SMART & SAFE CITY

ACCELERATING DIGITAL GROWTH

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A Seminar report submitted to

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BACHELOR OF TECHNOLOGY
In
ELECTRONICS AND COMMUNICATION ENGINEERING

Submitted by

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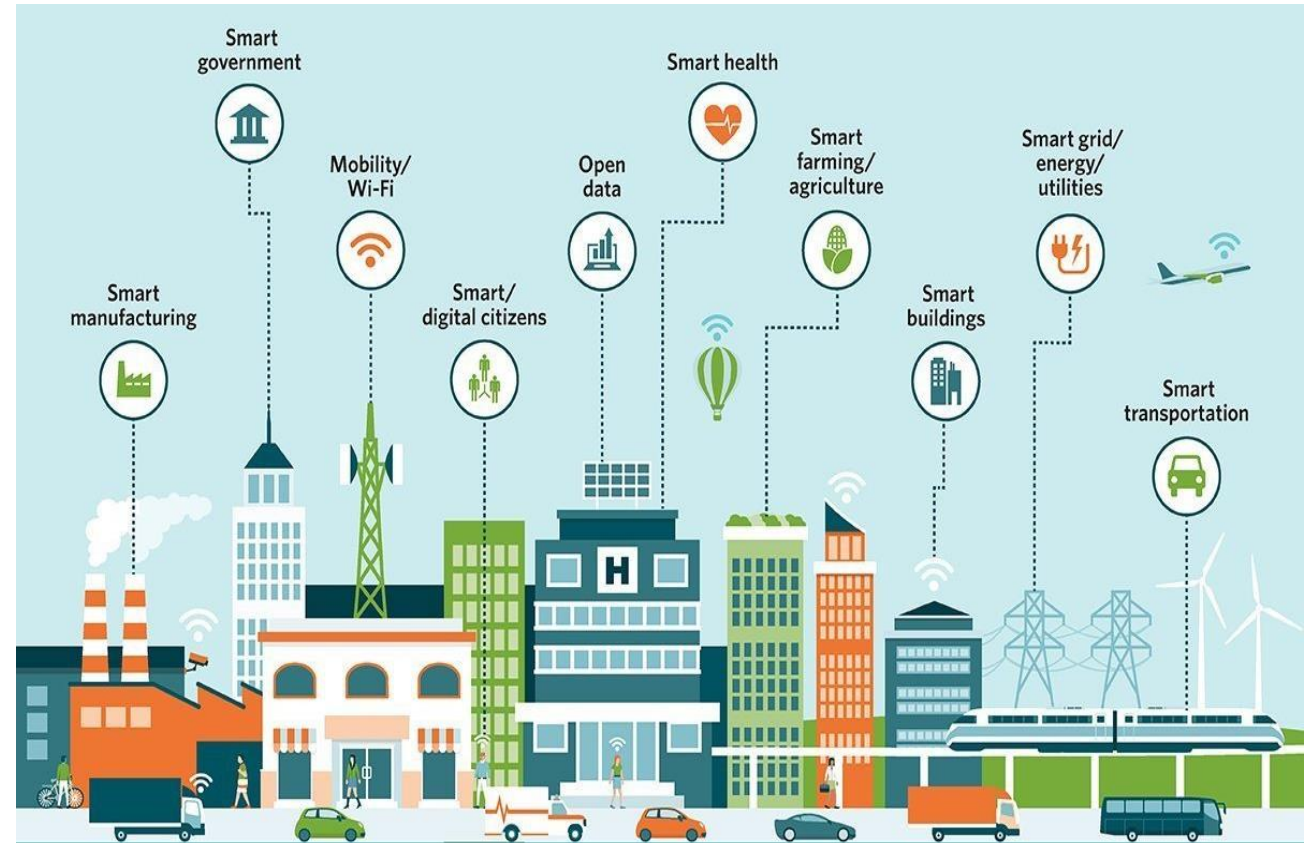**(2017-2021)**

AGENDA

- Smart City & Necessity

- Literature Survey

- Technologies of Smart City

- Applications

- Conclusion (Benefits & Challenges)

SMART CITY & NECESSITY

• **Smart City:** An area/ locality that uses different types of electronic methods and sensors to ease the day to day functions of citizens

• Insights gained from that sensor data are used to manage assets, resources and services efficiently.

• Sensor-driven data collection and powerful analytics automates a wide range of services.

• Enhances quality of citizens life and increases the equity and prosperity of human life.

LITERATURE SURVEY

Year	Author	Description	Publication
2007	Giffinger	• Importance of technology and communication links for the IOT in smart cities • Information and Communication Technologies and quality of life, and participation of citizens in the governance of cities	Smart cities – Ranking of European medium-sized cities https://www.researchgate.net/publication/261367640_Smart_cities_-_Ranking_of_European_medium-sized_cities
2017	Badis Hammi & Rida Khatoun	• 50 billion IOT connected objects will be deployed in smart cities by 2020 • The deployment of IoT needs communication standards that seamlessly operate among the various objects.	Internet of Things (IoT) Technologies for Smart Cities https://www.researchgate.net/publication/319938161_Internet_of_Things_IoT_Technologies_for_Smart_Cities
2018	Iqbal Yulizar Mukti, Yudha Prambudia	Three components of IOT constitutes the smart city: • Hardware (sensors, actuators, embedded system) • Middleware (Software, AI, Cloud, Storage etc..) • End-user smart devices	2nd International Conference on Energy and Environmental Science https://iopscience.iop.org/article/10.1088/1755-1315/164/1/012036/pdf

TECHNOLOGIES IN SMART CITY

• Information and Communication Technology (ICT)

• **<u>Internet of Things (with Sensors & Smart Devices)</u>**

• Cloud Computing

• Artificial Intelligence (AI)
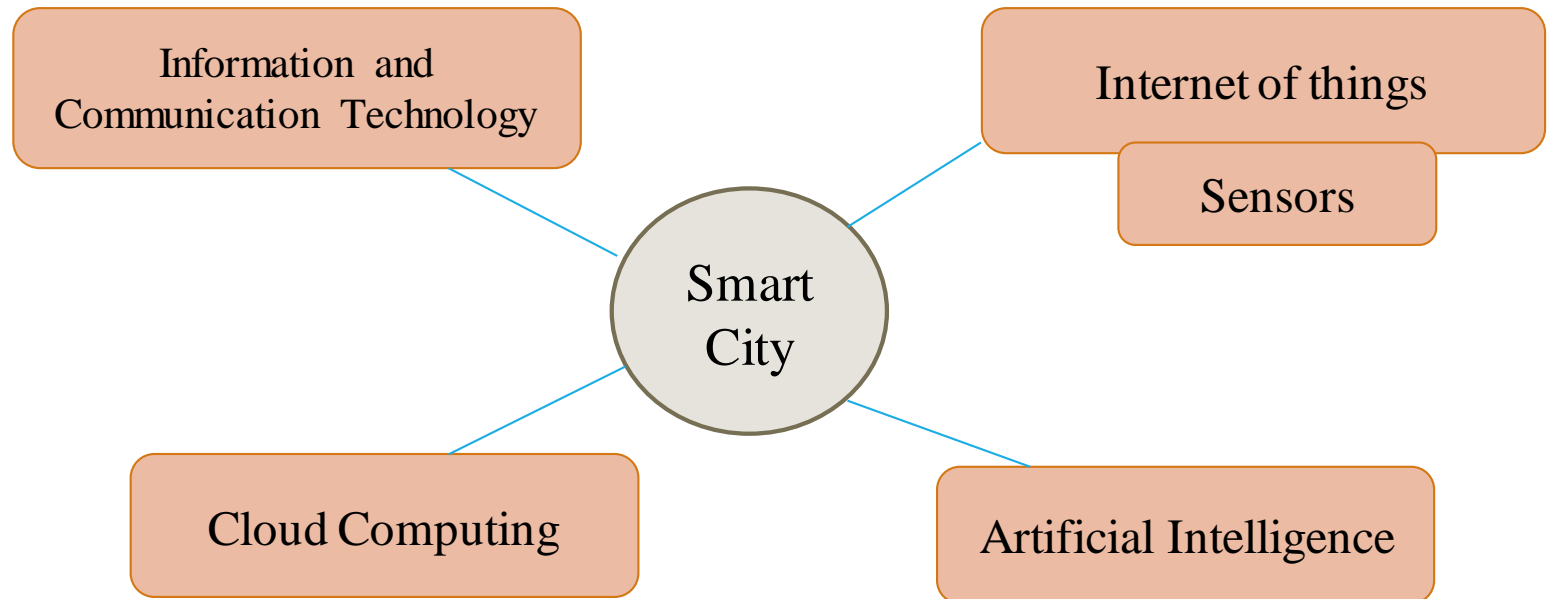
INFORMATION & COMMUNICATION TECHNOLOGY (ICT)

- Creates two-way communication channel.

- ICT builds a bridge between the citizens

- Enhances quality, performance and interactivity of services to citizens

Key Attributes of ICT

- Technology and Infrastructure (e.g., transportation, buildings, health care)

- Sustainability (e.g., water, air, waste, energy, climate etc)

- Governance (e.g., organization, administration)

- Economy (e.g., financial, human capital, economic strength)
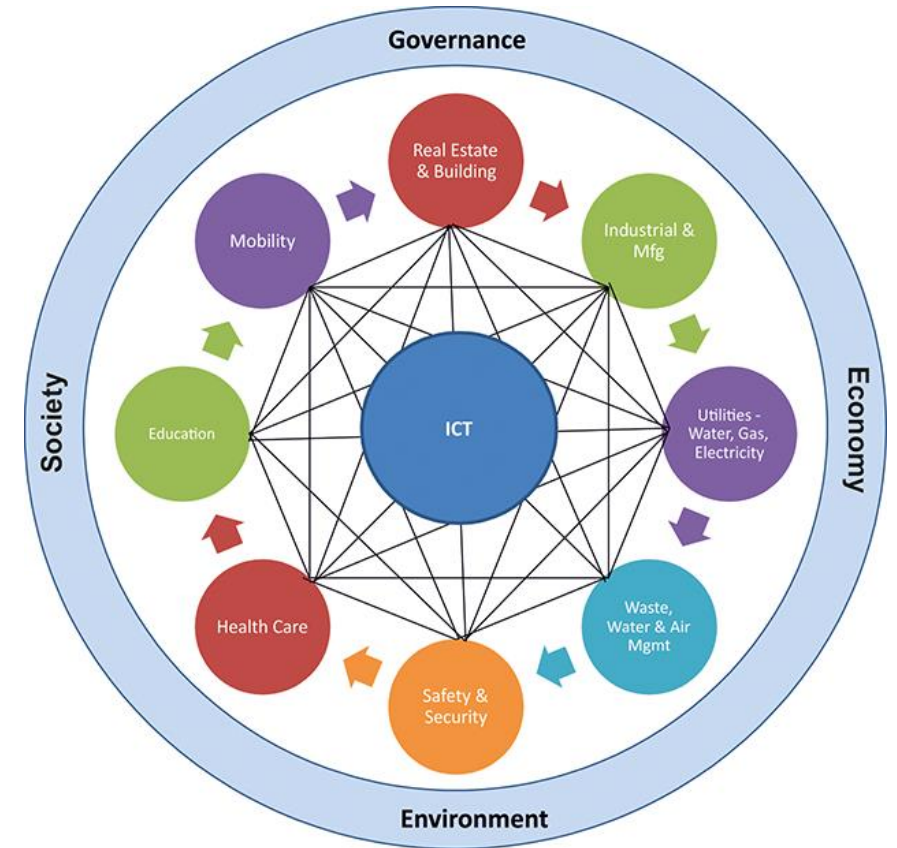
INTERNET OF THINGS (IOT)
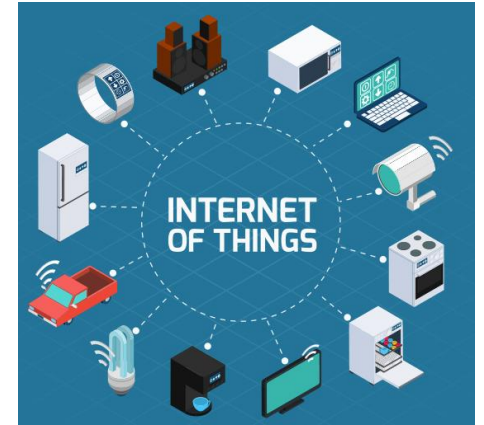
- Network of physical objects that are embedded with sensors and software for the purpose of connecting and exchanging data with other devices over the Internet.

- Every device in smart city needs to be connected to each other for communicating & thus IOT in picture

- Smart cities use IoT devices such as connected sensors, lights, meters to collect and analyze data.

- IoT provides an advantage of knowing things in advance

Architecture of IoT

- Perception Layer

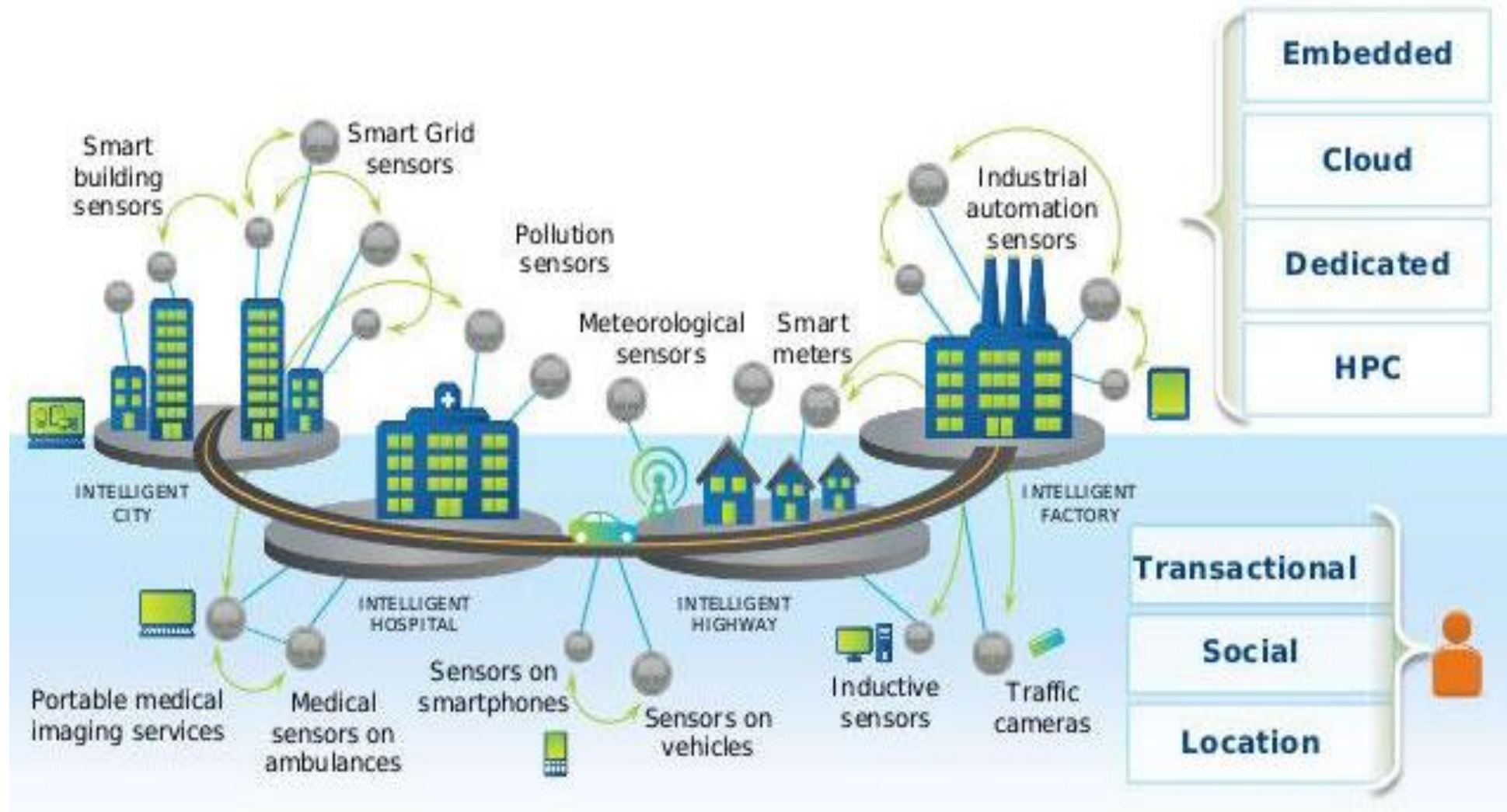- Network Layer

- Application Layer
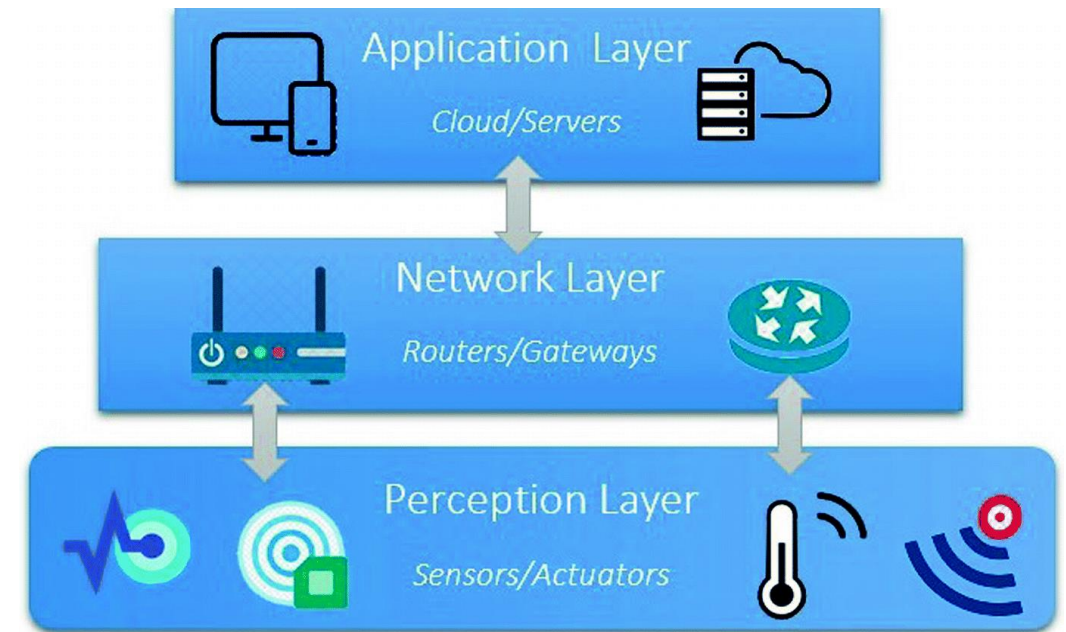
SENSORS/ SMART DEVICES

- Smart sensors are built as IoT components that convert the real-world variable into a digital data stream for transmission to a gateway.

- Information from multiple sensors can be combined and correlated to infer conclusions about latent problems.
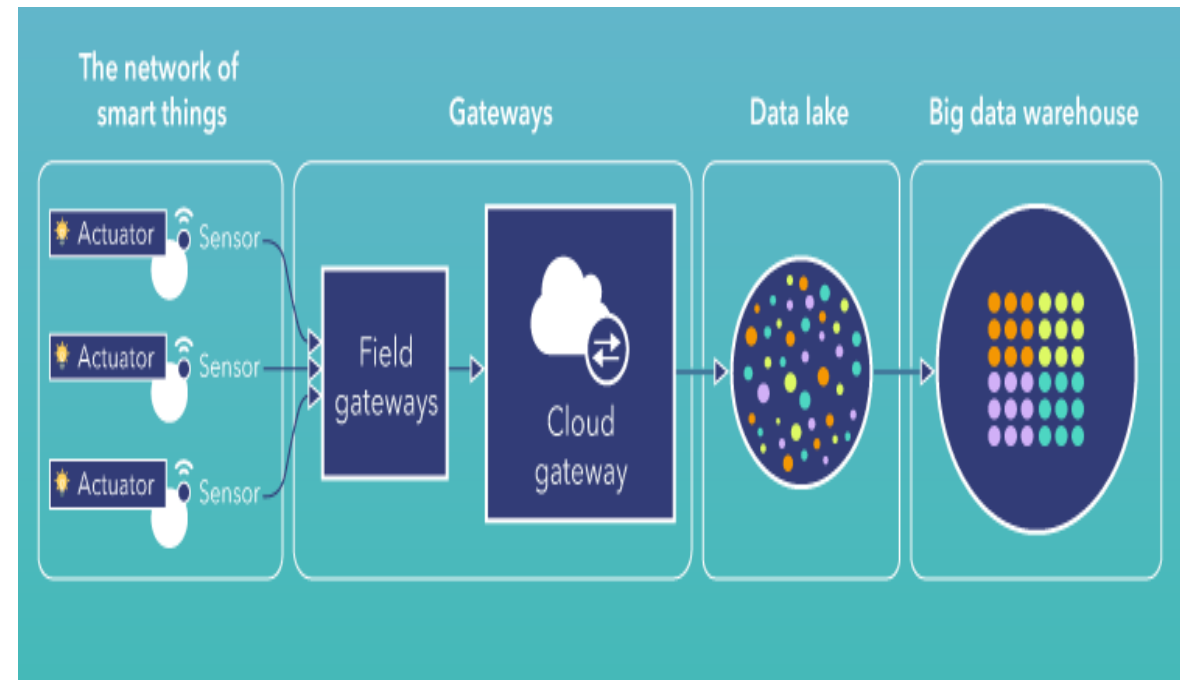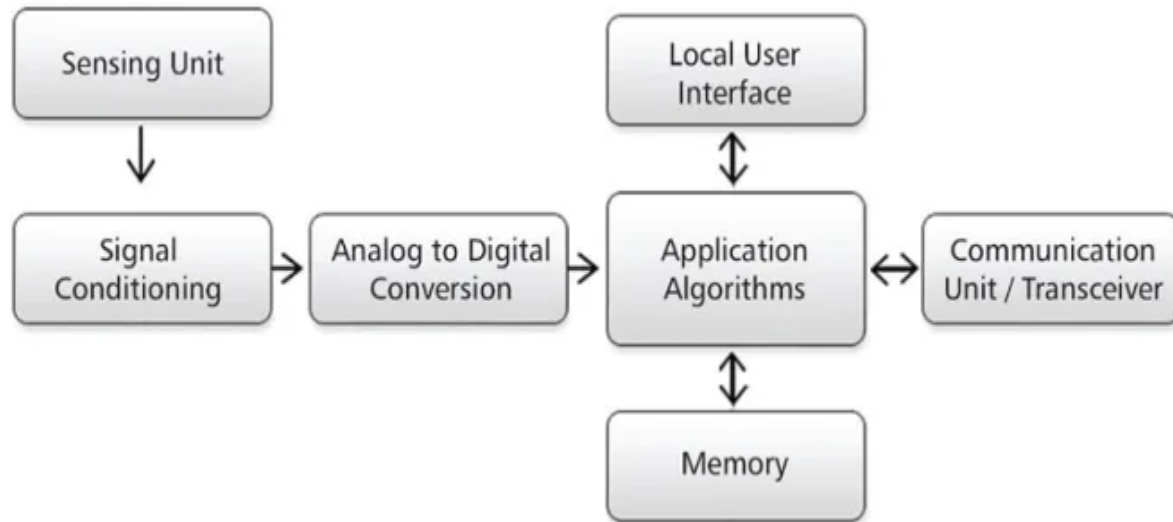
SMART CITY SENSOR MODEL

CLOUD AND AI

- AI enhances devices/ applications to learn and take self-decisions by processing the complex organized or unorganized data.

- Cloud computing: On-demand availability of computer system resources (data storage and computing power) for effective functioning of IoT system

- IoT devices collect data and transfer it to the cloud through internet

- AI in IoT system helps in decision making and simulating the machines to act or respond.
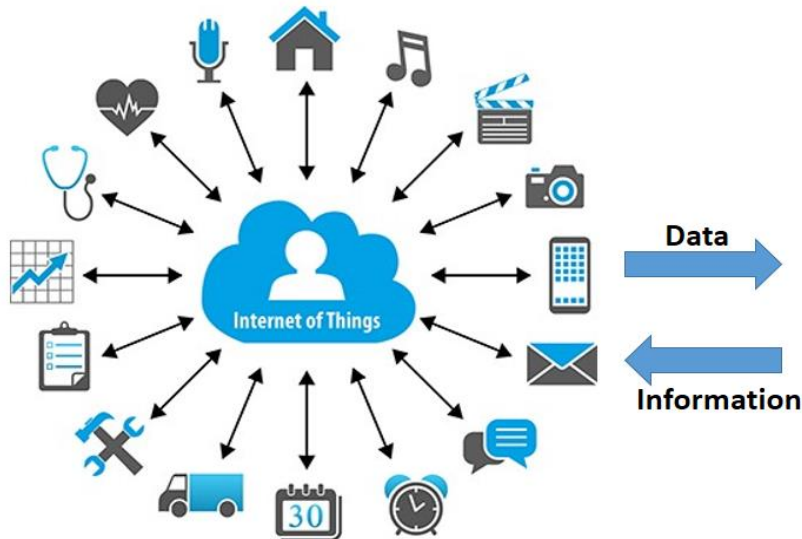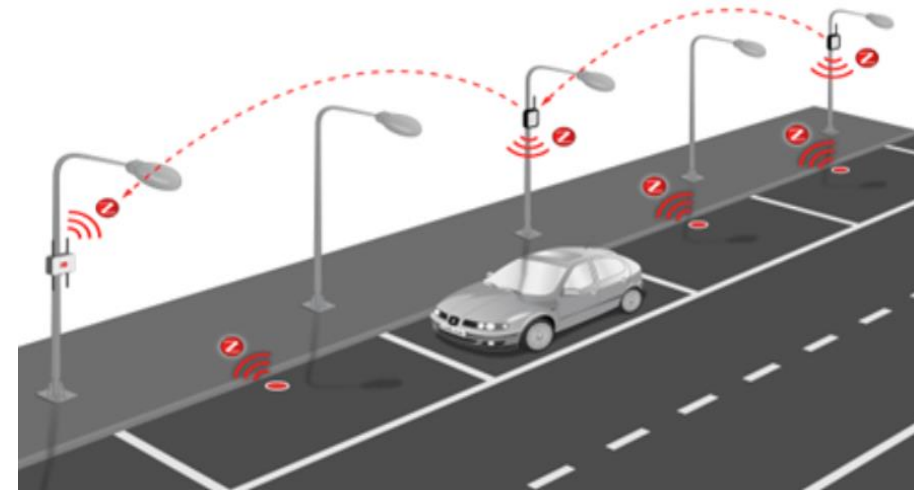

IOT with electronic Sensors

Cloud with AI

SYSTEMS OF SMART CITY

- Smart Transport

- Smart Energy

- e-Health

- Smart Environment

- e-Agriculture

- e-Education

- Smart Economy & Government

- Safe City

APPLICATION – SMART PARKING

• Sensors are installed in each bay to register whether the bay is occupied or vacant.

• The data is shared live to local and central system where parking management application is hosted

• Then analyzed information is relayed instantaneously to signage & digital-display screens for the citizens reference

Components:

• Parking Sensors

• Wireless Sensor Networks Module

• Embedded Web-Server

• Mobile Device of Driver

• Central Web-Server

• Boom Barrier & Digital Display Unit

| 1 CHECK	2 DIRECTION	3 PARKING	4 PAYMENT
38 SPACES	TURN RIGHT		
Estimate slot availability in parking space	Navigate driver to parking area	Occupancy sensors gather real-ime data	M-payments/Parking fees Convenient digital payments

APPLICATION – SMART LIGHTING

- Energy efficient LED based Street Light System bundled with motion & ambient light sensors (along with smart controllers)

- Minimize the energy usage, operate the street lights in three state (Dual DIM/Bright/Off) automatically as per the real time field requirement.

Components:

- Smart Light Fixtures (LED based with motion and Ambient Light sensors)

- Street Light Smart Controller: These will help LED base Smart lighting to support automated lighting and sensing Unit
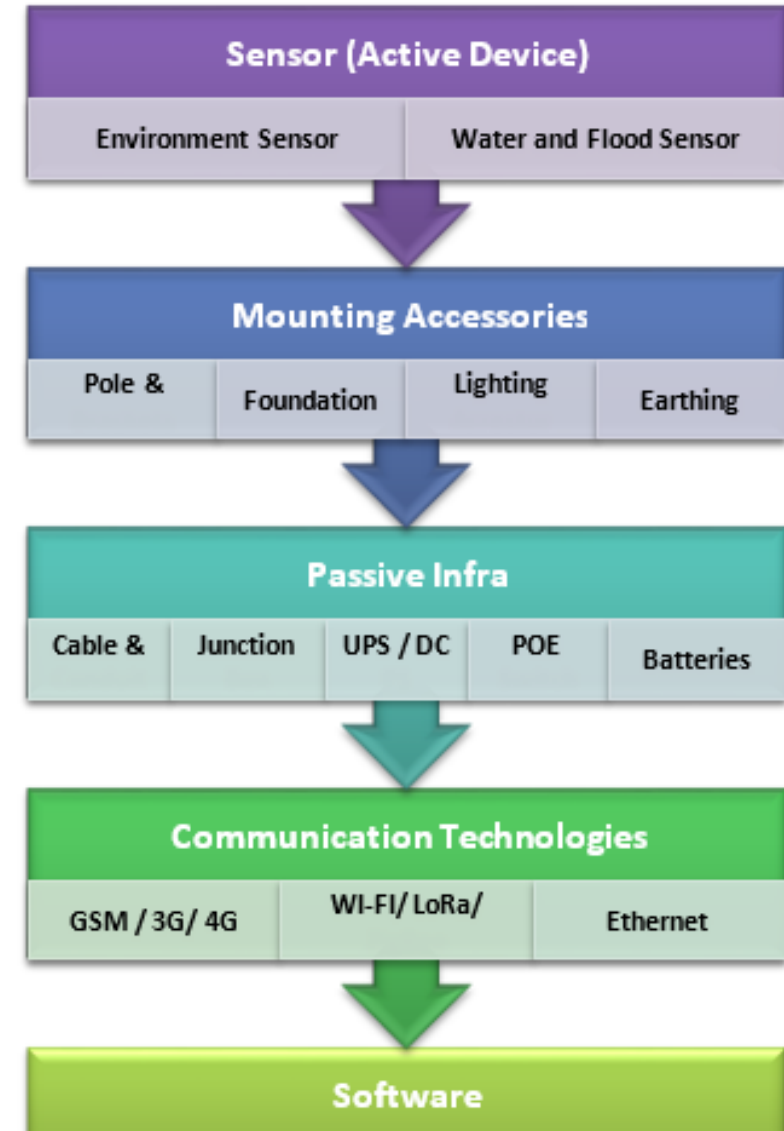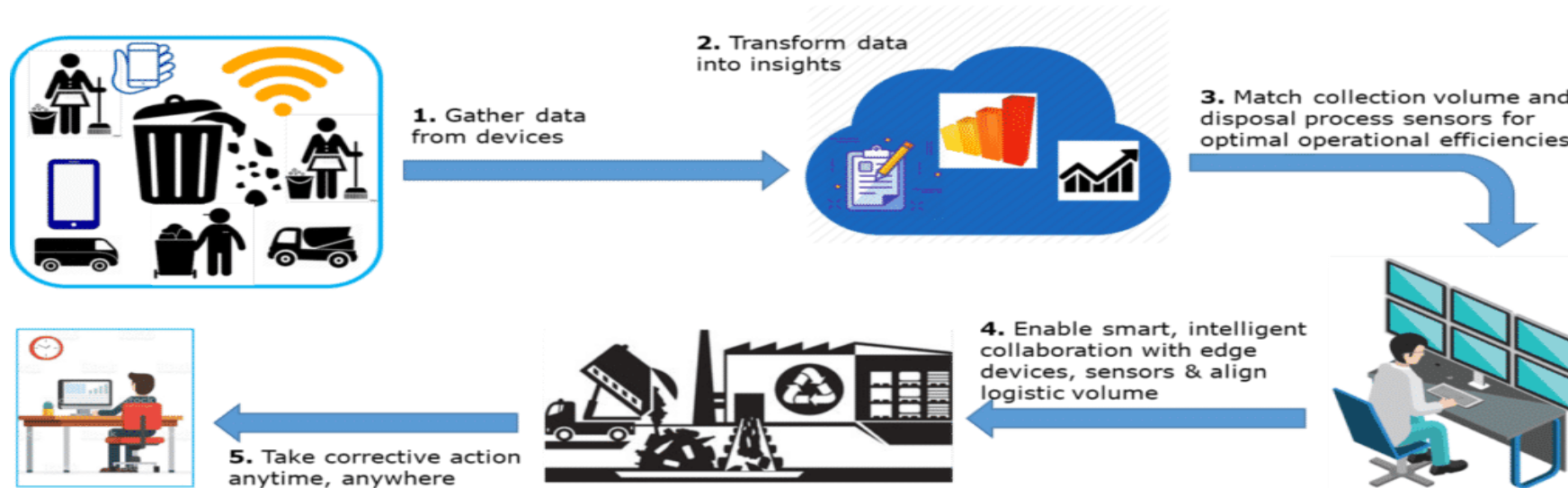
APPLICATION – ENVIRONMENT SENSOR
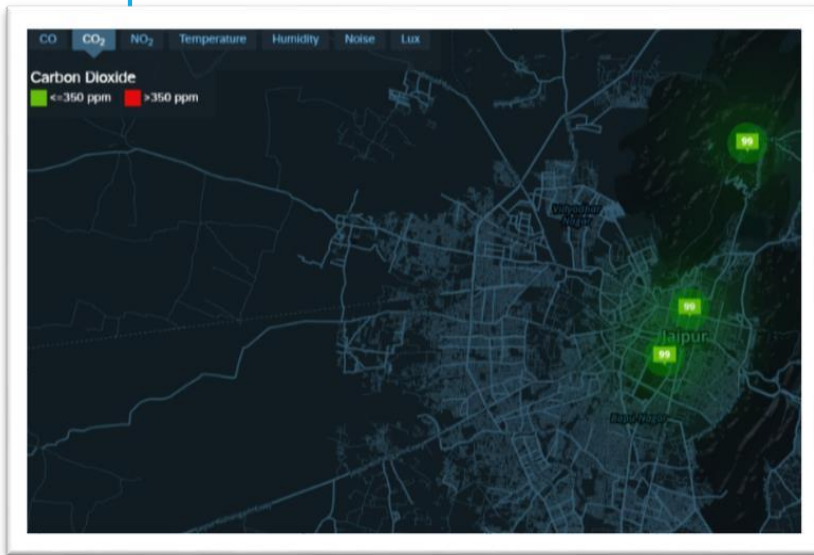
Components:

- Wireless Environment Sensor

- Central System for receive information from sensors

- Digital Display Unit

APPLICATION – SOLID WASTE MANAGEMENT

1. Gather data from devices

2. Transform data into insights

3. Match collection volume and disposal process sensors for optimal operational efficiencies

4. Enable smart, intelligent collaboration with edge devices, sensors & align logistic volume

5. Take corrective action anytime, anywhere

- RFID tags installed in the each of the collection bins read the Bin details.

- Weight sensor shall sense the level of occupancy of the bin placed above and send this data to the application in the cloud

- The application shall trigger alert signal to the authority through device GPRS/GSM network.

CITY SURVEILLANCE

- Surveillance System Infrastructure at Field Locations (Cameras)

- Video Management System

- Video Analytics

- Command Control Center (CCC)

- Public Address system & Message Signboard

Video Analytics Capabilities:

- Facial recognition

- Parking & Traffic Violation detection

- Detection of people loitering within restricted area

- Unattended object detection

CONCLUSION

Benefits of Smart City

- Digital Technology Utilization: Ease of daily operations

- Safer Communities through surveillance

- Efficient usage of public utilities

- Enhanced citizen and government engagement through digitalization

- Improved transportation

- Conserver environmental resources

- Effective citizens life style

Challenges

- Technology adoption by citizens & government

- Existing infrastructure to support latest technologies

- Funding
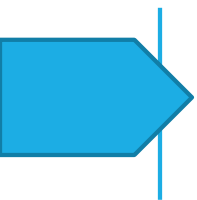
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Any Questions ?

Thanks