5G
- Open spectrum
- IoT technology

Requirement Of Smart City:

- **Requirement of smart city**-it essentially require a control network,to control the flow of resources.
 1. The network must be flexible to reconfigured, so that multiple devices can be added and removed continuously.
 2. The network must support many different devices with varying capabilities.
 3. The network must be available at every corner of the city.

Requirement Of Smart City:

1. **Wireless technology**-smart city trust on wireless and mobile network for providing services like
 - Health care
 - Real-time traffic monitoring
 - Security and safety
 - Managing the environment

Requirement Of Smart City:

1. **5G wireless technology**-it will be the main part of smart city communication infrastructure.

5G Features-

1. More- more bandwidth, more antennas
2. Better- better interference management, better scheduling
3. Faster- higher data rates
4. Cheaper - increased support for low capacity device.

Requirement Of Smart City:

1. 5G wireless technology-

- Sensor usually produce data at a low rate .
- An additional feature of 5G is heterogeneous network.
- Hetnets contain networks such as cellular, wifi, bluetooth.
- Hetnets provide excellent utilization of network and cause fusion of different data streams.

Requirement Of Smart City:

2. Open spectrum-

- It is the most important need of smart city,
- Currently, in a “fixed” spectrum regime, each spectrum band is allocated for a specific purpose to a particular technology.
- As our need change to “open” spectrum, so our regulatory regime.
- A flexible open spectrum will provide devices, a more freedom to choose the spectral bands.
- The device can use any available spectral band at any time for the efficient utilization of spectrum.

Requirement Of Smart City:

3. IOT-

- stand for internet of things
- It is new technology in the history of network computing, that reflects changes in device usage.
- It has ability to provide valuable and beneficial information by various user devices through wireless and wired internet network.

Requirement Of Smart City:

- **IOT** has many inbuilt technologies:
- **IPV6**- contain expended address space, so that individual devices may be addressed without network address translation (NAT).
- **M2M**- provide direct communication between devices by using any communication channel, it may be wire or wireless.
- **WSM**- contain dedicated sensor for monitoring and recording the physical condition of the environment by arranganging the collected data at central location.

Requirement Of Smart City:

→ **MANET-** In this network each device is free to move independently in any direction.

In this network, it become necessary of wireless sensor to form their own network topologies i.e **round safety ,peer to peer messaging.**

→ **CR-** it is a type of wireless sensor

It will not use the network layer, but at the physical layer it use open spectrum and utilize it efficiently.

Its main function is to avoid user interference.

Contribution Of IoT And Roadmap Of Cyber Human Smart City

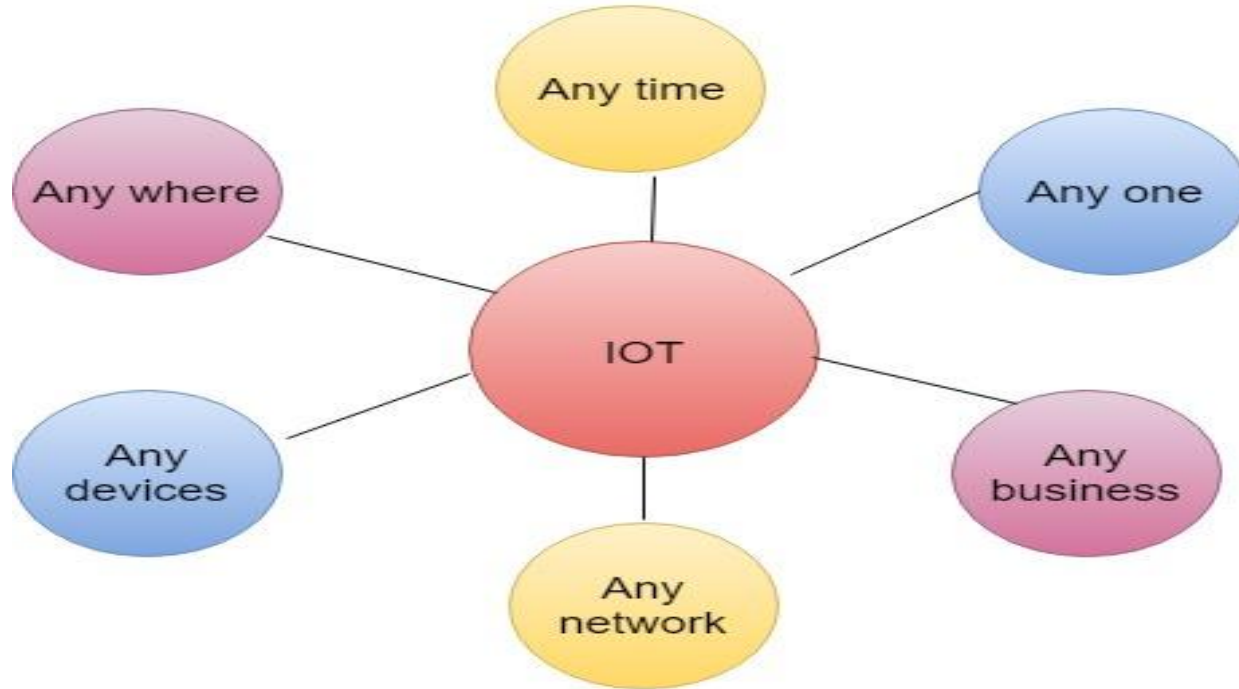
Content:

- Contribution of IoT
- Security and privacy
- Application of IoT
- Roadmap of cyber human smart city

Contribution of IOT:

- In 2017, about 1.6 billion IoT component and devices were used in smart cities, that means an increase of 39% compared to 2015.
- In 2017-2018, The number of IoT component and devices are expected to show an increase of 42% and 43% respectively.
- By 2018, about 3.3 billions IoT components are expected to be utilized in smart city.

Internet of things :



Contribution of IoT:

→ Security and privacy-

1. **Security Concern in IoT:** The security concern in IoT arise due to different cyber attacks on network.

There are several threats in the security of IoT

1. Front end sensor and equipment
2. Network
3. Back-end of IT systems

Contribution of IoT:

→ Security and privacy-

2. **Privacy concern in IoT-** Privacy is needed to protect the device, during communication and processing. It is helpful in disclosing the sensitive information.
 1. Privacy in device
 2. Privacy during communication

Contribution of IoT:

→ Application of IoT-

1. Home automation
2. Smart transport in smart city
3. Health and fitness
4. Smart environment and agriculture.

Roadmap of Cyber Human Smart City

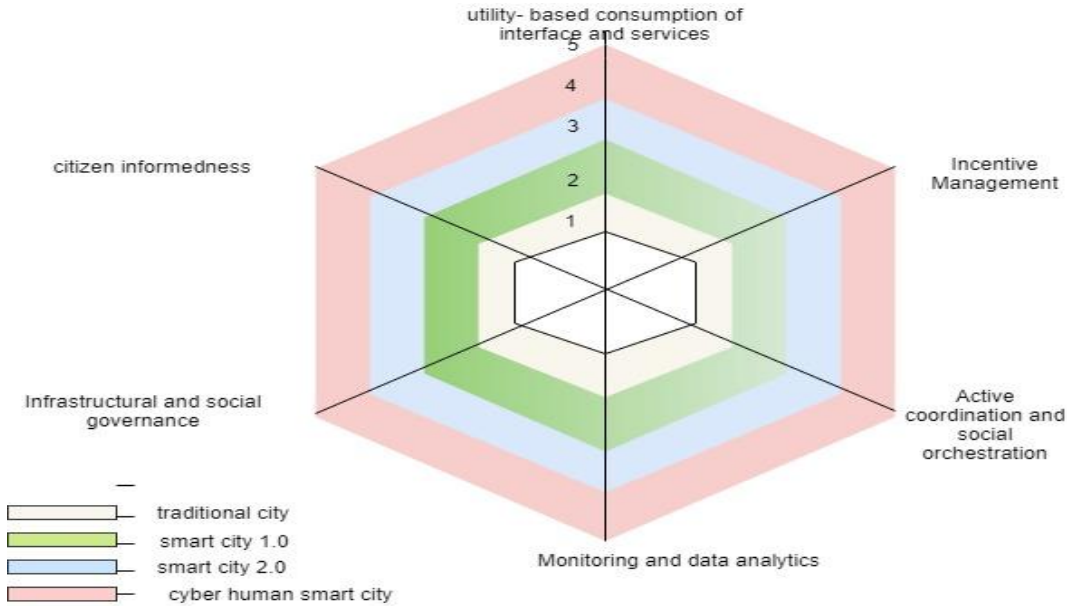
- A number of technical coordinator are required in this process.
- It support equal participation and integration of human, smart devices and existing city facilities.
- This roadmap allow smart city for more horizontal integration and also fuel the value generation process.
- This make smart city as a rich and self sustained ecosystem that facilitate the production and consumption of generated values.

Roadmap of Cyber Human smart city

→ It is categorized into six main group:

1. Provisioning and utility based consumption of interface and services.
2. Incentive management
3. Active coordination and social orchestration
4. Monitoring and data analytics
5. Infrastructural and social governance
6. Citizen informedness

Roadmap of cyber human city:



IoT

Content:

- Architecture of IoT

Architecture of IOT:

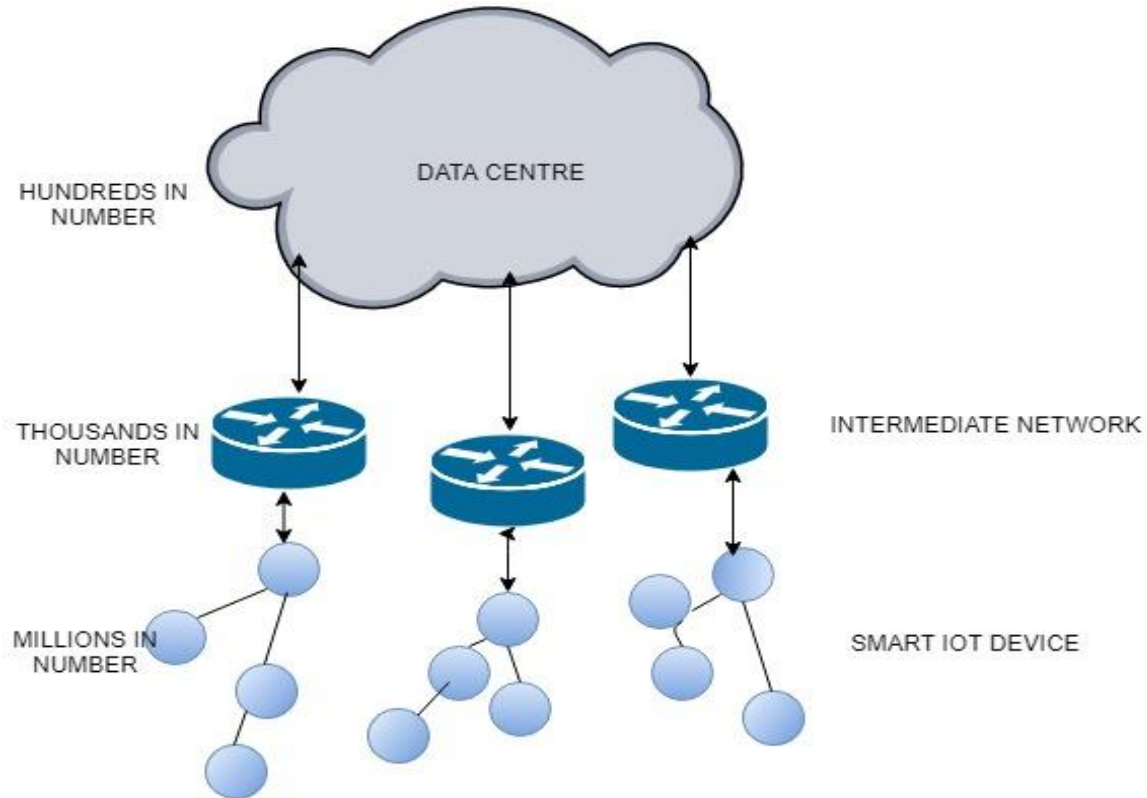
- it is based on embedded system, that is connected to the internet
- This architecture connect physical things to internet
- Make it possible to monitor, manage and control the sensor data.
- It define individual element of IoT, i.e sensing, communication, computation, services etc.

Architecture of IOT:

The complete IoT architecture divided into three different layer

1. Cloud data centre
 - Service layer
 - Interface layer
2. Communication (intermediate network) layer
3. Smart IoT device

Architecture of IOT :



Architecture of IOT:

Component of IoT architecture

1. Cloud data centre
 - Service layer
 - Interface layer

Architecture of IOT:

→ Service layer of cloud data center consist of four different layer:

1. Sensing layer
2. Network layer
3. Service layer
4. Interface layer

Architecture of IOT:

1. Sensing layer-

- This layer is integrated with hardware object (i.e sensor) to sense.
- In which more and more devices are equipped with RFID([radio frequency identification](#)) or intelligent sensor, to make easier connection between different things
- This layer help to track devices easily.

Architecture of IOT:

1. Sensing layer-

There are few factor ,that need to be consider in sensing layer

1. **Deployment** - shows that device need to deployed randomly.
2. **Heterogeneity**- shows that device have different properties.
3. **Communication** - shows that need to communicate each other in order to get.
4. **Network** - shows that network must access different topology for data transmission process.

Architecture of IOT:

2. Network layer-

- This layer help to connect all thing together and share information with other connecting things
- is capable of combining information from current IT infrastructure.
- It provide reliable services (i.e Qos- quality of services) for different user or application.

Architecture of IOT:

- **Automatic assignment of the device is major task, but there are some issue related to network layer**
 1. Network management technologies
 2. Network energy efficient
 3. Qos requirement
 4. Security and privacy

Architecture of IOT:

3. Service layer-

- This layer creates and manage services requirement according to user need.
- It is developed by various organization
- Role is to identify common application requirement, that provide functionality to integrate services and application in IoT.
- This service layer run directly on the network and find new services for an application.

Architecture of IOT:

4. Interface layer-

- This layer provides interaction method to users and application.
- It is used to describe the specification between application and services.

Smart City Future Internet System Design

Content :

- Introduction of cloud and IoT technologies
- Cloud based IoT functional model
- FIWARE
- NDN-(NAMED DATA NETWORKING)
- NDN applications

Future Internet System Design:

- **Introduction of cloud computing and IoT technology-** it is main technology that is used to transform the living or working environment into new model
- It is characteristics by services for automated and smarter management of infrastructure and machine by interacting with people.

Infrastructure management like -houses, factories etc

- Cloud computing offer a variety of services including hardware and software.

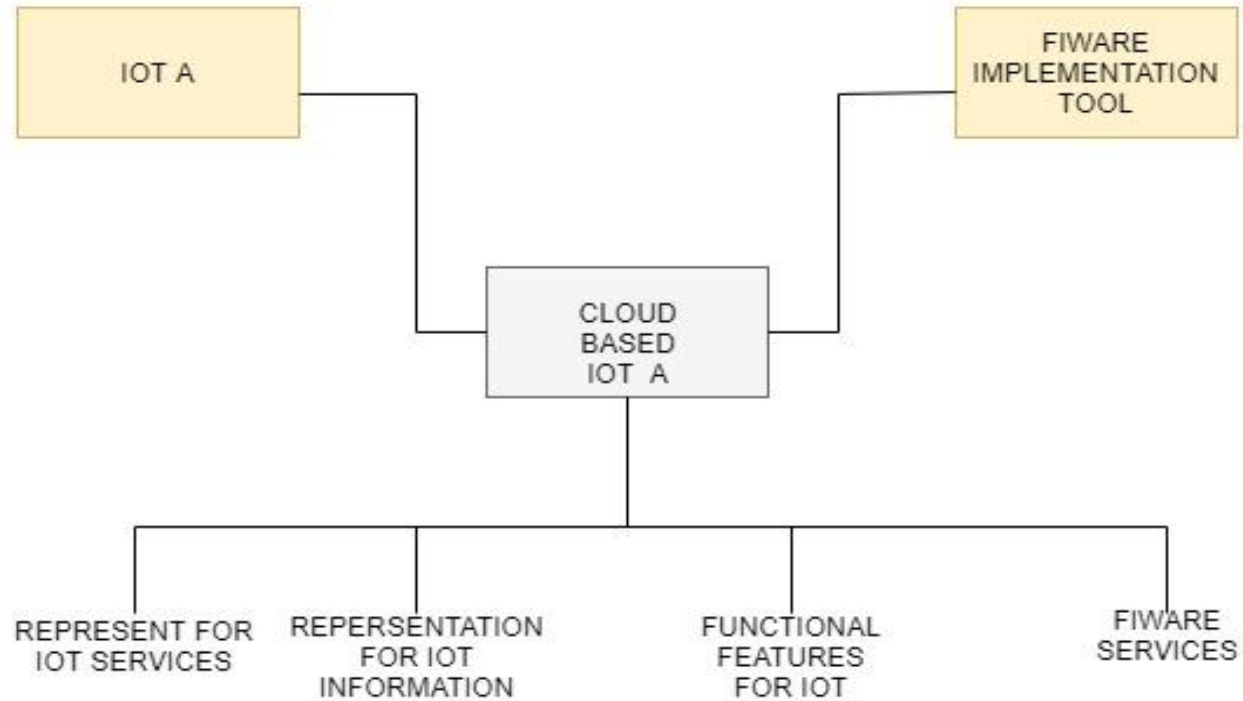
Future Internet System Design:

- The concept of cloud computing has emerged toward developing future internet application tools and services for next generation system that can be easily reused in smart city application.
- There are number of domain, in which FI-PPP Project have been applied to validate and test features to build a smart system for,
 1. Health care
 2. Business collaboration
 3. Network creativity
 4. Smart energy

Future Internet System Design:

- **Cloud based IoT functional model**- the aim of this model is to handle the complexity of communication in heterogeneous IoT environments
- This model will provide significant advantages as follows:
 1. Process management
 2. Service organization
 3. Virtual entities
 4. Management
 5. Communication

Future internet system design:



Future Internet System Design:

- **FIWARE-** is an open source platform which provide access to real time content information that will describe what is going on in the city.
- It offer a new method of designing tools for emerging needs of future IoT.
- Other benefits includes:
 1. Cost effective infrastructure for IoT
 2. Cloud computing at much cheaper rate than traditional approaches.

Future Internet System Design:

- FIWARE moves future internet application design a step forward by large scale cloud services to built upon the concept of scalability and elasticity.
- It help to develop public services, that increases interoperability and enable incorporation of resources and services independent of their location.

Future Internet System Design:

- **Named data network (NDN)**- is future internet architecture, that is related to CCN (content centric network), CBN (content based network), DON (data oriented network), ICN (Information centric network)
- These all are funded by US future internet.
- The idea of NDN is to transform the existing shape of IP (internet protocol).
- In NDN, IP will have a unique name and will be independent from a location

Future Internet System Design:

→ **NDN-based application-** there are number of application that contribute to built a smart city.

1. NDN in IoT for smart cities
2. Smart grid
3. WSN (wireless sensor network)
4. MANET (mobile adhoc network)
5. VANET (vehicular adhoc network)

Future Internet System Design:

- **NDN in IoT for smart cities-**
- In this technology number of devices are connected to internet and the connection between device make them smarter.
- This also help to exchange and process the information to other device freely.

Future Internet System Design:

→ Small Grid-

→ In this computer based technology, integrate advance communication control and automation, that regulate and manage the utility of electricity.

Component of smart grid are:

1. Smart meter.
2. Smart power distribution
3. Smart substations

Future Internet System Design:

- **WSN (Wireless Sensor Network)-**
- It is integral part of IoT
- It consist of inexpensive and large number of devices spread or installed in sensing area
- These devices are used to monitor the environment physical parameter.

Future Internet System Design:

- **MANET (Mobile Adhoc Network)-**
- Is a technology in which each device is free to move in any direction
- It is self configuring ,self healing ,infrastructure-less network of mobile devices connected wirelessly.
- Manets have highly dynamic and autonomous topology.
- It has a routable networking environment on top of a Link Layer adhoc network

Future Internet System Design:

- **VANET (Vehicular Adhoc Network)-**
- It is created by applying the principles of MANETs for creating wireless network for Vehicle-to-vehicle (V2V) communication.
- It plays important role in everyday life by providing services related to road safety, navigation and other roadside services. .
- VANETs are a key part of the intelligent transportation systems (ITS) framework.
- One of the most famous characteristics of VANET is WAVE(wireless access in vehicles environment)

Smart Cities Impact on Government

Content:

- Introduction
- Role of smart cities in domination (i.e government)
- Benefits
- Challenges

Smart Cities impact

Introduction-is an innovative technology that is initiated by the government

TOWARD IMPROVING:

1. The quality of life.
2. Attracting people.
3. Investment.

Role Of Smart Cities In Domination

- Smart city is helping the government in monitoring, understanding, analyzing and subsequently planning the city in order to improve efficiency and quality of life.
- ICTs (information and communication technologies) allow to enhance the effectiveness of electronic governance.

Benefits

1. Sustainability

Quality of life

Environment

2. Urban development

Transport

Infrastructure

Benefits

3. Entertainment

Tourism

Leisure and recreation facilities

4. Public participation

Social media

Crowdsourcing

Challenges

Human issue

1. Cultural issue
2. Communication issue
3. Behavioral issue
4. Social issue

Security issue

1. Crime and disaster
2. Privacy issue
3. Authentication issue

Challenges

Technology issue

1. Hardware and software in-compatibility
2. Lack of detection of error in technology

Acquirement of Electronic Public Services

Content:

- Introduction
- Guidelines of smart cities.
- E- services by government of india.
- Several e-services for its citizens.
- E-government
- E-filing.
- Challenges to e-government acquirement.
- E-government growth.
- Advantage of e-government.

Introduction of E-Services For Citizens

- The main aim of providing mechanism for e-governance is to ensure their development and implementation
- ICT is increasing all over the world ,internet is major change of modern human history.
- It combine various capabilities of services for their citizens.
- ICT, help to develop various countries government operation i.e back office processes,internal and external business process and inter-government interaction within the whole government body

Introduction Of E-Services For Citizens

- Use different technology to make interaction between citizens and other government agencies.
- It depend on the role of stakeholder
- E -government Classification: depend on the role of stakeholder **i.e**
 - ◆ **G2C**(government to citizens)
 - ◆ **G2B**(government to business)
 - ◆ **G2E**(government to employ)
 - ◆ **G2G**(government to government)

Guidelines of smart cities in india:

- In late **2014**, government of india released a program called **digital india**.
- In **2015**, indian government declared a new beginning of smart cities mission, especially for economic growth and to enhance quality of life.
- The plan is to develop **100 smart cities across india in phase 1** of this beginning.
 - ◆ **Phase 1**, will focus on satellite town of metropolitan cities.
 - ◆ Develop and modernizing the existing midsize cities.

E- services by government of india:

- There are three organisations focused on e-government initiative and providing e-services according to government of india notification.
- It is provided by **ITD (ministry of finance)**, **MEA (ministry of external affair)**,and the **MCA(ministry of corporate affairs)**.

E-services for citizens:

→ There are several e- services for citizens.

1. Child

Birth certificate.

Health care

2. Student

School admission

Scholarship

E-learning

Examination result

E-services for citizens:

3. Youth

Employment services

Vehicle registration

Driver license

Passport /visa

4. Family

Agriculture

Land record

Property registration

Marriage certificate

E-services for citizens:

5. Old age

Pension

Insurance

Health care

Death certificate

Electronic Public Services:

→ E-government system functionality-

1. Support to electronic services
2. Information about citizens and their feedbacks
3. City administration portal

Electronic Public Services:

→ E-filing-

It is possible to transmit information electronically, using the internet as a stakeholder.

Challenges to e-government:

1. Cost
2. Skill barrier
3. Technical
4. Business
5. Legal
6. Political crisis/trust issue
7. Usability

E-Government Growth:

There are four stages of development mentioned by **LAYNE AND LEE'S MODEL OF E- GOVERNMENT DEVELOPMENT STAGES.**

1. Catalogue.
2. Transaction.
3. Vertical integration.
4. Horizontal.

Advantage of e-government

- Is able to offer an increased database of public service to citizen.
- Provide efficient and cost effective service.
- Government transparency

Mobile Crowd Sensing

Content :

- Introduction
- Categories
- Architecture
- Application
- Issues and challenges
- Crowd sensing framework

Mobile Crowd Sensing:

- **Introduction**; it is technique, where a large number of individuals having mobile devices, which are capable of sensing and computing,
- It collectively share data and extract information to measure and map, and analyze according to the occurrence of common interest.
- These devices have computational facilities as well as capability of uploading data to internet.
- These devices is built with many sensors like accelerator, gyroscope, digital compass, light sensor, bluetooth etc.

Mobile Crowd Sensing:

→ **Categories** -classified into two parts.

1. Personal sensing
2. Community sensing

Mobile Crowd Sensing:

1. **Personal sensing**- the aim of the personal sensing is to take information related to smart device users.

E.g-monitoring user activities.

Mobile Crowd Sensing:

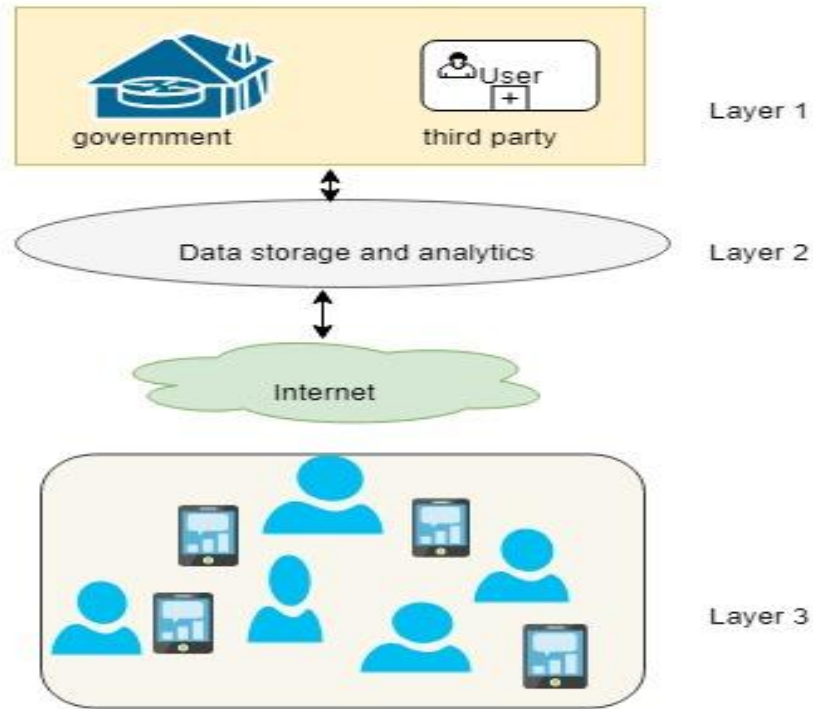
2. **Communities sensing**- is a sensing in which data is collected from smart phones of many individual, in order to monitor environment phenomena around a region

E.g-traffic congestion level

Communities further divided into sub parts

1. Participatory sensing
2. Opportunistic sensing

Architecture of crowd-sensing:



Mobile Crowd sensing:

→ **Application-** it have three main classification

1. Infrastructure
2. Environment
3. Social

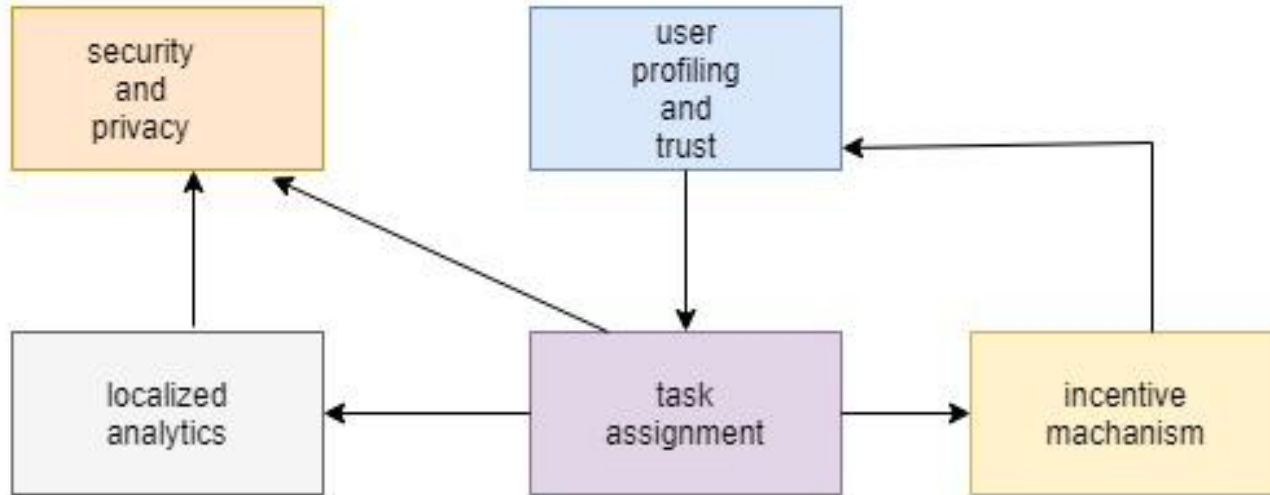
Mobile Crowd sensing:

- 1. Infrastructure application-** in which application like smart transportation involving route planning, parking availability, public safety are used.
- 2. Environment application-** in which air quality sensing devices communicate with mobile phones, and are used to measure various air pollutant. Example temperature and humidity, air quality or pollutant of the environment i.e smoke and harmful gases, mainly oxide of carbon, sulfur and nitrogen etc.
- 3. Social application-** crowd sensing is used in application like Bike Net.

Challenges Of Crowd-Sensing:

1. Task assignment problem
2. User profiling and trust worthiness
3. Incentive mechanism
4. Localized analytics
5. Security and privacy

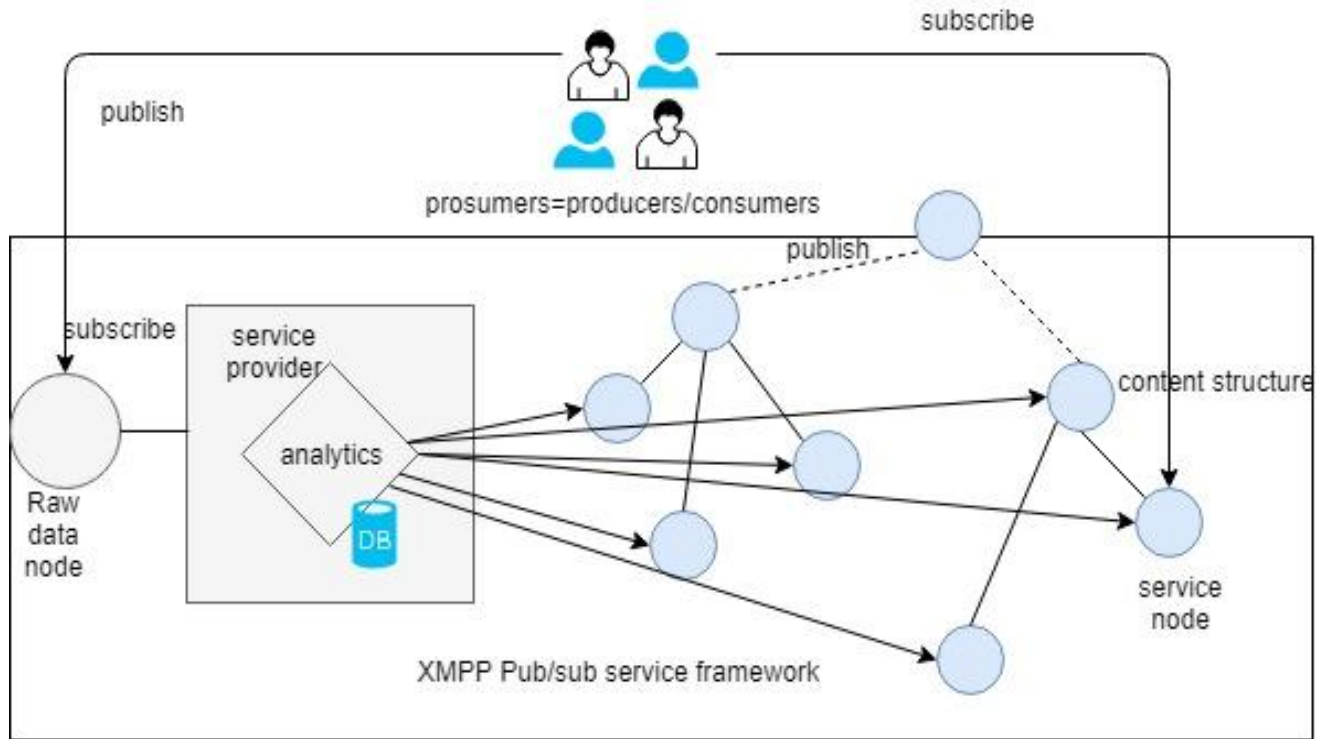
Challenges of crowdsensing:



Crowd sensing framework:

- **XMPP**- it stand for extensible messaging & presence protocol
- It is a message oriented communication protocol based on XML, and its also known as Jabber.
- It was design for instant energy.
- It allow association between various XMPP servers and even communication with different technology using XMPP gateway
- Now a day it is used as for VoIP, Video Game, or even for IoT application.

Crowd-Sensing Framework:



Human Context Sensing

Content:

- Introduction of human context sensing.
- Human context type.
- Sensing technologies.
- Impact.

Human Context sensing:

- **Human context sensing**- it is technology having both individual and societal application that are used to modify the people living in city and help to improve healthcare, transportation, energy use.
- Today ,**54%** of the human population live in urban areas and by **2050**,the number is expected to increase to **66%**.
- In future, smart city will have such application that must be able to sense and monitor the people themselves through **Human Context Sensing**

Human Context sensing:

- **Human context type-** there are four main type of human context
 1. Physiological sensing
 2. Emotive sensing
 3. Functional sensing
 4. Location sensing

- These parts capture the mental states, physical body condition, lifestyles, location of individuals.

Human Context sensing:

- 1. Emotive sensing-** in which, it detect the emotional state of the user.example-stress, happiness, engagement, and general emotional intelligence
- 2. Physiological sensing-** it is just similar to the emotive sensing but the difference is that, it might detect ,such as increased heart rate.

Human Context sensing:

3. **Functional sensing**- it detect the user's activity and ability, such as eating, walking, daily activities routine.
4. **Location sensing**- it detect the user's physical presence and location in their environment.

Human Context sensing:

→ **Sensing technologies-** there are **four** most common type of technology used to **Human Context Sensing**

1. Video and audio.
2. Wearables.
3. Smartphones.
4. Sensing from the environment.

Human Context sensing:

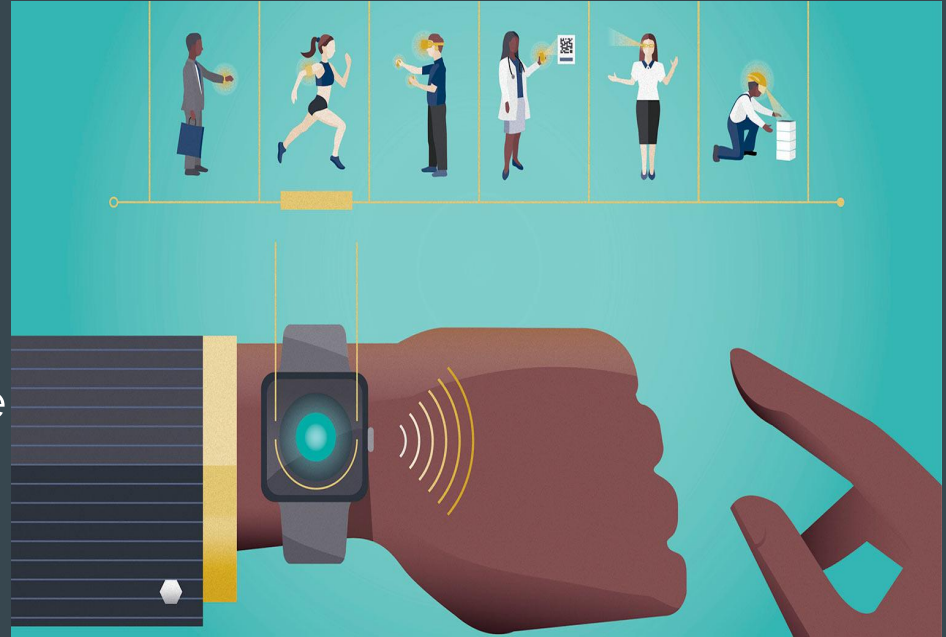
1. **Video and audio-** video and audio are generally the most common way to sense Human context information

Example-camera, Today, cameras are the universal sensor in the world with decrease in size and cost and increase in the recording capabilities



Human Context sensing:

2. **Wearable-** it is smart electronic device with microcontroller so it also known as smart electronic device i.e- **clothings, accessories, shoes** that have processing and sensing component embedded in them.



Human Context sensing:

4. **Smart phones-** it is the advanced technology, it possesses **high computing capabilities, like high speed access to internet** using both **wifi** and **mobile broadband** and it is able to process a variety of software component that are use to sense the human context.



Human Context sensing:

5. **Sensing from the environment-** this type of sensing places sensor in the environment so that a user will interact with-rooms, chair, walls,appliances etc.

And sense person's context from their interaction with those object



Human Context sensing:

- **Impact-** there are number of impact of human context sensing.
1. By video and audio ,any human context that can be seen or heard can be recorded,processed as well as identified.
 2. Some area of human context are more difficult to sense through video and audio. **i.e-physiological sensing.**
 3. The major drawback in human context sensing from video is the concept of privacy.

Human Context sensing:

4. The biggest advantage of using wearable for human context sensing is that since they are wearer's person ,they are able to capture sound, picture,physiological,and gesture of the person.
5. Whereas, the application of smart phones are endless,

Management of cyber security

Content:

- What is cyber city and cyber security?
- Cyber security issue.
- How to manage the cyber security?
- Need for management the cyber security.
- Different phases of cyber security life cycle.

Management of cyber security:

- **What is cyber city?**
- Cyber city is composed by citizen using solution.
- This solutions are related to platform, framework, and application.
- All of those built on technologies to receive the user data

Management of cyber security:

→ **What is cyber security?**

→ It define as protection of

1. Data.
2. System.
3. Infrastructure.
4. Responsible for the city operation.
5. For the stability and livelihood of its citizens.

Management of cyber security:

→ **Cyber security issue**- there are several issue associated with smart city services.

1. Access to information from application.
2. Information tracking.
3. Smart transport sector.

Management of cyber security:

- 1. Access to information from application-** according to network access perspective ,the device could access a packet in different way and location by using different methods
 - to reduce latencies during data transfer, local copies or cache value of packet are made.
 - It means data can be retrieved from the network from local devices or cache values,
 - So this retrieving of data from local devices led to various threats for a smart city devices

Management of cyber security:

2. Information tracking- In smart city it is very important to have interoperable and interconnected environment for the systems

The design of such network make it difficult to track the information that is transfer between various devices.

So it is difficult to track back the originality of information

Management of cyber security:

- 3. Smart transportation system-** the number of vehicle architecture design is mainly driven by safety and cost factor rather than security.
 - In most cases, the car industry practice for establishing communication between embedded subsystem in automatic car which do not follow the standard computer security principles.
 - This will cause autonomous vehicle prone to theft and remote attacks
 - For example -(TPMS) tire- pressure monitoring system do not utilize any cryptographic algorithm for protecting their communication

Management of cyber security:

- **How to manage the cyber security?-**
- it is done by ,where a standard rule to be follow between system efficiency, security expenses, and data protection.
- It is continual process of analysis , design, implementation, monitoring, and adaptation to needed change.

Management of cyber security:

→ **Need for management cyber security-** there are number of method to manage the cyber security.

- Changes in services continuously.
- Emergence of new threats.
- Change in laws.

Management of cyber security:

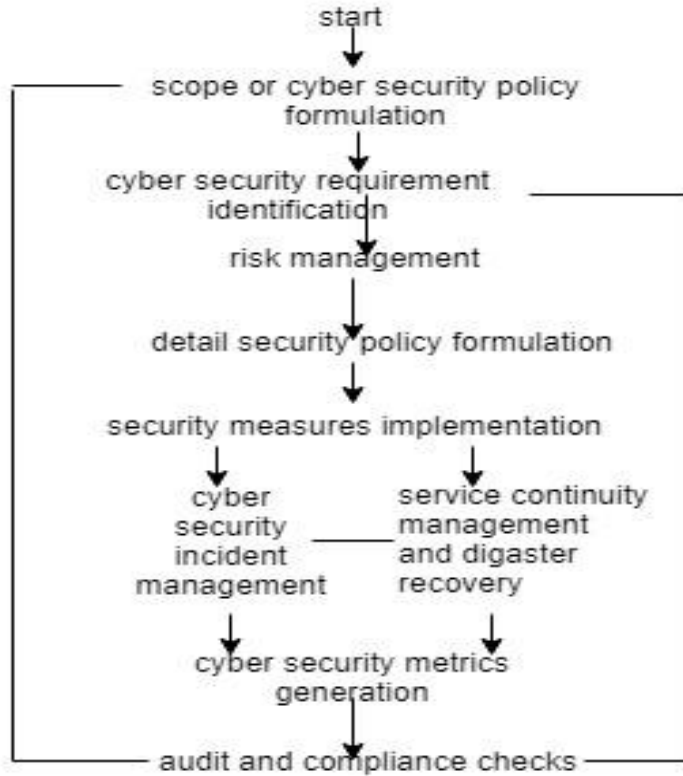
→ **Phases of cyber security of smart city**- we propose a life cycle to manage the various phase of cyber security of smart cities.

1. Scope and cyber security policy formulation.
2. Cyber security requirement identification.
3. Risk management.
4. Detailed security policies formulation.
5. Security measures implementation.

Management of cyber security:

6. Cyber security metrics generation.
7. Audit and compliance checking.

Cyber security life cycle:



Future Application Of Smart City

Content:

- Smart electric grid
- Smart city air quality sensor
- Smart lighting
- HVAC

Future Application Of Smart City:

- **Smart electric grids-**
- It is power network.
- Optimized by
 1. Composition of devices,
 2. Software and services,

Future Application Of Smart City:

- **Objective of smart electric grid are -**
- It will integrate and utilize information to be shared between department, infrastructure operator, and with citizens.
- Smart grid ensure flexible delivery of electricity to provide their several function.

Future Application Of Smart City:

- **How a smart electric grid can empower a smart city?**
- It allow electricity demand to be adjusted, and to match the direct generation and storage capacities available on the grid.
- Smart grid technology are key, allow to resolve the india's hardship, and address difficult issue such as
 1. Massive transmission and distribution losses
 2. Power theft

Future Application Of Smart City:

→ A smart city address three major things that are:

1. It improve power system by

- Self healing design,
- Automation,
- Remote monitoring
- Controls on establishment of smart microgrid.

Future Application Of Smart City:

2. It inform and educate customers about their
 - Energy usage
 - Cost alternative options
 - Allow to make decision automatically about how and when to use electricity
3. It provide safe and secure renewable energy sources

Future Application Of Smart City:

- **Smart city air quality sensor-**
- It is part of air conditioning system.
- It measures
 - Pollutant, in form of oxidisable or reducible gases.

Future Application Of Smart City:

- **How do smart cities allow air quality sensing?**
- Thousand of air quality sensor provide true information to government and citizens.
- Allow us to make better decision that can improve the quality of life,
- Citizens make decision based on air quality index information whether to do transport planning or to find best route to walk to work.

Future Application Of Smart City:

- **Smart lighting-**
- It is lighting technology designed for energy efficiency.
- Its main objectives is to develop the smart city strategies around the world in which street and other exterior lighting installation serve as backbone of a network.
- This service will benefit the citizens,business, government.

Future Application Of Smart City:

→ Key benefits of smart light-

1. Huge reduction of energy usage and maintenance.
2. Increase public safety.
3. Safer traffic.
4. Measurable environment impact.

Future Application Of Smart City:

- HVAC -
- it stand for heating ventilating and air conditioning.
- HVAC is a building service and based on IoT technology.
- It is dedicated to ensure a comfortable , healthy indoor environment inside building are known as HVAC.
- It extract heating and cooling load inside the building and provide fresh air from outdoor at room temperature.

Future Application Of Smart City:

- HVAC can automatically
 - ◆ Switch equipment on and off at predefined times.
 - ◆ Monitor environment condition
 - ◆ Send alert message when measurement exceed threshold
 - ◆ Provide information on energy consumption.