

Automated City Based on Arduino-Uno and Internet of Things

Dinesh Singh, Department Of Electrical Engineering
Galgotias University, Yamuna Expressway Greater Noida, Uttar Pradesh
E-mail id - dineshsingh@Galgotiasuniversity.edu.in

ABSTRACT: *The City of the Future is Smart. It is completely integrated and can monitor traffic, save energy, fire crime and the internet of things helped by big data. More than half of the world's population lives in urban areas, and this number is growing rapidly, generating enormous challenges: more people, more traffic, more noise, more electricity, more water, and more waste. To help deal with these challenges, smart cities are intended. In this paper, projects in India, Nigeria, South Korea or Malesia, for example, are popping up everywhere. A livable city that can think for itself Example: smart city is dreams of the future; conventional street lights are replaced by smart lighting that can be connected to the internet of things, smartphones and broadband; smart mobility that causes fewer accidents; smart logistics such as drones and robots provide even better facilities such as smart mobility that causes fewer accidents.*

KEY WORDS: *Smart City, Cloud Computing, Internet of Things, Drones, Robots, Smart phones.*

INTRODUCTION

Technology is growing increasingly across the globe. As we know, internet access was previously restricted to devices such as desktops, cell phones, tablets, smartphones, laptops and many other devices; but now with IOT, almost all devices can be connected to the internet and remotely monitored[1]. The Internet of things is molding in the manner one live their lives. It helps us get better inside into the working of things around us. IOT is a system of interrelated devices connected to the internet, to transfer and receive data and information from one device to another. to prove this technology Smart home is one of the Suitable examples to show how IOT works. In smart homes appliances like AC, television, lightning, electric supply and security alert are interconnected to share data with the user or the authorized person of the house over the Smartphones application. The user can now get the detailed data and information about the working appliances in the house.

Until recently the internet only helps people to get connected around and interact with each other. But now objects or things have the ability to sense the surrounding to interact and collaborate with one another. Forexample, in the house when the user wakes up alarm clock gets off of and the window automatically yes open to let the inlet of fresh air in the house, turn on the coffee machine, sets the AC as per the body temperature, and even this technology helps to turn on the water heater as per the use. All these mechanisms seem to be alluring but there are a lot more functions going on in the background which are not visible with our naked eyes to ensure the function of the Machines connected to the internet[2]. There are a number of components in between for efficient communication between the systems to accurately process the data we get. It is divided into two groups within the context of Reference IOT devices, namely general devices and sensing devices, where the key components of the data hub and exchange of information are in the general devices. The wired or wireless interfaces connect these devices, smart home appliances, smart industries, smart irrigation systems and many other smart applications are examples of such devices.

On the other hand, the sensing system contains sensors as well as actuators that help to calculate temperature, humidity, light intensity, and other parameters. Here, the IOT Devices link the data and information collector from the sensors and actuators to the internet with the aid of gateways to the processing network phase and transfer it to the cloud. However, a cloud accesses both the storage and processing unit, actions are carried out for more learning and inferences on the collected data. The wired and wireless interfaces like Bluetooth, Wi-Fi, GSM and ZigBee are used to provide connectivity to ensure ambiguity. Applications needed to support a diverse set of devices and Communication protocols from minute sensors capable of sensing and reporting the

desired factor to powerful service that are utilized for data analysis. In the Field of irrigation as well as pouring of water in the ground everytime we have to manually check the water present in the soil but with the help of IOT this thing can be done automatically wherein the sensors and the actuator installed automatically check the moisture present in the soil and send this information to The IOT Gateway and with the help of communication process the Gateway significantly aggregates the data and feeds it to the cloud with the help of Wi-Fi.

Once the moisture level in the soil drops the system immediately triggers and sprinkles water. However, with information stored in the cloud The detailed analysis like the time of the Sprinkle water turned on, the rate of soil moisture at which the Sprinkle turns on and so forth can be done and a report can be sent to the smartphone of the user. With improved response monitoring and Analytical capabilities IOT is being adopted in almost all the industries and domains, opening doors to endless applications to make the city smart. In the present scenario IOT technology has been extensively used to reduce the human burden. IOT is deployed for smart homes, wearable watches, smart vehicles, smart irrigation, smart cultivation, smart retail smart grids, smart Healthcare and the most important the Smart City. With such a broad set of applications the future of the internet of things seems to be more promising than ever before. In the year of 2018 there were about 23 billion devices connected to the internet which was double the range of the world population. The information collected from the experts calculated that about 80 billion of the devices will be connected to the internet by the year 2025. By this we can conclude that IOT is an Illusion to connect all the devices to the internet. The integration of the internet of things with other growing Technologies like artificial intelligence, big data, machine learning is flooring the way from many novel, advanced and fascinating innovations[3].

➤ **Smart Grid:**

In the early time there were centralized power station generating system which is used to feed power into the grid to supply power to the users. Many engineers are placed to monitor the grid to keep it stable, this is why because the sudden change in the load will change the voltage and frequency of the grid. So it is necessary to monitor those grids. By involving IOT to the grid a generation of smart grid will be raised which enables the utility to do remote meter reading, remote disconnecting and reconnection, it also provides pre-paid metering [4]. In addition, analytical and the monitoring of the distribution networks provides them great insight to them along with false isolation and real time network wondering. The device agnostic IOT and an analistic platform can integrate any type of device or monitoring device or meter into the similar platform. This provides flexibility, scalability and means of operation for the distribution of utility[5].

➤ **Smart Mobility:**

Mobility in innovation are shaping the future and modifying the globe as we are acquainted with it. Small community are looking for the sustainable, a cooperative social responsibility aspect where co-operation is now beginning to pay more value on more than just making a profit. Smart community can have to make sure that they are economically profitable, to make more profit IOT and part of it is a system to develop more profit to the world[6].

➤ **Waste management:**

In the world of tomorrow, no decision will be taken lightly anymore. Companies will increase their efficiency exponentially or town will be converted into smart cities by connecting IOT. When we talk about waste management system wireless sensors are the devices which measure the appropriate or exact level of the waste in the bin, these sensor collects the real time information of the bin. The proximal IOT platform helps to access the lower network which consumes fastest network and 4G network[7]. However, the sensors batteries last for longer period of time. With the involvement of IOT the smart waste management involve many facilities where one can identify the level of waste around the entire world with a blink. By sending the collection of vehicles, unlabored is absolutely necessary where we can optimize waste management. This

technology will increase efficiency, reduce fuel and energy consumption. The waste trucks will be drive through the streets and the waste material can be emptied at correct timing[8].

➤ **Smart Irrigation monitoring system:**

The plants relay on water in the form of rain or irrigation. Plants are stationary and cannot communicate as human do, so they cannot ask for water when they need. As like other living being's plants have different water resources for growing and bio-medical condition. By suppling water to the plant helps crops to grow and provides nutrients to the plants, this process helps the plant keeping healthyand resist moisture in the soil. To fulfil this process, the farmer, need to get acquainted to the needs of the plants and that is the main process of cultivation. That is the thing what water management system used to do. This technique helps the farmer to listen and understand the need of water in the crop cultivation. By implementing IOT devices such as soil moisture sensors, water fall sensors, pump control, humility measurement sensor and sophisticated crop features that were in the causing with the effect of environmental crop. The cultivated water management system helps in ideally watering the crop based on their specific data need. The wireless sensors constantly monitor the weather and sends data to the cloud. However, the sensors help to activate the modules for the cultivation of corps and supply of water as per the needs.

REVIEW OF LITERATURE

In this research paper Husam Rajab et.al. had proposed a smart city based on IOT wherein with the huge distribution of Internet of Things (IOT) is allowing Smart City applications and enterprisesaround the world. This paper hadpresented an extensive analysis of the concepts of IOT and smart cities and their motivations and applications. This paper mainly describes about the major challenges and weaknesses of implementing the IOT technologies based on smart city paradigms.In this paper the highest research motivations were explained and then some useful applications outlined. It was characterized that how daily activities can be developed, improved and enhanced by employing them. Furthermore, in this work, the challenges which occur when implementing the IOT system were utterly explained. In this regard, the integration of the IOT platform with other autonomous and smart systems for implementing intelligent and widespread applications is one of the most affecting future trends presented.

Moreover, by explaining a mechanism to overcome some of the critical challenges like management and coordination and smart parking lots are being presented. The IOT with its implementation and features should, in particular, employ intelligent systems and sensors to preserve the rights of the smart city citizens.In this article author Yasir Mehmood et.al. had presented a recent trends and advancements in the IOT-enabled smart cities paradigm where the best bring froths of an IOT-based smart cities taxonomy, prime open source platforms, and case studies of recent deployments, as well as unearthing several open research challenges. The contributions of this study were a taxonomy of the IOT-based smart city environment, an overview of major open platforms for smart cities, recent synergies and a number of case studies on various smart city deployments reported by various enterprises and mainly an unearthen several IOT-related open research challenges to give future directions.

Withthe latest synergies and initiatives in worldwide is taken to promote IOT in the context of smart cities. This paper mainly highlight several challenges in order to give future research directions[9].H. Arasteh et.al. had proposed a survey on smart city based on internet of things. Due to the growing developments in advanced metering and digital technologies, smart cities have been equipped with different electronic devices on the basis of Internet of Things (IOT), therefore to become smarter than early time. This project aim is to provide a comprehensive review on the concepts of smart cities and on their motivations and applications. Moreover, this survey describes the IOT technologies for smart cities and the main components and features of a smart city. Jaehak Byun et.al. had presented a research paper on smart city implementation based in IOT (Internet of Things) wherein IOTwas the network of physical objects-devices, vehicles, buildings and other items embedded with electronics, software, sensors, and network connectivity-that enables these objects to

collect and exchange data. The internet of things allows objects to be sensed and controlled remotely across existing network infrastructure. By presenting applicable IOT business models to help business entities and research institutes participating in related projects build a smart city as part of the future vision of local governments by reflecting the new information paradigm of IOT. A limitation of this study, however, is the lack of available data in Korea that hinders the required empirical analysis on the benefits of IOT technology[10].

CONCLUSION

This paper identified the current situation and progress in the creation of a smart city in the IOT region. Different prospects are carried out in different applications, including smart cities with fast servers to connect from one mobile device to another, smart health care systems, smart houses, smart industries, and so on, to make this process work in advance. The implementation and corresponding study concluded that several wireless technologies are used to build or design smart cities, including Wi-Fi, ZigBee, Li-Fi, Bluetooth etc. These wireless technologies are the Internet medium between the general device and the sensing device that gathers data and information and stores data in the cloud, then transmits a signal to the device after evaluating the stored data with the current data to function in a more advanced and better manner. This immediate transmission and data and information reception allows the city to be smart where things are automatically operated without human intervention. With the participation of these paper devices, greater security, viability, scalability and sustainability are run. Without involvement with bugs. In the fields of sustainability, stability, scalability, safety, hardware, software and many more, there are some challenges. These problems can be easily solved by integrating artificial intelligence.

REFERENCES

- [1] K. Saha, "A remote sensing approach to smart city development in India: Case of Bhopal City, Madhya Pradesh," 2017, doi: 10.1145/3055219.3055232.
- [2] J. Sadowski and F. Pasquale, "The spectrum of control: A social theory of the smart city," *First Monday*, 2015, doi: 10.5210/fm.v20i7.5903.
- [3] H. Farhangi, "Smart Grid," in *Encyclopedia of Sustainable Technologies*, 2017.
- [4] *Advanced metering infrastructure and customer system*. 2016.
- [5] A. Ipakchi and F. Albuyeh, "Grid of the future," *IEEE Power Energy Mag.*, 2009, doi: 10.1109/MPE.2008.931384.
- [6] N. Baucells Aletà, "SMART MOBILITY IN SMART CITIES," 2016, doi: 10.4995/cit2016.2016.3485.
- [7] T. Anh Khoa *et al.*, "Waste Management System Using IoT-Based Machine Learning in University," *Wirel. Commun. Mob. Comput.*, 2020, doi: 10.1155/2020/6138637.
- [8] M. Saidi and A. Ghaffari, "Waste management," in *Design and Operation of Solid Oxide Fuel Cells: The Systems Engineering Vision for Industrial Application*, 2019.
- [9] Y. Mehmood, F. Ahmad, I. Yaqoob, A. Adnane, M. Imran, and S. Guizani, "Internet-of-Things-Based Smart Cities: Recent Advances and Challenges," *IEEE Commun. Mag.*, 2017, doi: 10.1109/MCOM.2017.1600514.
- [10] Y. He, I. Stojmenovic, Y. Liu, and Y. Gu, "Smart city," *International Journal of Distributed Sensor Networks*. 2014, doi: 10.1155/2014/867593.

• Basant Ali Sayed Alia, Abeer Badr El Din Ahmedb, Alaa El Din Muhammad, El Ghazalic and Vishal Jain, "Incremental Learning Approach for Enhancing the Performance of Multi-Layer Perceptron for

Determining the Stock Trend", International Journal of Sciences: Basic and Applied Research (IJSBAR), Jordan, page no. 15 to 23, having ISSN 2307-4531.

- Dildar Husain, Mohammad Omar, Khaleel Ahmad, Vishal Jain and Ritika Wason, "Load Status Evaluation for Load Balancing in Distributed Database Servers", 3C Technology, Glosses of innovation applied to the SME, ISSN: 2254-4143, Vol. 29, Issue 2, page no. 422-447.
- Dipti Mishra, Mohamed Hashim Minver, Bhagwan Das, Nisha Pandey and Vishal Jain, "An Efficient Face Detection and Recognition for Video Surveillance", Indian Journal of Science and Technology, Volume 9, Issue 48, December 2016, page no. 1-10 having ISSN No. 0974-6846.
- J Ganeshkumar, N Rajesh, J Elavarasan, M Sarmila, S Balamurugan, "A Survey on Decentralized Access Control Strategies for Data Stored in Clouds", International Journal of Innovative Research in Computer and Communication Engineering, 2015
- J Ganeshkumar, N Rajesh, J Elavarasan, M Sarmila, S Balamurugan, "Investigations on Decentralized Access Control Strategies for Anonymous Authentication of Data Stored In Clouds", International Journal of Innovative Research in Computer and Communication Engineering, 2015
- VM Prabhakaran, S Balamurugan, S Charanyaa, "Sequence Flow Modelling for Efficient Protection of Personal Health Records (PHRs) in Cloud", International Journal of Innovative Research in Computer and Communication Engineering, 2015

