

Making Cities Smarter Through IOT:A Review

AarsiKumari^[1], Mr.Arvind Kumar Pandey^[2]
 ARKA JAIN UNIVERSITY, JHARKHAND

Abstract-As Urban cities are developing faster and other people using the resources provided naturally at their convenience level which can cause exhaust of those resources. So to make most use of resources and produce less wastage, cities are made smarter through Information and communication technologies (ICT) which is used to develop, deploy and promote sustainable development. This work represents a review for the technologies used for the making cities smarter and growing challenges in urbanization. This paper will cover the various areas like parking, lighting, health, traffic, homes, etc. The work will represent how these things are connected to each other through IOT devices like sensors for the proper use time and energy. This will lead to easy and fast access of things and a flexible life to perform many works simultaneously

Index Terms- IOT, Sensors, ICT, Challenges, Urbanization,Resources.

I. INTRODUCTION

As the population density is increasing rapidly in urban cities and also the rural are moving towards urban cities, there is large demand of infrastructure and services for the necessities of urban areas.

According to this there's a big demand of digitally connected equipment's as these can be automatically operated and saves the energy and time of peoples. Nowadays people are rushing and so busy in their future development, so they want easier and faster equipment's that will save their times. Also as per the population density is increasing rapidly the natural resources are not be seen to exists for longer time, so these devices are so designed that the can reuse many of the waste and make the resource to be used at its maximum level with producing minimum

amount of wastage. These are also working in the field of using those resources which will never exhaust like wind, air, sunlight, heat, etc.

It has a worked on the field of security, safety, health, etc. These are the some fields which has been updates through information and communication technologies to send and receive data. Records are kept for analysing data and giving reviews according to records for future assumptions. Technology has developed many fields but it has still much area to cover for more reliable environment.

II. LITERATUREREVIEW

S. no .	Title	Author	Findings	Remark
1.	IOT Based Smart Cities: A Survey	Hamidreza ArastehNir oo Research Institue(N RI)	Various features and characteristics of IOT system where reviewed and also effectively motivated towards using them. Here description has been given of enhancing and developing daily activities by utilizing	Privacy right still remains the essential challenge of the citizens for that a proper mechanism should be provided. For that intelligent system and sensors can be used to preserve the

			them.	right.
2.	SmartCities: A Survey on Security Concerns.	Sidra Ijaz, Munam Ali Shah, Abid Khan And Mansoor Ahmed	The work gives an overview of threats, vulnerabilities and available solution which leads to that there is a much research needed in this field. As this paper as identified many risks and vulnerability.	An information security problem ranges over variety of aspects such as social, economic, structural and governance factors. And the major issue is the security, which is the loophole throughout the smart city implementation.
3.	Building IOT based applications for smart cities: How can Ontology Catalogs helps.	AmelieGyard*, Antoine Zimmermann* and AmitSheth, Mines saint-Etienne	In this proposal first four ontology catalogs for IOT and Smart cities (Ready4 SmartCities, LOV, LOV4IoT, and OpenSensingCity) have been analyzed, and then some studies	Examining the quality of ontologies so that it can be reused and improve semantic interoperability. Interesting area for

			about ontologies to build smart cities based on IoT technologies. And at last whole work is done under the aim to help developers to reuse the existing ontologies for building more applications.	future work is enabling unifying and aligning ontology catalogs to update themselves with new technology, and automatically finds and fixes there bugs.
4.	A Survey On Data Management, Security And Enabling Technologies.	AmmarGharaibeh, IssaKhalit, Mohammad Salahuddin, Ala Al-Fuqaha.	In this paper survey is done under various use cases and deployments of smart city infrastructure, applications and services. Here data management techniques are discussed for data acquisition, processing and dissemination	Building proper infrastructure, frameworks and data management system are the future work to be done. Again the data acquisition is the field to be more worked and improved for better performance.
5.	IoT-enabling Smart	Amit Kumar Sikder*,	Here, it has been focused	The paper has

	Lighting Systems for Smart Cities	Abbas Acar*, Hidayet Akusu*, A.Selcuk Uluagac*, Kemal Akkaya.	on smart lighting system for indoor and outdoor lighting systems (SiLS, SoLS) which helps reduce the use of power consumptions up to 33.33%. So this proposal is for the future energy saving system which can be used for decades in future.	given the better idea for future saving but still has shortcomings such as security issues of outdoor lighting systems. And the management of these devices which are located in street and roads.
6.	Smart City and the Applications	Kehua Su, Jie Li, Hongbo Fu.	It has proposed the idea for developing china and also the work which china has been working for smart planet system, including sensor technologies, network technologies, physical networking technologies and intelligent	After such developments also developers have to convince people to use it make changes in their living system, as people are used-to their back lives and don't want to

			t information processing technologies.	change or if changed they are not use-to it, which will take time. People would have to accept the changes.
--	--	--	--	---

III. Smart City: The area to be connected through Information and Communication Technologies (ICT).

- A. *Smart Homes*: Smart homes mean a home where electronic and physical devices are connected through digital system using sensors to track records of activities taking place in houses. Motion sensors such as Passive Infrared (PIR), MicroWave(MV), Dual Technology Motion Sensors, Area Reflection Type, Ultrasonic, Vibration. These devices are used to detect fire, water leakage, smoke, dust, or any intruder which tries to enter in house without permission. These devices give a notification to owner regarding any of these possibilities so that he/she can take right decision according to requirements. It also helps to save energy consumption by detecting people and automatically operating the electronic devices such as lights, fan, ac, etc. And the most important part is door security system which helps the owner to detect if any door or window is broken by thieves. Or it can also detect if any intruder moving in boundaries.
- B. *Smart Parking's*: Smart parking can be done through various sensors like Ultrasonic sensors, Electromagnetic field sensors, Infrared sensors(IR sensors). These devices can detect and measures

magnetic fields or by measuring distances which results as if the parking slot is empty or full. This leads to data science and computer vision technologies based on video streaming which will automatically open the gates of parking area or navigate for cars to available and suitable parking slots.

C. *Street Lights*: Street Lights are connected through sensors to be operated automatically when its required or area becomes black it will switch on the light and when darkness fed its switch off the lights. It is able to do so with the help of light and weather sensors. This system helps in saving power consumptions as street light are not noticed by people regularly to switch on or off, so this can automatically operate the lights by sensing through sensors. IoT based communication for street lights is bi-directional monitoring system which can receive and send information and commands to and from the lamps. It dependence on the information when to dim the lights by detecting peoples are there or not. It also depends upon the weather condition, road condition, time of day, natural lights are available or not etc. In this field RIIM(Radio crafts Industrial IP Mesh)-An Effective Solution For Smart Street Lighting is the product used nowadays.

D. *Smart Traffic System*: Smart traffic system gives the current condition of traffic on roads. Its has many sensors which detects the presence, speed, weight, type and number plate of vehicles. These devices are used to keep records of vehicles speed, Automatic Number Plate Recognition(ANPR) is used in toll roads for automatically identifying the number and generating toll tax bill which saves the jam over toll plaza. There are many environmental sensors which is used to sense fog, wind, noise, weather, ice, pollution, visibility on roads. Inductive Loop Detectors(ILD), Microwave Radar

Detector, Infrared Sensors, Ultrasonic Detectors, Acoustic Detectors, Magnetometers are the devices places on roadways to detect vehicle presence and how much traffic is there in the road some of them cannot work on some weather conditions, but some can work in any weather condition to give accurate and real-time information.

E. *Smart Wearable Health Monitoring system*: Some of the simplest and most wearable technologies are wearable fitness trackers, Smart Health Watches, Wearable ECG Monitors, Wearable Blood Pressure monitors, Biosensors which allow consumers to keep record of their health every minute. These systems are more demandable now-a-days as people wants to keep track of their health. Its increase the awareness of health and now people are more responsible towards there health's which reduce the risk factors of heart attacks, high blood pressure or high pulse rates.

IV. METHODOLOGY

Here are some points including all the steps which were followed while preparing this paper.

1. Firstly need was to identify the area of interest and the topic under that. Select the topic and search them for social platforms.
2. Talk to peoples according to the topics and get the people's views noted in points.
3. Make keywords for the topics and search them on books and articles for background knowledge.
4. Keep the references, links, name of the book saved somewhere for future knowledge.
5. Read some more research and thesis related to the topic, and mention literature review on paper for knowledge of what works has been done.

6. Use search engines like Google scholar, shodhganga to get information about the related topics and also keep the references of same.
7. Evaluate the work, what finding has been done. Reviewed all the information and conclude what has at the last with future scopes.

V. CONCLUSION

This literature was reviewed to investigate various characteristics and features of IoT system used for making smart cities. The paper covers various factors of smartness of city and motivate in the field of using IoT devices to get real-time information and take decision according to that information. These systems helps people save their time and energy as the can sense and operate automatically according to the conditions. But above all these development there are still loopholes, there is lack of these devices which are placed publically of getting theft. Or lack of maintainers and the most important the people who has to adapt these changes and make use-to to there day-to-life.

VI. REFFERENCES

- [1] <http://hdl.handle.net/10603/195985> from Shodhganga.
- [2] Arasteh, H., Hosseinneshad, V., Loia, V., Tommasetti, A., Troisi, O., Shafie-khah, M., & Siano, P. (2016, June). Iot-based smart cities: A survey. In 2016 IEEE 16th International Conference on Environment and Electrical Engineering (EEEIC) (pp. 1-6). IEEE.
- [3] Gharaibeh, A., Salahuddin, M. A., Hussini, S. J., Khreishah, A., Khalil, I., Guizani, M., & Al-Fuqaha, A. (2017). Smart cities: A survey on data management, security, and enabling technologies. IEEE Communications Surveys & Tutorials, 19(4), 2456-2501.
- [4] Ijaz, S., Shah, M. A., Khan, A., & Ahmed, M. (2016). Smart cities: A survey on security concerns. International Journal of Advanced Computer Science and Applications, 7(2), 612-625.
- [5] M. M. Rathore, A. Ahmad, A. Paul, and S. Rho, "Urban planning and
- [6] building smart cities based on the internet of things using big data
- [7] analytics", Comput. Netw., 2016, DOI: 10.1016/j.comnet.2015.12.023.
- A. Botta, W. de Donato, V. Persico, and A. Pescapé, "Integration of
- [8] cloud computing and internet of things: a survey", Future Gener.
- [9] Comput. Syst., vol. 56, pp. 684–700, 2016.
- [10] Sikder, A. K., Acar, A., Aksu, H., Uluagac, A. S., Akkaya, K., & Conti, M. (2018, January). IoT-enabled smart lighting systems for smart cities. In 2018 IEEE 8th Annual Computing and Communication Workshop and Conference (CCWC) (pp. 639-645). IEEE.
- [11] Jin, J., Gubbi, J., Marusic, S., & Palaniswami, M. (2014). An information framework for creating a smart city through internet of things. IEEE Internet of Things journal, 1(2), 112-121.
- [12] Jin, J., Gubbi, J., Marusic, S., & Palaniswami, M. (2014). An information framework for creating a smart city through internet of things. IEEE Internet of Things journal, 1(2), 112-121.
- [13] Mehmood, Y., Ahmad, F., Yaqoob, I., Adnane, A., Imran, M., & Guizani, S. (2017). Internet-of-things-based smart cities: Recent advances and challenges. IEEE Communications Magazine, 55(9), 16-24.
- [14] Sanchez, L., Munoz, L., Galache, J.A., Sotres, P., Santana, J.R., Gutierrez, V., Ramdhany, R., Gluhak, A., Krco, S., Theodoridis, E., Pfisterer, D.: SmartSantander: IoT experimentation over a smart city testbed.
- [15] Computer Networks (2014)
- [16] Ismagilova, E., Hughes, L., Rana, N.P. et al. Security, Privacy and Risks Within Smart Cities: Literature Review and Development of a Smart City Interaction Framework. InfSyst Front (2020). <https://doi.org/10.1007/s10796-020-10044-1>
- [17] Guerrero-Ibáñez, J., Zeadally, S., & Contreras-Castillo, J. (2018). Sensor Technologies for Intelligent Transportation Systems. Sensors (Basel, Switzerland), 18(4), 1212. <https://doi.org/10.3390/s18041212>
- [18] Appelboom, G., Camacho, E., Abraham, M.E. et al. Smart wearable body sensors for patient self-assessment and monitoring. Arch Public Health 72, 28 (2014). <https://doi.org/10.1186/2049-3258->

72-28

- [20] M. M. Rathore, A. Ahmad, A. Paul, and S. Rho, "Urban planning and buildings smart cities based on the internet of things using big data analytics", *Comput. Netw.*, 2016, DOI: 10.1016/j.comnet.2015.12.023.
- [21] A. Botta, W. de Donato, V. Persico, and A. Pescapé, "Integration of cloud computing and internet of things: a survey", *Future Gener. Comput. Syst.*, vol. 56, pp. 684–700, 2016.
- [22] <https://rno-its.piarc.org/en/its-basics-its-technologies-data-and-information/roadway-sensors>.
- [23] <https://www.businessinsider.in/science/latest-trends-in-medical-monitoring-devices-and-wearable-health-technology/articleshow/70295772.cms>
- [24] M. M. Rathore, A. Ahmad, A. Paul, and S. Rho, "Urban planning and buildings smart cities based on the internet of things using big data analytics", *Comput. Netw.*, 2016, DOI: 10.1016/j.comnet.2015.12.023.
- [25] A. Botta, W. de Donato, V. Persico, and A. Pescapé, "Integration of cloud computing and internet of things: a survey", *Future Gener. Comput. Syst.*, vol. 56, pp. 684–700, 2016.
- [26] D. Kyriazis, T. Varvarigou, A. Rossi, D. White, and J. Cooper, "Sustainable smart city IoT applications: the case of electricity management & Eco-conscious cruise control for public transportation", *IEEE 14th International Symposium and Workshop on World of Wireless, Mobile and Multimedia Networks*, pp. 1–5, 2013.
- [27] "Strategic opportunity analysis of the global smart city market", <http://www.egr.msu.edu/~aesc310-web/resources/SmartCities/Smart%20City%20Market%20Report%202.Pdf>.
- [28] J. Gubbi, R. Buyya, S. Marusic, and M. Palaniswami, "Internet of Things (IoT): A vision, architectural elements, and future directions", *Future Gener. Comput. Syst.*, vol. 29, pp. 1645–1660, 2013.
- [29] L. Atzori, A. Iera, and G. Morabito, "The internet of things: a survey", *Comput. Netw.*, vol. 54, pp. 2787–2805, 2010.