

Smart cities

A digital city is a network of connected and intelligent objects and machines that transmits data using wireless technology and the cloud. This infrastructure receives, analyzes, and manages data in real-time to help cities, communities, municipalities, enterprises, and citizens make better decisions that improve quality of life.

Citizens nowadays have an enormous access to all kinds of information. Mobile devices like smartphones are now ubiquitous and we can use them to engage with smart city ecosystems in various ways using the connected devices. But we cannot restrict to smartphones and tablets, also we must take into account wearables like smartwatches and the computer devices embedded in our cars and appliances at home. Pairing all these personal devices and other types of devices summarized by the government agencies with data is what becomes a city's physical infrastructure and all the services that can be provided using this data can cut costs and improve sustainability and quality of life. An increase in quality of life is because using data collected by IoT devices can improve energy distribution, streamline trash collection, decrease traffic congestion, and improve air quality with help from the IoT.

Urbanization is posing a new challenges to cities

More than a half of world's population live in cities, and it is expected that the figures reach to 66% in the next three decades. Besides population growth, urbanization will contribute with additional 2.5 billion people to cities by 2050.

This means that governments, and society as a whole will be facing major challenges when it comes to provide public services with quality to all sectors of societies. Among these challenges there are environmental, social, and economic sustainability and it is expected that these regards must keep pace with this rapid expansion of population and need in our cities and will have an impact in our environment resources.

Nevertheless, it is known that governments take so much time to make decisions and that centralized decisions and actions can take time. Moreover, there is a decreasing willingness of

citizens and local authorities to strive more agile to launch innovative initiatives, and smart city technology plays a key role for the success and meeting all sustainability goals.

What are the advantages of smart cities?

Using IoT sensors and analyze the data collected by these devices can be advantageous because we can measure how public services are being used and deployed, or we can find patterns in people's mobility and we can find areas of opportunity to improve public services. Some of the advantages of this follows:

- **Public Safety.** Drones and cameras can be used for public safety and emergency management. Also, aside of aiding the police and immediate response services, public health also plays a key role, Covid-19 testing and utilization of sensors for smoke and flood detection, and preventing epidemic diseases like dengue.
- **Cybersecurity.** Smart cities can use blockchain-based technologies to secure IoT sensors, and as mentioned before, cameras in the government center that utilize this technology.
- **Connectivity.** We can implement fixed wireless broadband to the underserved population so every person can be connected to the internet and grating this people to opportunities like access to baking and online education.
- **Hazard Detection.** The use of outdoor sensors for detecting forest fires and floods can bring many advantages to people living in smart cities.
- **Building Management.** IoT technologies can help to improve the situational awareness for a fast and safer responso to all kinds of threats.
- **Economic Development.** These technologies can help to achieve a greater success in tourism and attract foreign direct investments because its deploying allows to be a more modern and digital city. For example, using Virtual Reality can be used to provide a virtual history tour of the county for potential tourists.

The possibilities are endless, since wireless connectivity and IoT technology can transform traditional elements of city life next-generation characteristics that all population can benefit from. For example, streelights can adjust intensity according to moving sensors, so these

intelligent lighting platforms with expanded capabilities provide better illumination and at the same time can cut costs of electricity bills.

Data engineering and Smart Cities

As the cities move towards digitalization, more and more data is becoming available to examine. A single IoT device can generate megabytes of information every 24 hours; a city with hundreds or thousands of devices generating data will add up to terabytes of data every year. Urban planner depend of this data but it will be not possible for them to do all the work. Here is the great opportunity for data engineers and other related fields to extrapolate their knowledge and to help other professionals to boost the economy of their own cities. For example, when the city of London opened the feeds of their sensors to the public, they were used by many companies to elaborate solutions for the city's transportation needs, and almost half of the population were benefited by this.

Having access to open and public data creates business opportunities. But smart cities are not very intelligent is data analysis isn't part of the equation. It takes an effort from government, companies and professionals to build the cities of the future that we want to live in now.

References

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