

introduction

- through out the world there is a focus on building smart cities
- in india many cities have been identified and given them funds to transform them into smart cities
- in addition to regular infrastructure in any city for e.g. urban infrastructure consists of offices , residential areas hospital , school , polices , transport and so on .
- smart in smart city mean services that are given to the stake holders , people are able to in a improved manner and this is possible by ict technology information and communication which also includes electronics embedded electronics different other advanced technologies in electrical sciences.
- computer and electronics put together can make cities smart.
- components of a smart city
 - transport
 - railway
 - hospital
 - schools
 - traffic control
 - waste management
 - banking
 - police
- in order to make a city smart WE have to take help of different things like ,ict used to make a city smart

sensor

sensor network

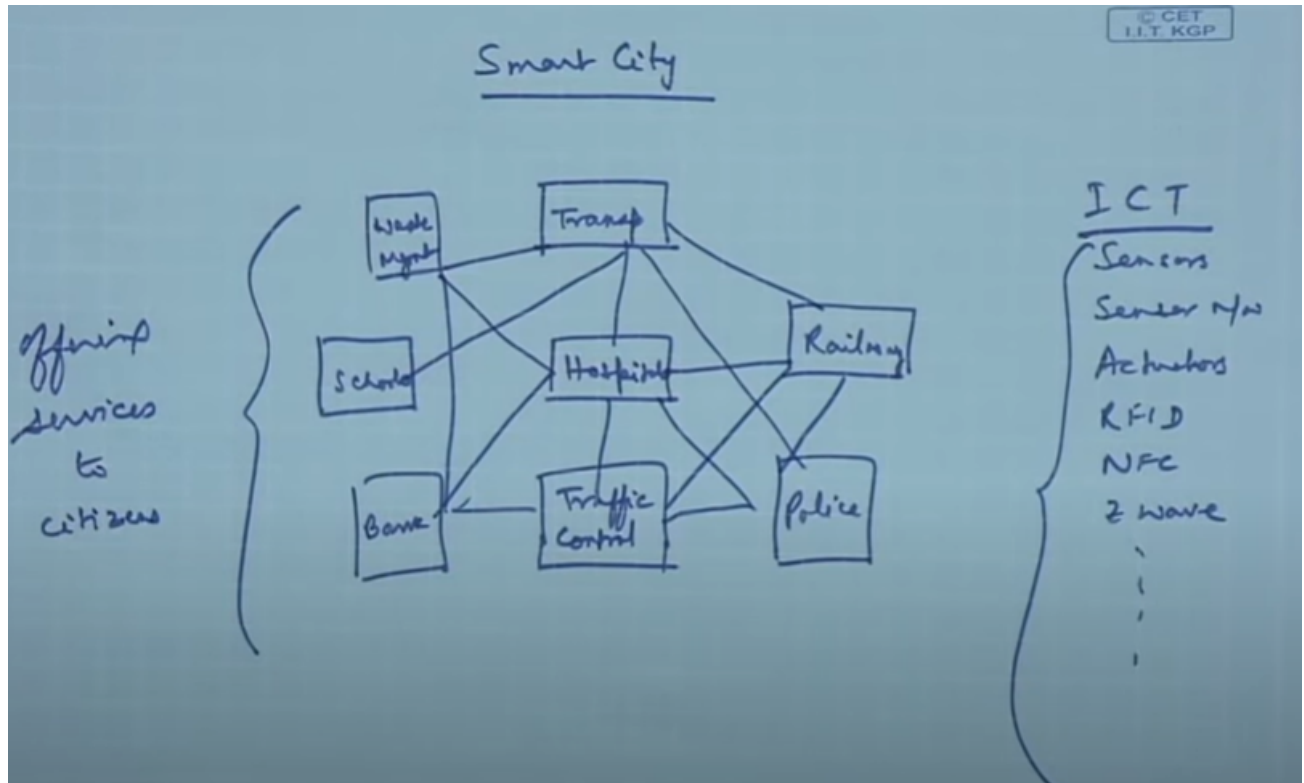
actuators

rfid

nfc

z wave

* and so on



need for smart city

- in an iot environment there is a connectivity b/w different components to provide better facility to the stakeholders

Introduction

✓ A Smart City is-

- An urban system
- Uses Information & Communication Technology (ICT)
- Makes infrastructure more interactive, accessible and efficient.

✓ Need for Smart Cities arose due to-

- Rapidly growing urban population
- Fast depleting natural resources
- Changes in environment and climate

smart city analogy

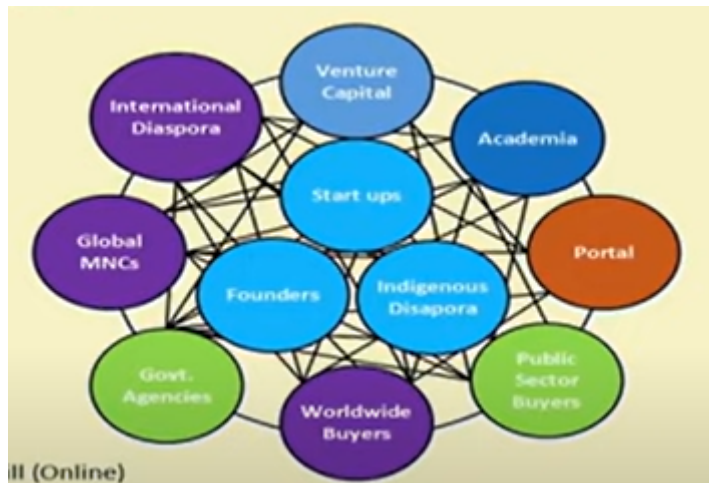
Analogy

Humans	Smart Cities
Skeleton	Buildings, Industries, People
Skin	Transportation, Logistics
Organs	Hospital, Police, Banks, Schools
Brain	Ubiquitously embedded intelligence
Nerves	Digital telecommunication networks
Sensory Organs	Sensors, Tags
Cognition	Software

to bring in life to a city we need embedded intelligence (by embedded ict) that include interconnection b/w different services by using sensor , tag, software etc.

Application focus area

- smart economy : competitiveness

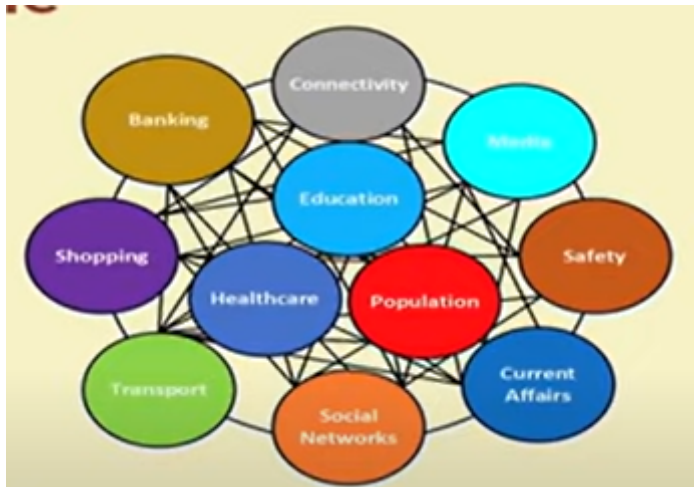


- smart governance : citizen participation in different things



in a normal city there is close to no interconnection b/w these but in a smart city these are interconnected by ICT (like officials would be interconnected with citizens banking system the emergency dept. and many more)

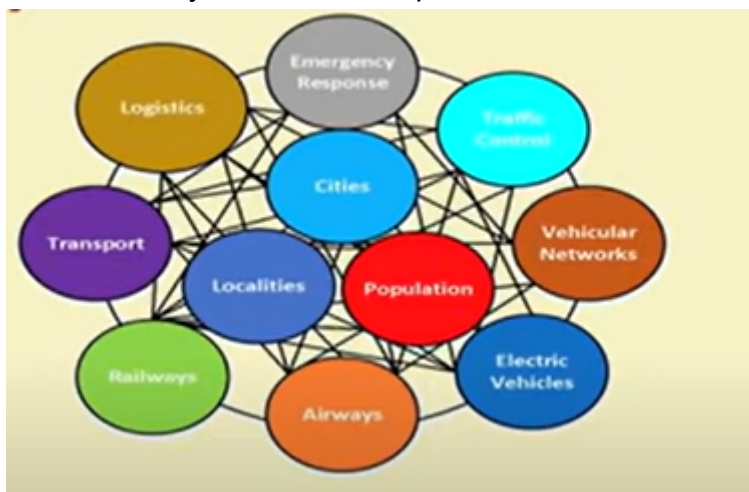
- smart people : social and human capital



education , healthcare and population are the core of a city and others are peripherals
in a smart city citizens are connected to these services and these are inter connected with each other

and how there perform well we have to identify them by ICT

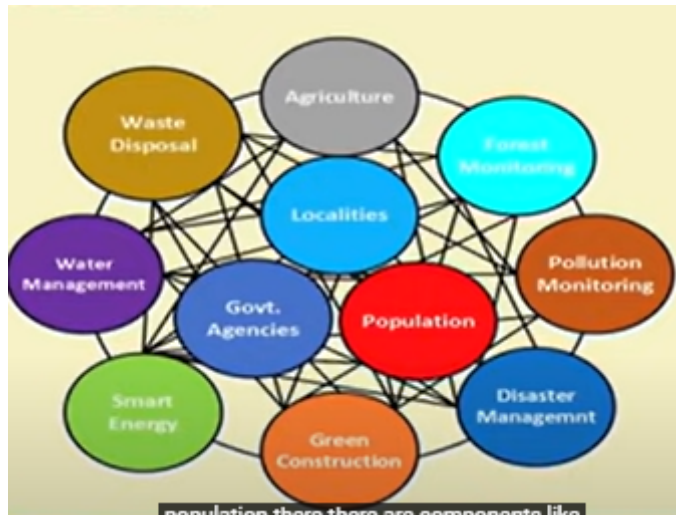
- smart mobility: ICT and transport



use case: i want to go from point A to C , there is a system that tells me what is the fastest way to reach there by keeping track of traffic .

suppose you got into a accident so the traffic sysstem is connected to healthcare system and that connected to police and thus will result in immidiate action

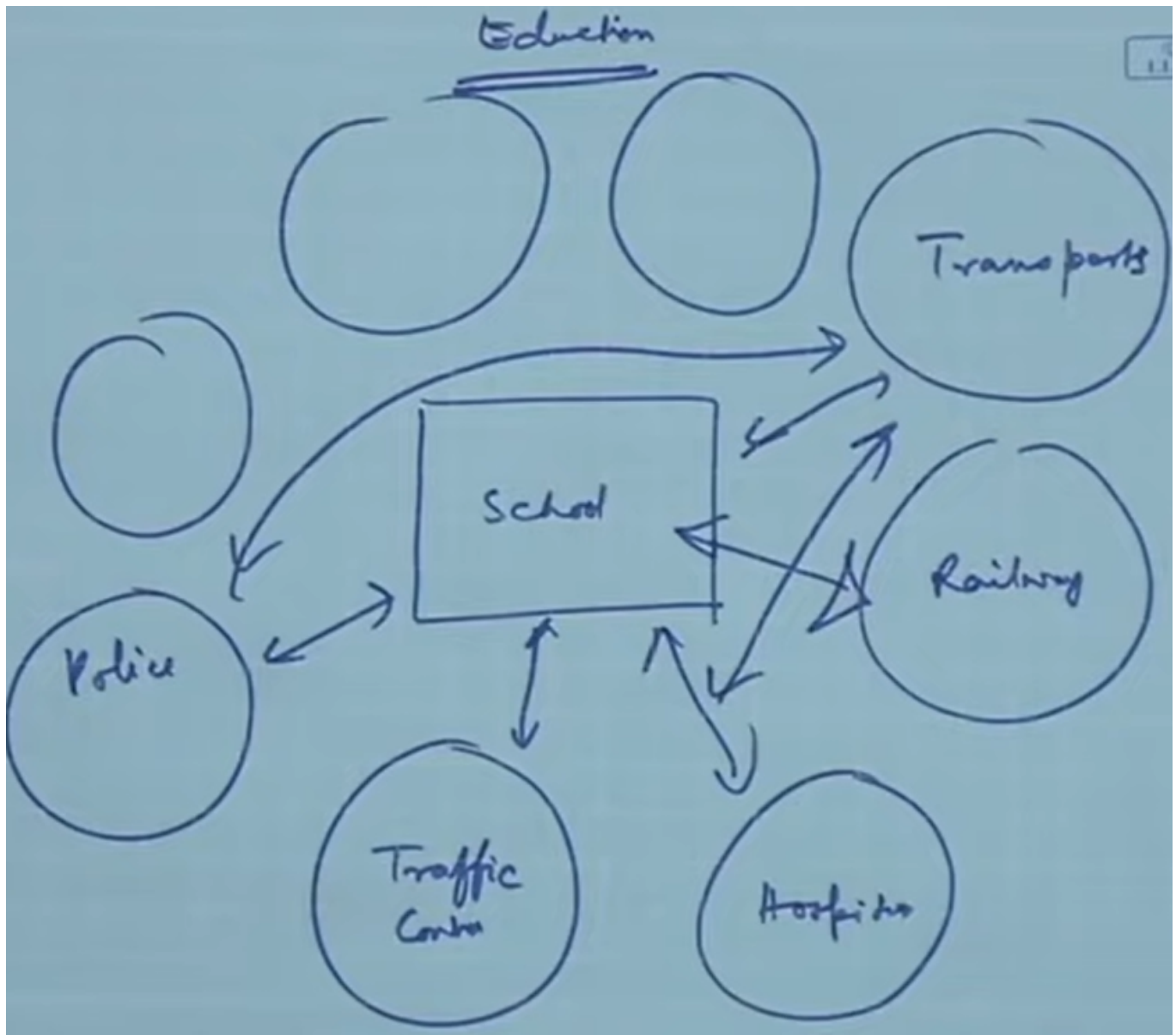
- smart environment : natural resources



- smart living : quality of life



eg: smart school



if we have interconnectivity b/w transport , polices , school , traffic , hospital and etc.

suppose a school child , have to go to school from his home , he has information about different forms of transport that he can take

suppose in an event of emergency on the road while going there is some accident then correspondingly police has to be informed and also traffic control has to take over and also hospital have to be informed so that required facility has to be given to the stakeholder this can also happen in school.

Smart Home

- ✓ **Smart Homes**
 - Health monitoring.
 - Conservation of resources (e.g. electricity, water, fuel).
 - Security and safety.
- ✓ **Smart Parking Lots**
 - Auto routing of vehicles to empty slots.
 - Auto charging for services provided.
 - Detection of vacant slots in the parking lot.

smart vehicles and health

![[Pasted image 20231114131805.png]]

smart energy and meteorology

![[Pasted image 20231114131934.png]]

Smart agriculture

- Smart Agriculture**
- Automatic detection of plant water stress.
 - Monitoring of crop health status.
 - Auto detection of crop infection.
 - Auto application of fertilizers and pesticides.
 - Scheduling harvesting and arranging proper transfer of harvests to warehouses or markets.

Technology Focus Areas

- Data Collection : mobile devices , sensors , architecture
- Data Transmission : radios , networking , topologies
- Data Storage : local storage , data warehouse
- Data Processing : data clearing , analytics , prediction

IOT challenges

- ✓ **Security and Privacy**
 - Exposure to attacks (e.g. cross-site scripting, side channel, etc.).
 - Exposure to vulnerabilities.
 - Multi-tenancy induces the risk of data leakage.
- ✓ **Heterogeneity**
 - Integration of varying hardware platforms and specifications.
 - Integration of different radio specifications.
 - Integration of various software platforms.
 - Accommodating varying user requirements.

Reliability Challenges

- ✓ **Reliability**
 - Unreliable communication due to vehicle mobility.
 - Device failures still significant
- ✓ **Large scale**
 - Delay due to large scale deployments.
 - Delay due to mobility of deployed nodes.
 - Distribution of devices can affect monitoring tasks.

Big data issues

- ✓ **Legal and Social aspects**
 - Services based on user provided information may be subject to local or international laws.
 - Individual and informed consent required for using humans as data sources.
- ✓ **Big data**
 - Transfer, storage and maintenance of huge volumes of data is expensive.
 - Data cleaning and purification is time consuming.
 - Analytics on gigantic data volumes is processing intensive.

sensor network

- ✓ **Sensor Networks**
 - Choice of appropriate sensors for individual sensing tasks is crucial.
 - Energy planning is crucial.
 - Device placement and network architecture is important for reliable end-to-end IoT implementation.
 - Communication medium and means play an important role in seamless function of IoT in smart cities.

