**Smart City Project**

***Introduction***

In latest years, the word Smart City is used more in all regions. Smart City is generally referred as the regions which heavily invested on the Information and Communication Technologies (ICT) infrastructure to facilitate both business and the quality of life for the citizens.

The Government of India defines smart cities as – cities that provide core infrastructure and give a decent quality of life to its citizens, a clean and sustainable environment and application with Smart Solutions. These smart solutions includes electronic governance, waste management , water management , energy management , urban mobility management and services such as education and healthcare.

**Key Elements of Smart Cities for the Country India**

**Diagram, timeline

Description automatically generated**

***Smart Transportation***

One of the major concerns in most of the urban cities is traffic congestion. Because of the migration of people for employment and other aspects, population gets increased day by day in urban areas which leads to major traffic congestion. Smart Transportation is designed in such a way that the traffic is monitored continuously and will be reduced by the rerouting of the vehicle movements. This is done by the data collected by various sensors and cameras deployed in traffic signals which collects feed and sends them to control room.

Depending upon the infrastructure of the regions this is achieved in different approaches.

1. Capturing the traffic images with the cameras mounted on signals and sending them to control room personnel , whom will communicate ground police to reroute the traffic.
2. Calculating the number of vehicles and the length of the queue automatically with the analysis of the streamed images sent from the camera which will be directly sent to traffic signals .

***Water Conservation***

Country like India with higher in population always in need of water conservation. Many urban regions have a need to sense and monitor water resources as the growing population of these cities is creating shortages of this commodity. Water bodies such as lakes and reservoirs are monitored by sensors for their levels, the amount of inflows they have streams and rainfall, and the amount that is consumed by urban water needs. These levels are sensed by water meters and the data is provided on a continual basis to a central system that computes the water levels. Monitoring is also done with satellite image data that gives an indication of the spread of lakes and streams, flows in rivers and canals and the depth of water bodies. When waste water is released from urban areas un to the local lakes and reservoirs, this too is measured and accounted for.

***Pollution Control***

One of the Major aspect in the smart project is Pollution Control. Because of the rapid urbanization , pollution is very high due to the increase in the vehicle transportation. Pollution control is enabled by monitoring air quality at different points in the city and aggregating this data to arrive at a comprehensive picture. Typical measurement sensors record data pertaining to levels of carbondioxide, carbon monoxide, nitrogen dioxide,humidity,temperature and pressure. Some sensors will also monitor light quality and vibration levels.These sensors are typically mounted on kiosks at points on city streets, on top of traffic signals , or on top of buildings.These sensor data are collected and overlaid on a map of city and hotspot with bad air quality are identified.

***Energy Management***

Energy Management requires locating and measuring the generation, storage, distribution and consumption of energy. Each of these stages of the energy life-cycle requires sensing and monitoring for efficient management.

Energy distribution in smart cities follows the smart-grid concept where each energy generation and storage location is connected to a grid, along with the consumption locations. The function of the smart grid is to distribute energy from supply sources to demand points based on price expectations,contractual obligations and sustainability criterion. The key idea of smart grids is to meet customer demand with existing energy sources without resorting to building new facilities.

**Importance of Smart Cities**

54% of the world’s population live in cities and this is expected to rise to 66% by 2050, adding a further 2.5 billion people to the urban population over the next three decades. With this expected population growth there comes a need to manage environmental, social and economic sustainability of resources.

Smart cities allow citizens and local government authorities to work together to launch initiatives and use smart technologies to manage assets and resources in the growing urban environment.

This becomes increasingly important in the light of the future population growth in urban areas, where more efficient use of infrastructure and assets will be required. Smart city services and applications will allow for these improvements which will lead to a higher quality of life for citizens.

**Challenges in Smart Cities**

For all the benefits offered by smart cities, there are also challenges to overcome.

Smart city projects need to be transparent and available to citizens via an open data portal or mobile app. This allows residents to engage with the data and complete personal tasks like paying bills, finding efficient transportation options and assessing energy consumption in the home.

This all requires a solid and secure system of data collection and storage to prevent hacking or misuse. Smart city data also needs to be anonymised to prevent privacy issues from arising.

The largest challenge is quite probably that of connectivity, with thousands or even millions of IoT devices needing to connect and work in unison. This will allow services to be joined up and ongoing improvements to be made as demand increases.

Technology aside, smart cities also need to account for social factors that provide a cultural fabric that is attractive to residents and offer a sense of place. This is particularly important for those cities that are being created from the ground up and need to attract residents.