An Intelligent Traffic System Using IOT

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Abstract -.An intelligent traffic monitoring system depends on automatic identification for vehicles. At present, automatic identification technology based on image and vehicle license plate is going to fall in the trap due to its low recognition rate and affection by adverse weather. Thus it is necessary to apply new technologies to solve this problem, and technologies based on Internet of Things provide a new approach for it. In this paper, we study various approaches and proposed systems that have been implemented for traffic monitoring system.

The realization of automatic detection and transmission of data provided a fundamental guarantee for constructing an intelligent traffic monitoring system. Research and design show that it is feasible and inexpensive to construct an intelligent traffic monitoring system based on Internet of Things, and the intelligent traffic monitoring system based on Internet of Things has a number of advantages such low cost, high reliability, never affected by adverse weather, all weather operations etc.

Keywords-intelligent traffic monitoring, Internet of Things, EPC, RFID.

I. INTRODUCTION

Intelligent traffic monitoring plays an important role for urban traffic and modern transportation. There are a lot of problems needed to be addressed in an intelligent traffic monitoring system, but how to automatically identify traffic tools is a crucial one among them. IOT is an innovation which uses internet to control the physical items. Using IOT we can obtain outcome which is more precise, quick and exact. This Components can be accessed from far place by using IOT, hence it reduces human work or involvement. We all know that India is the second largest populated country in world. India faces a problem in traffic congestion, it needs a solution for this problem. Hence by using IOT concept this can be solved. If traffic lights work's depending upon the vehicle number in a lane/road, then time management for traffic lights can be done and congestion could be reduced in great way. Providing Green signal to emergency vehicles is very important task to save patient life. And if the automobile is lost or theft, in present days it is a long procedure of filing case in police station and then searching for it. Tracking has to be done as soon as possible. This both can be cleared by using RFID near field communication.

Initially we were able to able to communicate through internet which requires address to identify each device. The IOT is based on the standard of using the Internet protocol (IP). Internet of things host the visualization computing and ambient intelligent enhancing them by requiring a full communication and a complete computing potential among things and integrating the element of continuous handshaking, recognition and interaction [6]. We are already running out of IP address within IPV4 due to use of it in personal computing. Hence IPV6 was launched in 2012, the address under IPV6 are much longer and have large capacity of unique IP address. The IOT market is expected to potentially grow in 2015 there are about 25 billion autonomous internet connected devices, which are about to rise to 200 Billion devices by 2020.

for them similar to license plate. And then, RFID is a non-contact automatic identification technique and can identify traffic tools automatically and obtain related data via radio frequency signal, so the work of the monitoring system based on RIFD recognition is not affected by night or adverse weather. Therefore, intelligent traffic monitoring system based on Internet of things has broad prospects of development and expansion space.

Nowadays, more and more domestic and foreign scholars and specialists pay highly attention to intelligent monitoring technology and have achieved a lot of productions in many aspects of technologies. The following scholars took a lot of research

for automatic identification. Jianhe Du et al. [1] used 12 ten-day real-world GPS travel datasets to develop, calibrate and compare three methods to identify trip start points in the data stream. The true start and end points of each trip were identified in advance in the GPS data stream using a supplemental trip log completed by the participants so that the accuracy of each automated trip division method could be measured and compared. R. Acharya U et al. [2] presented an identification of normal eye image and abnormal (consists of five kinds of eye images) classes using radial basis function (RBF) classifier. The features are extracted from the raw images using the image processing techniques and fuzzy K-means algorithm.

Iphigenia Keramitsoglou et al. [3] developed a fully automated system for the identification of possible oil spills present on Synthetic Aperture Radar (SAR) satellite images based on artificial intelligence fuzzy logic.

II. MATERIALS AND METHODS

Internet Of Things(IOT)- The **Internet of Things** (**IoT**) is the network of physical devices, vehicles, home appliances and other items embedded with electronics, software, sensors, actuators, and connectivity which enables these objects to connect and exchange data. Each thing is uniquely identifiable through its embedded computing system but is able to inter-operate within the existing Internet infrastructure.

The figure of online capable devices increased 31% from 2016 to 8.4 billion in 2017. Experts estimate that the IoT will consist of about 30 billion objects by 2020. It is also estimated that the global market value of IoT will reach $7.1 trillion by 2020.

The IoT allows objects to be sensed or controlled remotely across existing network infrastructure, creating opportunities for more direct integration of the physical world into computer-based systems, and resulting in improved efficiency, accuracy and economic benefit in addition to reduced human intervention. When IoT is augmented with sensors and actuators, the technology becomes an instance of the more general class of cyber-physical systems, which also encompasses technologies such as smart grids, virtual power plants, smart homes, intelligent transportation and smart cities.

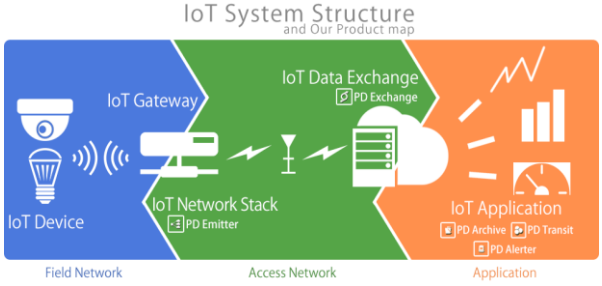
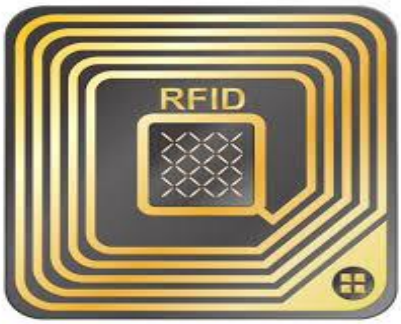


Figure 1. System Structure of IOT [12]

B*) Radio Frequency Identification (RFID)*- It uses electromagnetic fields to automatically identify and track tags attached to objects. The tags contain electronically-stored information. Passive tags collect energy from a nearby RFID reader's interrogating radio waves. Active tags have a local power source (such as a battery) and may operate hundreds of meters from the RFID reader. Unlike a barcode, the tag need not be within the line of sight of the reader, so it may be embedded in the tracked object. RFID is one method for Automatic Identification and Data Capture (AIDC). RFID tags are used in many industries, for example, an RFID tag



attached to an automobile during production can be used to track its progress through the assembly line; RFID-tagged pharmaceuticals can be tracked through warehouses; and implanting RFID microchips in livestock and pets allows for positive identification of animals.
Figure 2. RFID[13]

C*) Electronic Product Code(EPC)*- Designed to be stored on an RFID tag, the Electronic Product Code (EPC) is a unique number that identifies a specific item in the supply chain. The EPC can be associated with dynamic data such as the origination point of an item or the date of its production. Much like a Global Trade Item Number (GTIN) or Vehicle Identification Number (VIN), the EPC is key to unlocking the power of the information systems that are part of the EPCglobal Network™.

EPCglobal Inc™ has responsibility for oversight of the EPC and the standards, specifications, and guidelines for the Auto-ID infrastructure to support its use. EPCglobal is a not-for-profit joint venture between GS1 (formerly EAN International) and GS1 US (formerly the Uniform Code Council). GS1 is a leading global organization dedicated to the design and implementation of global standards and solutions to improve efficiency and visibility in supply and demand chains. GS1 US is a not-for-profit member organization of GS1 and is dedicated to the development and implementation of standards-based, global supply chain solutions.

Basic Format

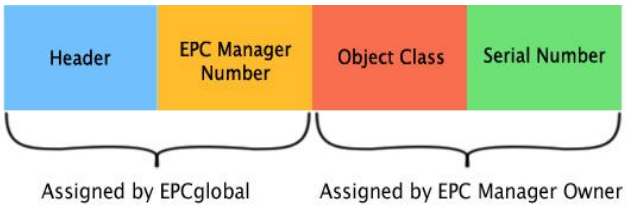


Figure 3. EPC Basic Format [14]

I. *LITERATURE SURVEY*

In this section we discuss about different methods of monitoring and control. Related to the traffic monitoring, many approaches and methods have been proposed. It includes rule based learning to the modern fuzzy and neural network approaches.

3.1 ***Existing Approaches and methods***

a) Findler and Stapp described an expert system based on connected roads and traffic lighting system. These expert systems use a set of rules and based on those rules, the next action will be decided.

b) In [9], a traffic light system using a simple predictor was developed by Tavladakis and Voulgaris. It takes measurements during current cycle and uses these measurements to test several possible settings for the next cycle. This system proves to be highly adaptive but could not handle high traffic fluctuations.

c) In [10], Liu has demonstrated some methods to overcome the fluctuations by incorporating traffic detectors at both sides of a junction and

vehicle identification were used to measure the average delay at a junction.

d) Tan describe a fuzzy logic controller for a single junction that should mimic human intelligence [11]. Traffic is quantized as many, medium and none. This system uses a predetermined order of states and the states can be skipped if there is no traffic volume in that particular state.

3.2 *Analysis of Traffic congestion in cities*

For the last few decades, the human population in the urban regions all over the world has drastically grown, surpassing the corresponding value in the rural areas. A graph depicting the world trends in world population from 1950-2050, with the abscissa representing the years and the ordinate representing the population in millions. As per 2016, the overall urban population accounts for 4.1 billion out of the 7.4 billion of the entire world population. According to predictions, the urban population would account 6 billion out of a total 9 billion. Thus, the urban population has seen a huge upsurge from 1950 and is expected to skyrocket in the coming years.

The problem of traffic jams in cities is not an easy problem to address. It is necessary to improve public transportation system and provide people with means to be less dependent on their cars. In addition, it is also necessary to stimulate other possibilities of transportation, to improve safety on the streets, to increase people security and walkability through the streets. This substitute would hardly be welcomed, which necessitates the need for an efficient traffic management system, overcoming the problems of the existing system.

3.*3* ***Challenges of Transport Industry***

Transportation industry cannot meet the rapid growth of data both in volume and variety. The data of transportation industry have rich sources, diverse types, and new sets of data are produced continually. The data are generated by GPS vehicle location tracking system and other mobile device search equipments yearly have raised over the threshold level. A massive data storage space and equipment is required and it must have fault tolerance and stability.

The conventional data processing systems are faced with the lack of efficiency and accuracy. The information system of transportation industry has had a certain foundation and scale, but generation of new business, rapid growth of data,complexity of the data processing have not been foreseen. The traffic information management system using traditional data processing technology cannot meet the rapid growth of data; collapses and failures have occurred.

The existing traffic management system appears single functioned, lacking integration, using backward technology and has other issues. In the process of building the transportation information system, homogenization is serious, at the same time, development of information technology in different regions is not balanced.

II. *CONCLUSION*

This paper Focuses on the new emerging technology i.e. Internet of thing (IOT). Using IOT, we have highlight some of the aspects of traffic monitoring system.

This paper also discusses the technology and approaches that have been taken into implementation in order to have a better traffic monitoring system. It goes through the pros and cons of the existing system as well.

The concept of IOT can produce outcomes which are more precise, quick and exact. Monitoring can be done from far place by using IOT, hence it reduces human work or involvement. It is known that India is the second largest populated country in world. India faces a problem in traffic congestion, it needs a solution for this problem. Hence by using IOT concept this can be solved.

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