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PERFORMACE AND SECURITY ENHANCEMENT OF IOT BASED ACCIDENT DETECTION AND PREVENTION SYSTEM

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Abstract: This paper provides a review on IOT based accident detection and prevention system. There are different sectors where IOT based device are used such as Industry, commercial organisation, hospital, etc. Apart from the several use of IOT devices, these are also used for traffic control and for prevention of road accident. IOT based accident detection system can be easily managed from a distance. IOT based devices can be controlled at remote location without need of human attention. There are several researches related to traffic control and accident detection system which are also discussed in this research work. The review paper would be helpful to known about IOT based traffic system, IOT architecture, its benefits and working process of IOT based devices for accident detection.

Keyword: IOT, Accident detection system, Sensors,

I. INTRODUCTION

In IOT based systems, devices are controlled and managed using internet. One of the important characteristic of Internet of Things is that it is possible to identify or address each and every device uniquely. The computers and laptops which are used in everyday life either in homes or in office contain a unique identifiable address. This unique identifiable address is known as IP address. The communication requirement in a particular situation is different. Therefore the unique component which is required for identification purpose is also different in each situation. It will depend upon the communication requirement. For example let us assume that intelligent refrigerator wants a method through which it can not only make connection to the Internet but also a unique address. The consumables items which are stored in refrigerator don't require any internet connectivity. But it is possibility that in some situations they might require this kind of internet connectivity depending upon the requirement of a special barcode or radio frequency identification. It is required because information regarding product freshness date is contained by it. Similar technologies and infrastructures are utilized for these purposes. The technology of internet of things and machine-to-machine (M2M) are isolated at the consumer point. This is done so that consumer can easily understand the difference in the middle of these two technologies. In this present situation it is clearly seen that in almost all the industrial and enterprise spaces machine to machine technologies is utilized. With the help of this technology companies are able to operate their businesses in a best way. It releases the additional weight of distribution network. In real time monitoring it totally depends upon useful information.

INTERNET OF THINGS(IOT)

The Internet of Things (IoT) stand in the form of a comprehensive background in which different appliances performs automatically.

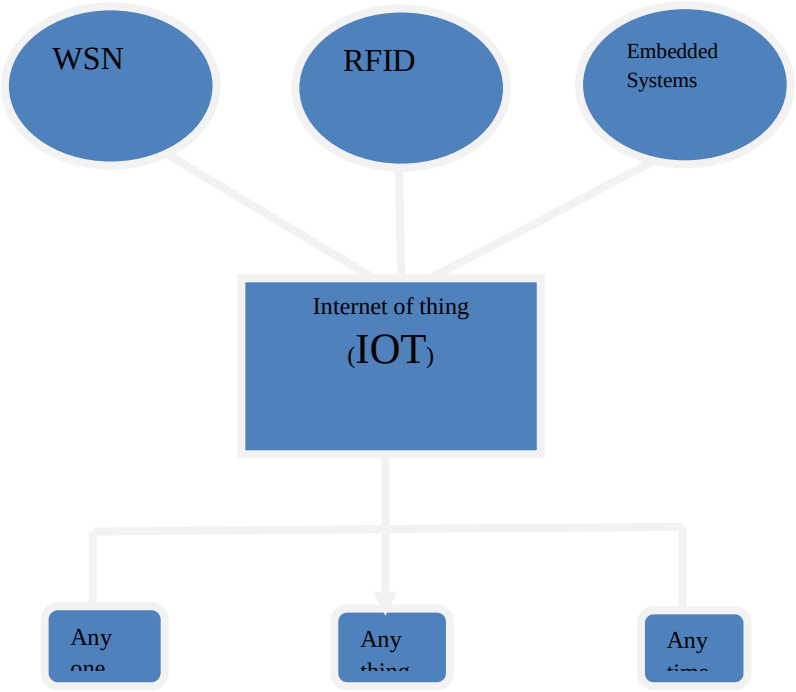

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Fig 1 Internet of things

For example, let us assume that a refrigerator is bought by someone. This refrigerator has the capability of tracking the freshness dates on products it contains. The owner of the refrigerator receives a text message on his smart phone. This message reminds him that pick up a carton of milk on his way to home from the office. Now a common question arises that by whom this text message was sent. The answer of this question is refrigerator. It happens because the information which is provided on the cover part of milk cartoon is examined by the refrigerator. On the basis of this examination it will tell that the milk is out of date and if anyone wants to cook the rice pudding, new packet of milk is required. Now again at this point a question arises that how does refrigerator know about the rice pudding. The answer of this question is that menu plans are also saved in to some appliances. At this point it is assume that there are no further surprises which are left unclosed at the back of refrigerator shelves.

II. IOT BASED ACCIDENT DETECTION AND PREVENTION SYSTEM

There are different IOT based devices for traffic monitoring. In traffic the domestic appliances are remotely controlled by used.

In comparison to population growth, our country motor vehicle population is growing at a faster rate. Due to road accidents, Accidents and the death rate are increasing at an alarming rate. Especially, within two wheelers, it is seen that the death rate is high. It is analyzed that the basic reason of accidental deaths is the absence of immediate medical aid. The medical assistance which is available on highways is almost negligible. It is possible to reduce the accidental death if instant medical help is provided at the accident spot. For the achievement of this purpose it is necessary to form such kind of system by which accident is sensed. As soon as it found that an accident has take place it deliver a message to the nearest medical center. Due to this, ambulance and medical help are reached to the accident spot without any delay. All of us know that the population is growing day to day, due to this; it has become challenge to deal with traffic congestion and to control traffic accidents. The Increasing vehicles are generating different issues such as wastage of time, wastage of fuel, air and sound pollution etc. as a result of increasing size in quantity of vehicles, even death rate is also increasing by getting stuck emergency vehicles.

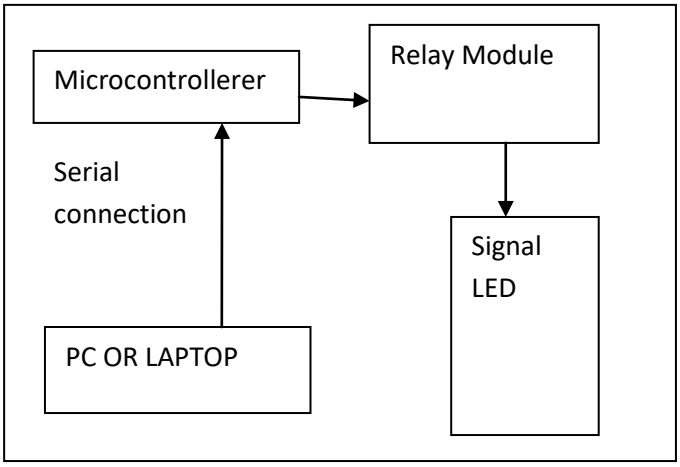

Fig 2 IOT based Traffic Management System

Benefits of IOT based accident detection system is discussed here such as:

1. **Detecting Congestion:** For the purpose of data collection, system sensing elements are used by Traffic lights and the other detection system. After that these deal with vehicles that are running on the road.
2. **Synchronize activity between traffic lights**: Sensors that are situated to collect the information about traffic conditions also make synchronization between activities of traffic light.
3. **Able to update traffic light timing:** It makes possible to modify the timing of light signals according to the traffic status of present time. Due to this, lights are providing signals according to real time.
4. **Update and inform drivers about ideal speeds**: there are different smart traffic lights which are developed in order to provide assistance in the favor of drivers by telling them maximum driving speed. If the driver drives his vehicle according to the suggested speed he found that the subsequent light signal is green. In this way, movement of vehicles are managed by these intelligent systems. If this happens then the idea of "always green traffic lights" becomes possible.

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5. **Prioritizing vehicles movement**: In comparison to public transport, private vehicles get more priority. Whenever a public vehicle reach to a traffic light it always get preference in comparison to private vehicles at crossings Advantages which are provided by intelligent traffic lights are as follows:

a. It makes efficiency better because it reduces traffic and time.
b. Probability of accidents reduced because road becomes safe
c. By delivering essential information it improvement in the movement of vehicles
d. Pollution is reduced because traffic reduced.

III. APPLICATION OF IOT

Iot based devices are used in below given sectors such as:

1. Smart Cities

Some specific IOT devices are used for management of traffic. Some devices are applicable especially to manage the traffic at the time of jams, any type of accidents and at the raining time. The Internet of things systems is also applicable to monitor vibrations of buildings, bridges & monuments.

2. Home Automation

Home automation has been known as a process. This process has been performed to control the home devices. It is possible to use several devices which are IOT based. Electrical as well as the electronic devices are used in home. Such devices are may be internal and external lights, different types of alarm system etc are also smart devices.

3. Industrial Automation

Using the IOT devices it is easy to manage the record with the chain of supply. When such devices do not work properly, it is necessary to repair and maintain them.

4. Health Monitoring

There are different types of devices. Such devices are capable to deal with the patterns of heart rate, digestive system, blood pressure etc. These systems are efficient to monitor and diagnose such diseases.

Fig 3 IOT Services

5. Smart Environment

Using the IOT devices it is easy to capture the releasing of dangerous chemicals. Such chemicals are mixed up in rivers and sea. Thus the water pollution has been made. Therefore it is essential to overcome such type of pollution.

IV. REVIEW OF LITERATURE

There are several researches related to traffic automation using IOT device. Along with this in the past, the research on the IOT has been made along with the study on various applications of internet of things. We are the people on which the future expansion of Internet of Things (IOT) depends.

Fizzah Bhatti, et al(2019) The method which was introduced by them wants to utilize the highly developed details of smart phones. With the help of these details an economical solution was invented and formed. This solution makes the transportation systems better. This system is used in older vehicles. The proposed approach is validated through simulations and comparison with a real data set of road accidents acquired from Road Safety Open Repository, and shows promising results in terms of accuracy.[1]

Kattukkaran, et al (2017). At present, the speed with which road accidents happens is very high especially, two wheelers. If instant medical aid is provided then it is possible to save lives. When this system is used, it will deliver an alert message to the nearest medical centre. This message tells that an accident take place and immediate medical aid is required. Vehicle inclination is sensed by a sensing element which is already installed in the vehicle. The intensity of an accident is determined by the use of a sensing element which senses the heartbeat of an individual. This element is present on the body and it will sense the abnormal condition of heartbeat. On the basis of these information systems take an appropriate decision and delivers the information to the smartphone. This phone is integrated in the company of accelerometer and heartbeat sensor, through Bluetooth. The application which is already installed in an android phone will deliver a message in written form

to the nearest medical centre and friends. In addition to this, application also tell about the area where accident takes place which will save lot of time [2]

Sharma, Shivani (2019). The basic intention behind this research work is the formation of a structure by which car accidents are identified and it give notice to the nearby hospitals immediately. In the formation of these structures, technology of IOT is used. For the achievement of this task, intelligent sensing devices are used in the company of microcontroller within the car. It will activate when an accident take place. For achieving accidents location global positioning system and for the delivery of alert message in the direction of registered mobile number and nearby ambulance global system for mobile communication are also used in the integrated form. It notify accident to obtain immediate help at the location.[3]

Bilal Khalid Dar1, et al (2019), The technology of fog computing has been come into existence for tackling the difficulty of waiting time or delay. By keeping this in mind, the advantages of refined quality of smart phones and fog computing are used in this research work. With the help of these qualities develop an economical system was invented and formed by them. This system detects accidents and gives an immediate response. This system is known in the form of Emergency Response and Disaster Management System (ERDMS). For the utilization of smart phone sensing elements in the detection of incidents an application for android phone is formed. As soon as an accident is detected, a plan of action is arranged. [4]

Ajith Kumar.A1, et al(2018) The basic intention behind this research work is the formation of a system by which accidents of vehicle are monitored. For the formation of this system the technology of Micro electro mechanical systems, global positioning system and global system for mobile communication are used.. For the delivery of message accelerometer, multipoint control unit, global positioning system and global system for mobile communication are used in this system.. Accelerometer is device which is for the detection of direction and Threshold Algorithm are used to detect accident. [5]

Duc-BinhNguyen et al(2018) To enhance prediction efficiency, this research work presents For reducing the wrong predictions to a minimum level a verification process was introduced by them. This process depends upon Rankine-Hugoniot condition. In addition to this it also provides the information of traffic jam. For the purpose of verification, a model was put in to operation. This model verifies the probability of the planned system It has been bring in to notice, that the system which was presented here can supervise the traffic jam in a very accurate way and the reaction time of the system is also good.[6]

G 1 , V. Vinisha2 , Vincy Sandra Edwin3 (2019) At this point in time the presence of traffic jams in the situation of hurry is the foremost concerns. Generally, in the situation of hurry the vehicles which are used for providing emergency help like Ambulances, Police cars and Fire Brigade trucks get trapped in jams. Due to this, many people lost their lives because they cannot get the required help on time. So they have done a project on IoT based online traffic congestion monitoring and management system. It gives permission to emergency vehicle.[7]

V. S. Nagmode et al(2017) considered many problems such as delay in traveling time, wastage of fuel, air pollution and create issues related to transport. A traffic signal controlled method is used for the management of traffic. This method depends upon the level of detecting traffic at the lanes. If any lane gives a high traffic level, then it gives highest priority to passing vehicles. RF transceivers used to communicate the main system to priority system which receives and transmits traffic related message. This system is given at the intersection of lanes which is reliable, simple and low cost.[8]

Ahmed ElShafee(2010)

They discussed that administrator of IOT based device can locally (LAN) or remotely (internet) manage or monitor these system codes. The next part is hardware interface model. It supplied proper interface to detectors and actuator of smart home system. In comparison to smart home systems which are available in market the proposed system is scalable.[9]

M. N. Ali(2018)

As a result the concept of smart homes is extremely recognized because to its unlimited benefits. Various perspectives are kept in mind before doing this documental retrieval. With the help of this discovery a well-organized and practical system has come across for people which are actually handicapped [10]

JayavardhanaGubbi et al.(2014)

The authors wrote vision, architectural elements. They also consider the future directions in the field of Internet of Things. In the present time IOT contains a variety of wireless technologies such as actuators etc. Therefore it is considered as next revolutionary technology. It would be helpful in transforming the Internet into a fully integrated Future Internet. [11]

A. Bayoumi et al.(2016)

The research of his research analyzed that. Due to this extremely organized comprehensive network structure that is commonly known by its second name Internet of Things will improve everyone's life. It is able to enhance business efficiency, upgraded government effectiveness, and the file just goes on.[12]

AnuragTiwari et al.(2018)

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The authors reviewed the Challenges and Ongoing Researches for IOT. The IOT systems are very common and are widespread. Therefore chances of security and privacy problems have become regular. Due to this all the things which are associated with internet may face safety issues. Due to the issue which is related to security and privacy IOT could not set himself as a reliable technology. [13]

Faisal Baig(2013) present an automatic system which has been formed on the basis of wireless technology. This system is managed by voice commands. In this system, GSM is used for the addition of wireless elements and technology of ZigBee is used for the purpose of home networking. For the processing of voice command an app is formed. This app is implemented in the smart phone.[14]

V. WORKING OF IOT BASED ACCIDENT DETECTION SYSTEM

To overcome different type of issues related to accident that are increasing day to day, different traffic management and accident detection system are there. All these systems were formed on the basis of IOT technology. With the help of this system the cases of accidental death are reduced because the time taken by the ambulance to reach the hospital gets reduced. In this system a detecting device is installed for the detection of direction in which accident takes place. Once an accident has been detected the in built GSM module delivered a message to the respective guardian and rescue team. This message tells about the area in which accident occurs. The signal of this sensing device allows us to identify a severe accident even in the presence of an obstacle. Microcontroller used, sends the alert message through the GSM module in the direction of guardian or a rescue team. This message includes the information of accident location. Therefore, the unit which is employed for emergency assistance tracks down the location through GPS module. As soon as they get information, they take appropriate action without any delay.

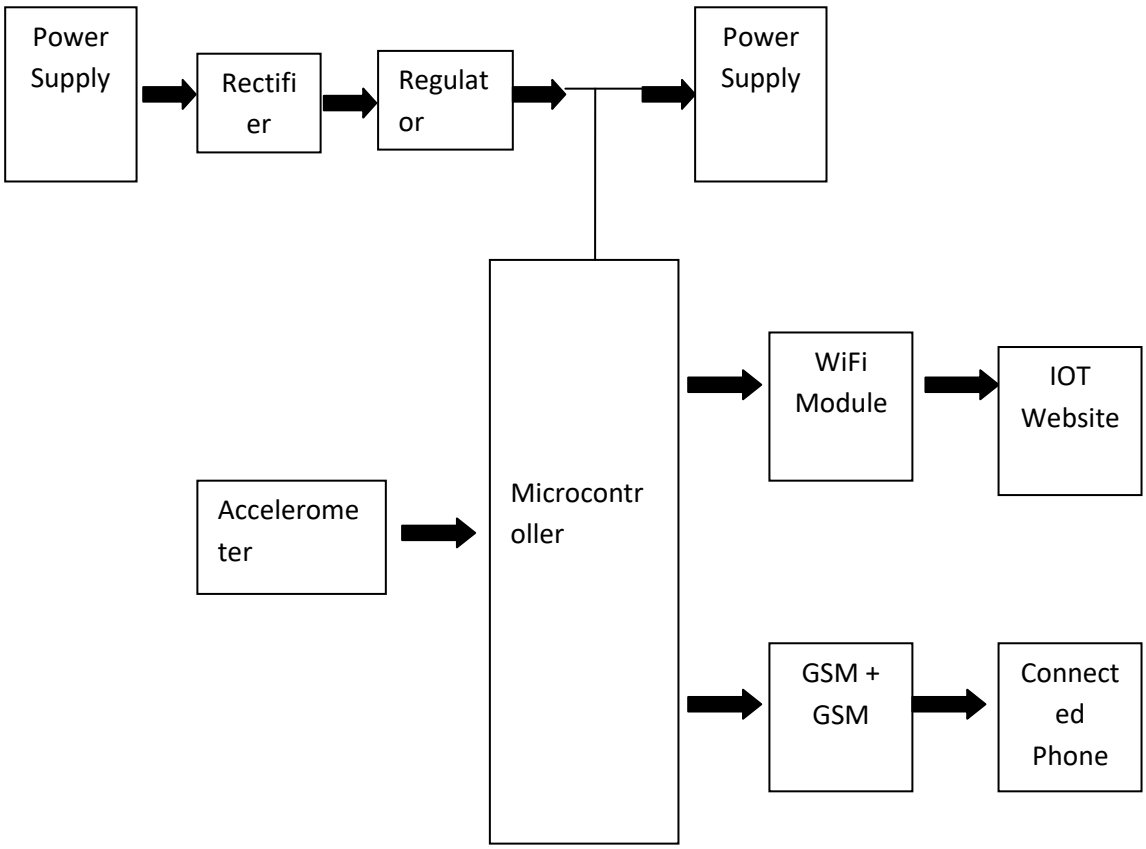

Fig 4 IOT Based Accident Detection System

For the removal of these concerns, a system which was formed on the basis of IOT technology is applied for the detection of accidents. It has been bring in to notice that it is possible to detect accident in an accurate way when different types of sensing device are used. The system which was introduced here identified the area of an accident instantly. It also provides the location of nearby hospital. It delivers a request for emergency help to the required hospital department. This system takes decision depending upon the information which is delivered by sensing element of smartphone and the detecting information about the vehicle status. It has been highlighted, that in comparison to other methods, the methods which were formed on the basis of IOT technology cut down

the cchances of false alarm. For the working of this system availability of internet connection is must. It is the initial examination of the system. This examination takes place in the surrounding which is man-made.

VI. FUTURE SCOPE

This research work would be beneficial as a serious issue is discussed here. It would be helpful to know about traffic management and accident detection mechanism. In addition to this, it provides a review of existing researches related to traffic management and accident detection system which would also be helpful for future researchers. To study this research, the coming researchers would be efficient to make more efficient and secure accident detection system.

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