

# SMART CITIES APPLICATION USING INTERNET OF THINGS

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## ABSTRACT

Modern technology changed world and people mind set. Technology move from (static & dynamic) web pages to most popular ubiquitous social networking web to modern mobile application, day by day sophisticated intuitive queries increases significantly. We cannot think our daily life without internet. Internet is connected with our daily life and here comes the term Internet of Things. IOT transforming the internet into a fully integrated future internet. Practical application of IOT found in many industries today, including precision agriculture, building management, health care, energy, advancing education system and transportation. For consumer, connectivity provided by the internet of things cloud enhance their quality of life in multiple ways such as, energy efficiency and security at home in city. Connected smart devices will enable a reduction in utility bills and outages. Development of smart grid, data analytics and autonomous vehicles will provide an intelligent platform to deliver innovations in energy management, traffic management and security via remote monitoring. IOT is a system of interrelated computing mechanical and digital devices, that are provided with unique identifiers without requiring human to human or human to computer interaction. The cities are transforming by improving infrastructure creating most efficient and cost effective municipal services. Enhancing public safe and more engaged in the community. In smart cities people are access various real-time information about the weather condition, traffic and local objects on which automatic decision, actions are planned. Urban IOTs in fact are designed to support the smart cities vision, which aims at exploiting the advanced communication technologies to support added-value services for the administration of the cities and for the citizens.

**Keywords:** Internet of Things; Smart City; Smart Devices; Advance Technologies;

## I. INTRODUCTION

The next generation of computing will be outside the realm of the traditional laptop & desktop. In the IOT paradigm, many of the objects that surround with us will be on the network in one form to another form. The sensor networking technologies will rise with new challenge, in which information are invisibly embedded around us.

Kevin Ashton, co-founder of the Auto-ID Centre at MIT, first mention the Internet of Things in a presentation he made to Procter & Gamble in 1999. With the help of technology, education is moving from a knowledge-transfer model to a collaborative, active and self-directed model that helps students increase their knowledge and develop a platform called “open learning” i.e anyone can learn any concept at any time with the help of interconnection of things called IOT.

## II. RELATED WORK

IOT divided into three paradigms – internet-oriented, things oriented (sensors) and semantic-oriented (knowledge). Smart surveillance, safer transportation, smart energy management systems and environmental monitoring all are the application of IOT for smart cities. Smart cities are the real substantial solutions for the troubles people usually face due to population outburst, pollution, poor infrastructure and shortage of energy supplies. Bigbelly smart waste and recycling system is a smart waste management system for smart cities.

Libelium has launch a Smart Parking solution for Smart Cities that allows citizens to detect available parking spots. The new surface parking device -with LORAWAN and Sigfox- features smaller size, higher accuracy and faster time of detection facilitating lower installation costs. The Air Quality Egg is a smart sensor system which his designed to track traces of CO and NO<sub>2</sub> in the home environment. It is dependent on the participation of community to determine air quality in their environment. It is highly extensible and inexpensive system which can be made from DIY sensors. 5.GE Tier 4 Locomotive is loaded with 250 sensors to measure staggering 150,000 data points in a minute.

This data combined with other incoming streams of data from informational and operating systems helps in anticipating events and help take driving decisions in real time. Landis+Gyr's grid management solutions are smart programs that provide capabilities to automate analyze as well as response to energy requirements in a smarter manner. They offer leading-edge tools that help both suppliers as well as consumers to reduce peak use problem as well increase energy use efficiency. Advanced metering will make energy management easier for everyone. Landis+Gyr are a wide range of energy management products. The smart metering solution offered by Landis+Gyr consumers to better understand their energy needs as well help them with load management as well.

Master node also consists of moisture sensor, relays to control the lights and other systems. A web application and the android application is developed to monitor and control the master node and master node controls the slave node. A user is provided with login ID and Password, whenever user wants to monitor data, user send the request to master node then according to request master provide the data like GPS Latitude and Longitude, Meter reading etc. to web based application through internet. If user wants to control the system, user send command to master unit, according to command master operate the relays through internet. This system is designed so that user can monitor and control data from anywhere in the world where internet is available.

## III. SMART CITY SERVICES

Traffic Management: Self-driving cars leading to better traffic management, lesser accidents, and reduction in the number of vehicles on the streets. For conventional vehicles, innovations like smart traffic signals (that self-manage according to the traffic), parking assist apps and sensors, and real time traffic updates will make things much smoother. Home automation: Smart city technologies will extend to our homes as well. These smart gadgets can easily be accessed and managed remotely to increase home safety and efficiency.

Waste Management: Waste management is a primary issue in many modern cities, due to both the cost of the service and the problem of the storage of garbage in landfills. The use of intelligent waste containers, which detect the level of load and allow for an optimization of the collector trucks route, can reduce the cost of waste collection and improve the quality of recycling to realize such a smart waste management service.

**Resource Management:** Smart cities applications are not just focused on improving our lifestyles. They have a crucial role to play in conservation of our natural resources. Such as solar and electric vehicles are examples of such eco-friendly solutions that are steadily gaining popularity. Besides that, the overall energy management solutions are going to get more sophisticated with the help of advanced sensors and data management. Our future lives in smart cities are full of possibilities. All the discussed technologies will mature and there will be many new innovations as well. In other words, we are in for some very exciting times, very soon!

**Noise Monitoring:** Noise can be seen as a form of acoustic pollution as much as carbon oxide (CO) is for air. In that sense, the city authorities have already issued specific laws to reduce the amount of noise in the city center at specific hours.

IOT offer a noise monitoring service to measure the amount of noise produced at any given hour in the places that adopt the service. Besides building a space- time map of the noise pollution in the area, such a service can also be used to enforce public security, by means of sound detection algorithms that can recognize, for instance, the noise of glass crashes or brawls.

**Traffic Congestion:** Even though camera-based traffic monitoring systems are already available and deployed in many cities, low-power widespread communication can provide a denser source of information. Traffic monitoring may be realized by using the sensing capabilities and GPS installed on modern vehicles, and also adopting a combination of air quality and acoustic sensors along a given road.

This information is of great importance for city authorities and citizens: for the former to discipline traffic and to send officers where needed and for the latter to plan in advance the route to reach the office or to better schedule a shopping trip to the city centre.

**Connectivity:** We have many examples of free and fast Wifi access at public places. Plans are already in place in to extend this across cities.

Once that happens, our cities will become truly connected. Another major connectivity breakthrough is a cloud based data repository. All local public and private agency can draw reference from a common pool of information. Records management will become easier and more accurate. This will also facilitate big data analytics for city management authorities.

**City Energy Consumption:** IOT provide a service to monitor the energy consumption of the whole city, thus enabling authorities and citizens to get a clear and detailed view of the amount of energy required by the different services (public lighting, transportation, traffic lights, control cameras, heating/cooling of public buildings, and so on). In turn, this will make it possible to identify the main energy consumption sources and to set priorities in order to optimize their behavior.

This goes in the direction indicated by the European directive for energy efficiency improvement in the next years. In order to obtain such a service, power draw monitoring devices must be integrated with the power grid in the city.

**Smart Parking:** The smart parking service is based on road sensors and intelligent displays that direct motorists along the best path for parking in the city.

The smart parking service can be directly integrated in the IOT infrastructure, because many companies in Europe are providing market products for this application. Furthermore, by using short-range communication technologies, such as RFID or NFC, it is possible to realize an electronic verification system of parking permits in slots reserved for residents or disabled, thus offering a better service to citizens that can legitimately use those

slots and an efficient tool to quickly spot violations. Smart Lighting: In order to support the 20-20-20 directive, the optimization of the street lighting efficiency is an important feature.

In particular, this service can optimize the street lamp intensity according to the time of the day, the weather condition, and the presence of people. In order to properly work, such a service needs to include the street lights into the Smart City infrastructure. It is also possible to exploit the increased number of connected spots to provide wifi connection to citizens.

In addition, a fault detection system will be easily realized on top of the street light controllers.

## IV. CONCLUSION

It would be fair to say that we cannot predict how lives will change. We did not predict the Internet, the Web, social networking, Facebook, Twitter, millions of apps for smartphones which has all qualitatively changed societies' lifestyle. New research problems arise due to the large scale of devices, the connection of the physical and cyber worlds, the openness of the systems of systems, and continuing problems of privacy and security. It is hoped that there is more cooperation between the research communities in order to solve the myriad of problems sooner as well as to avoid re-inventing the wheel when a particular community solves a problem.

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