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EFFECT OF INTERNET OF THINGS IOT APPLICATION AND SMART CITIES

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ABSTRACT

In an IOT based smart city, the most astonishing and, the most reflective component would be a much more efficient water supply. This kind of water supply treatment plant that would be established will be a much more advanced version of the already existing kinds. This water supply would help many people across the globe to get access to clean, drinking water and sanitation.

Also, in such a city there would be provided an innovative solution to the huge traffic congestion being faced these days that leads to delays in reaching to work, rash driving and results in huge chaos and accidents. Thus, it would be great to kept in mind to provide a mid-way out to deal with these traffic issues in a more reliable and efficient way. We would provide a more reliable public transportation. Public transportation these days are the most relied means of conveyance for people living in all parts of the world. Thus, we would build up a more reliable public transport structure that would be effortless. This would minimize the deals, difficulties and would maximize the ease for the travelers. The next thing would be to make energy efficient buildings that will aim at minimizing the wastage of energy of the entire community. These buildings would run on least amount of possible energy (for e.g. solar energy) resulting in minimum loss. Safety is a major concern these days. There are lot of safety issues popping up in all parts of the world. Thus, in our model, we would provide an improved public safety that links back to the infrastructure, buildings, lifts, escalators, elevators, public transportation etc. Thus, with improved public safety, all these factors would be procured. However, with all these aims being enforced in the city, there would come up a lot of challenges that would be needed to countered. The system software that would be the base of framework of this IOT based smart city, would be vulnerable to

hacks, system failures i.e. trojans, malware and viruses. This would result in privacy and security concerns but obvious, and also difficulties in interoperability, but suitable specific would be procured to counter these issues as well.

Keywords : IOT, Smart City, traffic, People.

1. INTRODUCTION

A smart city is focused on providing the advanced utilities throughout a city. These mainly includes an efficient water system, more advanced traffic light systems (ways to avoid traffic congestion[1]), a well maintained and structured infrastructure to resolve the problems of rapidly increasing pollution and much more features that makes a city much better than the other ones.

IOT (INTERNET OF THINGS): IOT is a connection of multiple devices such as computers, sensors, electronics and many other software devices which provides a better alternative to the traditional system and connections.

Smart city through IOT: The idea of smart city can be achieved through IOT i.e. by implementing the ideas of IOT we can develop a smart city at a lower cost and maximum efficiency.

Firstly, we go through the attributes and main features of smart city such as smart lightning, smart water supply system, advanced traffic control system and much more. The main components that will be used in developing the city are sensors, GPS systems, advanced infrared cameras etc. then we see the issues or challenges in smart city from which the major one is data security.

2. ATTRIBUTES OF SMART CITY

An Innovative Solution to Traffic Congestion: Traffic jams are really tiresome in a busy city life. IOT provides an outstanding traffic management system to deal with this complication. Smart or intelligent traffic lights would play key role in this regard. These traffic lights have inbuilt sensors and advanced artificial intelligence systems. In spite of timing system like normal traffic lights they work on real time vehicular data[2] system in which signal changes according to the current traffic conditions on all sides of an intersection or junction[3].

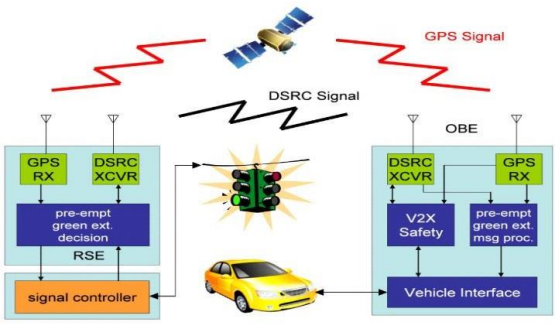

Fig 1 : Smart Traffic lights

In this fig.as shown clearly the whole system is based on real time vehicular data in

which real position of a vehicle can be traced through its registration number and inbuilt GPS system[4] and finally we use this on a large scale and can estimate the current traffic density on any side of road and traffic lights can respond according to the data calculated.

Energy Efficient System: IOT with the application of automation provides a satisfactory alternative for traditional lightning system to reduce power consumption by almost 35%. Automation[5] uses remote monitoring system which allows supervisors to regulate street lights through wireless connections with a fail resist or fail-safe nature that means even in a worst condition our solution fails the lights can still work normally without any interrupt. These lights embedded [6] with sensors which responds according to surroundings light conditions or brightness i.e. In foggy conditions sensors would turn the light on even if it is 12 of noon.

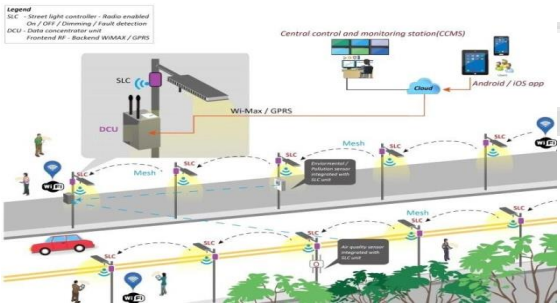

Fig 2: Smart street lightning system embedded with sensors

Minimized Crime rate: One of the major points of concern that is the rising crime rate can be tackled with the advanced video monitoring system an effective substitute of traditional camera[7] system. It consists of motion sensing models with low light capable infrared cameras and also have wireless battery powered options which surely curtail the crime rate and provide a safer environment.

Smart Water Supply and Management System: A Smart water management system consists of physical components such as pipes, reservoirs embedded with sensors which works on data analysis (water quality, pressure, consumption rate[8] etc.) in a particular area. It maximizes the efficiency of physical components in use so that we can save water and also cut down the cost of traditional system

Fig 3: Smart water management system

Fig 3. Shows a smart water management system based on pipeline and pump station monitoring with the help of data sciences and IOT. This system also checks the water quality on real time quality data basis. System should be under DMA control which is responsible for scheduling of water supply in different areas.

Challenges of Smart City through IOT Security: Security is one of the biggest and most significant issue for the deployment of IoT. With the increase in how many devices are connected on the internet, opportunities and incentives increase for exploiting vulnerabilities. Any one poorly designed device can be used to leak user data as hackers don't need to exploit every device but just the weakest link. Such exploits can be really bad and even harm people's safety and health[9]. For example: A weekly secured IOT based coffee machine can give hackers access to a network that also host health systems on which patients' lives depend on.

Securing IoT devices can only be successful if IoT ecosystem is secured as a whole. To achieve this IoT manufacturers need to concentrate on security as a requirement from beginning of the product development to deployment. Which includes tamper-proof hardware, secure upgrades, secure software, and security testing. Such common IoT security measures are:

- **Adding security during design phase:** Developers of IOT devices should include security at the start of any IOT based device development. Security in such devices should always be enabled by default. Providing software security patches and using secure hardware should also be a strict requirement for the development of such devices.
- **Login credentials should never be hardcoded:** A good security measure developers can take is to have users update the credentials[10] before allowing the device to function. Users should always update the credentials using a strong password or bio-metrics. An example of this is most routers shipping with login credentials "admin" which a lot of users don't update and therefore remain vulnerable to security hacks.
- **Identity management:** Detecting and identifying each device uniquely and quickly will be critical to understanding what the device is, its behavior, other devices it interacts with, and security measures that we should take for a particular device.
- **Hardware security:** Making devices tamper-proof will be highly useful. Same can be said for making devices tamper-evident so it can be easily detected when a device is tempered with. When devices used in harsh environments or remote locations where they cannot be monitored physically is a very good use case of this feature.

- **Network security:** IoT network needs to be secured by many ways including port security, encryption, no port forwarding, and not opening ports unnecessarily; using antivirus software, firewalls, blocking unauthorized IP addresses[11] are a few examples of good network security standard practices.
- **Consumer education:** Educating consumers about the dangers of IoT systems and provide them with way to stay secure. Users of IoT play a crucial role in making sure the devices remain secure. If we take the example of coffee machine from earlier, a well-educated user would know that they shouldn't install an unsecured device on the same network as highly secured devices.

3. PRIVACY

Internet of Things faces very unique challenges when it comes to privacy. A lot of it surpasses the user data privacy issues that is the biggest concern today. This is also why consumers[12] education is really important for IOT applications. It becomes even more widespread when it comes to deployed user devices. Smart TVs are now coming with vision and voice recognition features integrated. Such features can continuously focus on conversations or watch activities and selectively transmit data for post processing which can lead a lot of privacy concerns. Google home, and amazon echo are more recent example of such technology.

4. STANDARDS

There is a lack of documentation and community standard practices in the IOT domain. This hugely impacts Internet of Things and not just limits the development of such devices but also affects their potential. Not having a proper standard enables inappropriate behavior by IoT device developers. Not having proper guidelines and/or regulations on manufacturers and their manufacturing practices, developers may end up designing products that operate in disruptive ways without any regard for their impact on other devices or on users. Their are big negative consequences for having poorly configured or designed devices on a network and the resources they are linked to and, in essence drops the people trust on the internet itself. A main cause of poor standards can be cost constraints. Their a also a need to design and manufacture products faster than competitors, which can have a similar affect as it leads to not following the standard completely or properly.

5. REGULATION AND DEVELOPMENT

Similar to privacy, there are several regulatory concerns surrounding the Internet of Things which need some legal and thoughtful

consideration from the community [13]. Technology is moving a lot faster rate than what the regulatory committees are able to keep up to and generate policies for. This leads to the governing and regulatory committees to not come up with standards that last more than a shorter period.

There is a lot of potential with Internet of Things when it comes to having big social and economic benefits for third world countries. Less-developed regions will also need to create policies, educate people for relevant technical skills, and generate readiness requirements to be able take advantage of IoT's potential.

6. WHAT'S NEXT

As sensing and communication technologies continue to become cheaper, it becomes economical to introduce many more devices to the IoT network (even if consumers don't get a lot of the benefits). Most companies which work on IoT are at the trial stage, mostly because the sensor technology, wireless technologies like 5G, etc. are still getting developed. It's still not clear which of these technologies or companies will win out the IOT. It can be said though that without having proper standards and security still being an ongoing issue, its unlikely to see a big change in the immediate next future. However, as the number of connected devices continues to grow, our working and living spaces are becoming consumed with smart IOT devices and a lot of people are welcoming the new era of smart things.

7. CONCLUSION

In this paper we have thrown light on IOT based smart city and its challenges. In an IOT based smart city, the most astonishing and, the most reflective component would be a much more efficient water supply. in such a city there would be provided an innovative solution to the huge traffic congestion being faced these days, that leads to delays in reaching to work, rash driving and results in huge chaos and accidents. Thus, it would be great to kept in mind to provide a mid-way out to deal with these traffic issues in a more reliable and efficient way. Thus, we would build up a more reliable public transport structure that would be effortless. This would minimize the deals, difficulties and would maximize the ease for the travelers. Some of the features of smart cities are listed below:

An Innovative Solution to Traffic Congestion: Traffic jams are really tiresome in a busy city life. IOT provides an outstanding traffic management system to deal with this complication. Smart or intelligent traffic lights would play key role in this regard. Energy Efficient System: IOT with the application of automation provides a satisfactory alternative for traditional lightning system to reduce power

consumption by almost 35%. One of the major points of concern that is the rising crime rate can be tackled with the advanced video monitoring system an effective substitute of traditional camera system. With many pros. There comes some cons. Also, such as:

Security: Security is probably one of the biggest challenge for the IoT. By increasing the number of devices connected together, the opportunities to exploit vulnerabilities in such networks also increase. Any one poorly designed device can be used to leak user data as hackers don't need to exploit every device but just the weakest link. Privacy: the Internet of Things presents some unique challenges when it comes to privacy. A lot of it surpasses the user data privacy issues that is the biggest concern today. This is also why consumers education is really important for IOT applications. Regulation and development: Similar to privacy, there are a number of legal and regulatory concerns surrounding the Internet of Things which need some thoughtful consideration. Eventually the conclusion is that smart city is a great concept which focuses on all the basic amenities and if implemented carefully it surely helps us a lot.

REFERENCES

[1] CISCO, "The Internet of Things, Infographic", available online at: http://blogs.cisco.com/news/the-internet-of-thingsinfographic, May24, 2015.

[2] Awais Ahmad, Anand Paul, M. Mazhar Rathore, Hangbae Chang, "Smart cyber society:Integration of capillary devices with high usability based on cyber-physical system," Elsevier: Future Generation Computer Systems, Available online 14 August 2015 (In Press). doi:10.1016/j.future.2015.08.004.

[3] Zeng, Deze, Song Guo, and Zixue Cheng. "The web of things: A survey." Journal of Communications 6(6) (2011) 424-438.

[4] Srivastava Lara. "Japan's ubiquitous mobile information society". info 6(4) (2004) 234-251.

[5] Giroux, Sylvain, and Hélène Pigot. "From Smart Homes to Smart Care" ICOST 2005,3rd International Conference on Smart Homes and Health Telematics. Vol. 15. IOS Press, 2005. [6] Han, Sun Sheng. "Global city making in Singapore: a real estate perspective." Progress in Planning 64(2) (2005) 69-175.

[6] O'droma Mairtin, and Ivan Ganchev. "The creation of a ubiquitous consumer wireless world through strategic ITU-T standardization." IEEE Communications Magazine, 48(10) (2010) 158-165.

[7] Xia, Feng, Laurence T. Yang, Lizhe Wang, and Alexey

[8] Vinel. "Internet of things." International Journal of Communication Systems 25(9) (2012) 1101.

[9] Dixit, Sudhir, and Ramjee Prasad, eds. Technologies for home networking. John Wiley & Sons, 2007.

[10] Jin, Jiong, Jayavardhana Gubbi, Slaven Marusic, and Marimuthu Palaniswami. "An information framework for creating a smart city through Internet of things." Internet of Things Journal, IEEE 1, no. 2 (2014): 112-121.

[11] http://data.surrey.ca/dataset/water-meters, accessed on June 30, 2015

[12] Vehicular Networks on Two Madrid HighwaysMarco Gramaglia, Oscar Trullols-Cruces, Diala Naboulsi, Marco Fiore, Maria Calderon, IEEE SECON 2014, 3 July, Singapo [13] S. Uppoor, M. Fiore, Large-scale Urban Vehicular Mobility for Networking Research, IEEE VNC 2011, Amsterdam, The Netherlands, November 20

[13] D. Naboulsi, M. Fiore, On the Instantaneous Topology of a Large- scale Urban Vehicular Network: the Cologne case, ACM MobiHoc 2013, Bangalore, India, July 2013.

[14] S. Uppoor, O. Trullols-Cruces, M. Fiore, J.M. BarceloOrdinas, Generation and Analysis of a Large-scale Urban Vehicular Mobility Dataset, IEEE Transactions on Mobile Computing, 13(5) (2014).

[15] Stefan Bischof, Athanasios Karapantelakis, CosminSeptimiu Nechifor, Amit Sheth, Alessandra Mileo and Payam Barnaghi, "Semantic Modeling of Smart City Data", Position Paper in W3C Workshop on the Web of Things: Enablers and services for an open Web of Devices, 25-26 June 2014, Berlin, Germany.

[16] R. Tönjes, P. Barnaghi, M. Ali, A. Mileo, M. Hauswirth, F. Ganz, S. Ganea, B.

[17] Kjærgaard, D. Kuemper, S. Nechifor, D. Puiu, A. Sheth, V. Tsiatsis,

[18] L. Vestergaard, "Real Time IoT Stream Processing and Large-scale Data Analytics for Smart City Applications", poster session, European Conference on Networks and Communications 2014.

[19] Sefki Kolozali, Maria Bermudez-Edo, Daniel Puschmann, Frieder Ganz, Payam Barnaghi, "A Knowledge-based Approach for Real- Time IoT Data Stream Annotation and Processing", in Proc. of the 2014 IEEE International Conference on Internet of Things (iThings 2014), Taipei, Taiwan, September 2014.