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Survey on Smart Traffic Management

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ABSTRACT: As we all know, how big a traffic issue is in the current situation. Traffic management system is taken into main role to developing a smart city. With the rapid climb of population and concrete mobility in metropolitan cities, traffic congestion is usually seen on roads. To tackle various issues for managing traffic on roads and to help authorities in proper planning, a wise traffic management system using the online of Things (IoT) is proposed in this paper. A hybrid approach (combination of centralized and decentralized) is employed to optimize traffic flow on roads and an algorithm is devised to manage various traffic situations efficiently. For this kind of reason, the system takes traffic luxuriance as raw data from two equipment's then manages traffic signals i.e a) cameras b) and sensors, then manages traffic signals. Another algorithm supported Artificial Intelligence is employed to predict the traffic density for future to attenuate the traffic congestion. Besides this, RFIDs also are wont to prioritize the emergency vehicles like ambulances and fire brigade vehicles during a traffic jam. In case of fire on the road, Smoke sensors also are a part of this technique to detect this example. To exhibit the how effective of the proposed traffic management system, a sample is build which not only improves the originate of traffic but also joins close by emergency departments with a compact server. Moreover, it also extracts useful information presented in graphical formats which will help the authorities in future road planning.

KEYWORDS: IOT – Internet of things, RFID - radio-frequency identification

I. INTRODUCTION

Today the biggest issue facing all over the world is to manage the heavy traffic. Traffic congestion on road networks is nothing but slower speeds, increased trip time and increased queuing of the vehicles. In metro cities of India traffic congestion is a major problem. Traffic jam is caused when the demand be more than the available road size. This is known as saturation .India is the 2nd most populated country after China in Asia, thus with increase in population, the number of vehicles also increases. In all over world the heavy traffic is in Bengaluru ,the Indian City.

Figure 1.1 – Statistics of top 10 most traffic cities in the world

In bengaluru commuters waste 10 days and 3hrs on road every year. In Mumbai it is 8 days and 17 hrs, In Delhi 7 days and 22 hrs. There are even severe security problems in traffic system thanks to anti social elements which also results in stagnation of traffic at one place. In country like India, there is an annual loss of Rs 60,000cr due to congestion (including fuel wastage).The average fuel mileage in India is only 3.96km pl. The economic growth has continue impact on urban traffic. As the income rises, more and more people begin to go for cars rather than two wheelers. Hence there is a need to manage traffic in a smart way as the management of traffic with the conventional way such as the signaling system is not having a major effect in curbing congestion of vehicular traffic. There are even severe security problems in traffic organization required to anti-social factor which also conduct to stagnation of traffic at one location. Cities should be making their streets run smarter instead of just making them bigger or building more roads. When the number of vehicles exceeds the capacity of the road, traffic congestion occurs.

II. RELATED WORK

1. Smart Traffic management Using GPS.

This Paper Tell about GPS, GPS stands for Global Positioning System is a world wide radio navigation system formed from the planet of 24 satellites and stationed in low earth orbit. The Global Positioning System is especially funded and controlled by the U.S Department of defence (DOD). The GPS system was firstly designedand created for the United State for military use. But nowadays, it's available for civilian, with none quite charge or restrictions. Global Positioning System tracking may be a method of understanding precisely the position of GPS sensor's holder supported an easy mathematical principle called trilateration or triangulation. A GPS tracking system can add various ways i.e. Active and passive tracking. In Passive tracking, the position is typically stored in internal memory or on a memory card along the ride, while within the active tracking, also refers to a true time duration, data is to be circulated to main database beyond a modem within the GPS unit .

Figure 2.1- GPS Working

Key Points:-
1. GPS tracking device helps in customer satisfaction by inventory management.
2. GPS tracking device helpscustomer in speed detection and satisfaction make sure their safety .
3. Real time monitoring is one of the best advantages of a GPS device.
4. GPS Location can be inaccurate sometimes.
5. Battery might drain out.

2. Smart Traffic Management Using IOT and Big Data

This Smart Cities are day to day increasing and inside cities transportation play's key role also are increasing heavily. For better traffic system needed to regulate the vehicles traffic it means reducing time delay, now currently traditional, semi-automation only are using to controlling vehicles traffic. Traffic blockage has became an interesting issue in each

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extensive city of the planet .to ensure a dependable transportation framework it's imperative to possess a wise traffic control framework. The initial step to try to do that's to urge traffic information. Traffic information may originate from various sensors. a couple of cases are utilization of affectation circle, infrared sensor, optical stream flow etc. aren't used for current traffic system now our approach applying technologies called Internet of Things and large data. The paradigm of the web of Thing (IoT) has been introduced in traffic management systems . To the simplest of our knowledge, it's identified that till date the present traffic management systems are centralized. just in case of networking issues, such systems may crash. additionally , there's less specialized in fluctuations in traffic flow. Therefore, the proposed system manages the traffic on local and centralized servers by exploiting the concepts of IoT and Artificial Intelligence together. The representation of traffic data in statistical form also can be helpful to authorities for real-time controlling and managing traffic. Moreover, it's going to even be helpful for future planning.

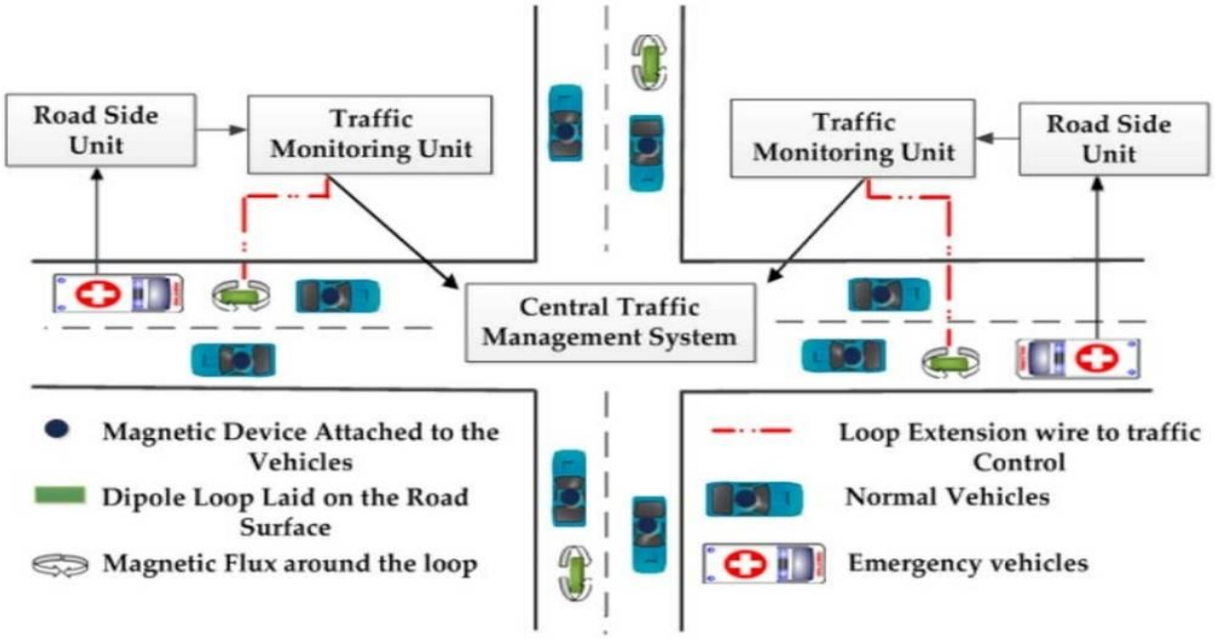

Figure 2.2 – System Architecture and working of IOT & Big data in traffic management

Key Points:-

1. It is used to solve the traffic problem like Parking Issues and Traffic Congestion.
2. .Minimizes number of accidents.
3. Minimizes hassle and cost of commuting.
4. hi-tech solutions need high-speed data transfer techniques and, thus, can work only in cities with great internet connectivity
5. the number of devices accessing the central network means more opportunities for hackers to conduct their malicious attacks.
6. Data privacy will also have to be maintained, looping in lawmakers and engineers.

3. Smart Traffic Management system using RFID

RFID technology others a more convenient and versatile technology which is compatible for fully automated systems, directing human lifestyle towards automation and reality . This automation are generally established for tracking and locating a function solutions in broad selection of industrial and commercial systems in produce supply chains, agriculture, transportation, library, managing toxic and hazardous chemicals, and healthcare facilities .

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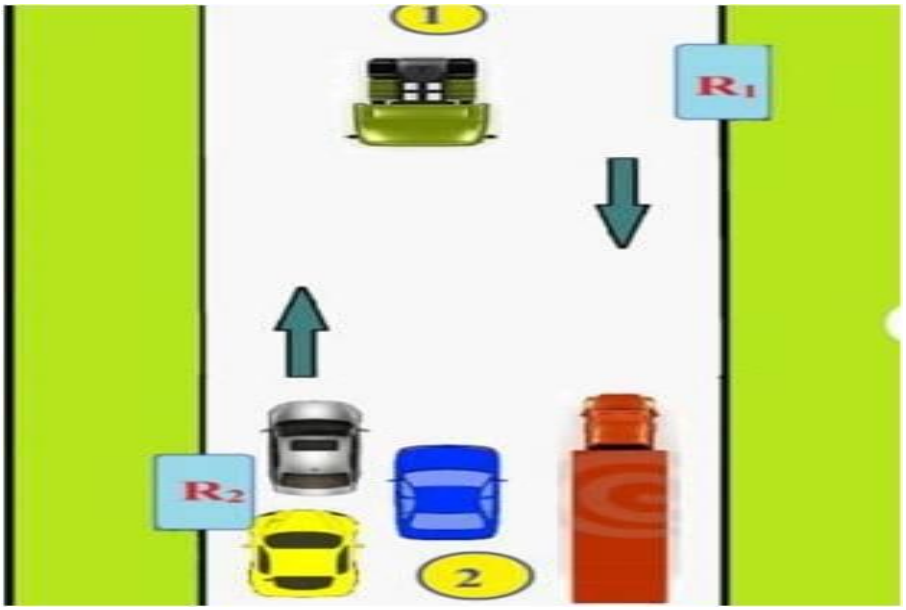

Figure 2.3 – System Architecture and working of RFID in traffic management

Data are often stored and skim from RFID tags embedded or attached to an object. Modern advances within the technology enables direct printing of tags on objects . Hence, information stored in the tag can be wireless transmitted to the RFID reader via reader antenna .Proper networking of readers at various smart parks to a central database management system.Our idea is predicted on the principle of RFID tracking of vehicles.An RFID i.e. Radio Frequency Identification system consists of two main components, the small transponder, more commonly known as a tag, which is attached to the item needing identification (here, vehicles) and the interrogator, or reader, which in some cases is employed to both power the tag and skim its data without contact.

Key Points:-
1.Traffic signals are fully automated and operated according to the current volume of traffic.
2.Differential priorities can be assigned to vehicles like ambulances, fire brigade.
3.stolen vehicles, or vehicles booked for offence can be tracked.
4.traffic data can be generated for statistical purposes .
5.Sometimes not accurate or reliable .
6.Cost – RFID readers can be expensive .
7.Implementation can be difficult time consuming.
8.RFID also brings up some security issues.

III.PROPOSED WORK

This part describe about proposed system, the main motive of this project is to build system which is implemented using IOT and Radar System. This system detects moving and stopped vehicles.And also it works under all condition. The biggest advantage of this system is it is maintenance free . It uses multilane sensors.It detects each and every vehicle on the road .smart microdesigns , develops and manufactures radar sensors and solution for traffic management and automotive applications. Today,smartmicro radars belongs to the largest manufacturers of the traffic management radar sensors.The main motive of this proposed system is to transform today's urban areas into smart cities.It detects vehicle upto320km/h No matter what traffic direction.The sensors maintains high accuracy. Radar is most robust sensing technology and it is not affected by dirt,smoke,sunlight,wind,etc.The sensors in this system has self-calibration function.

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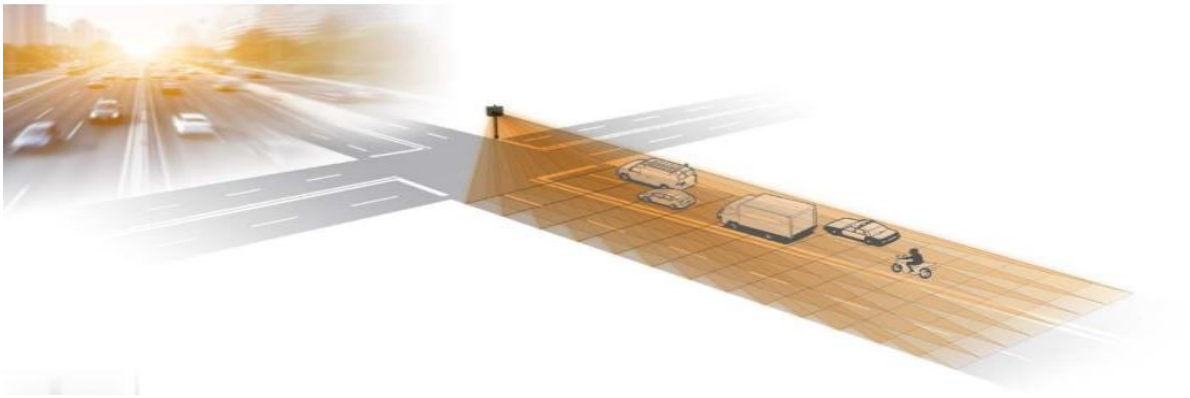

Figure3.1 – Overview of traffic system of Radar and IoT

Working :

FORWARD FIRING

Unlike older side firing sensors, the modern smartmicro radars use multiple forward firing beams which has many improvement. Vehicles lasts inside the sward area of view for much longer, their place, direction and speed vectors are measured with higher perfection and correctness, and a better classification is achieved. This radar sensors are the only technology available in the market today that supports precise course tracking of vehicles. Due to their high scope, vehicle positions can be tracked for up to 300m and over a 100-degree field of view.
Looking along the road, the mounting position is more flexible. On the roadside, at the corner of an intersection, at the median of a highway, whatever sensor position: forward firing provides the best coverage.
Actual infrastructure like traffic light poles or street light poles can be used. Other than for outgoing side-firing radars which usually need a very high mounting position, moderate heights are sufficient. The vehicles are tracked over a longer period when they drive in the field of view, blocking rarely happens.

HIGH DEFINITION CAPTURING –
This radar sensors technique supply Cartesian coordinates, velocity vector, range and elevation angle at the same time for all traffic objects within the field of view.
Most of other radar sensors on the market separate objects by only one parameter, for example either range or speed. In this technology smartmicro sensors separate objects by both speed and range. This leads to powerful performance especially in opaque traffic conditions.
Measurement in four dimensions Partition in speed and Partition in range.
The most advanced 4D/UHD object tracking radar technology provides certified, highly accurate and reliable speed and position data for enforcement applications. For many vehicles and multiple lanes simultaneously. No matter if approaching or receding. More than 20 times per second from 0.1m/s to 88 m/s (320 km/h).

Figure3.2 – Range and Capacity of detecting traffic area

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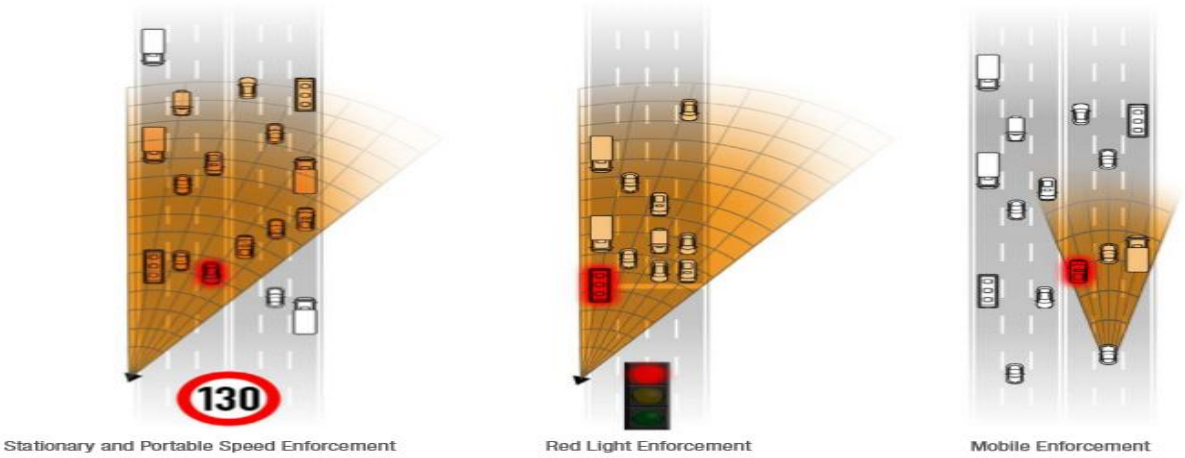

Figure3.3 – Forward firing detection

The sensors are designed for straightforward integration into any customer (OEM) enforcement system. A flexible data interface, many software configuration options and a skilled support team are available to facilitate integration. Seeing as the object/vehicle tracking radar provides highly accurate data of range, speed, lane index and also object class, red light enforcement can be combined with speed enforcement systems and other applications such as count any objects or traffic measurement or level of congestion .

Built-in redundancy is another advantage. In fact, there is double redundancy: 1) having two independent receive antennas, the values measured by both must be perfectly matching to enable a reported speed; 2) the speed is measured firstly by the Doppler shift and secondly by the range progress over time, the two measurements being independent and redundant.

IV. CONCLUSION

The proposed system is going to be built upon IOT and Radar which can differentiate Running and stop vehicle, the proposed system also make use of multilane sensors which increases the work zone .The proposed system can detect vehicle upto320km/hr. No matter what traffic direction. Use of Radar makes the technology robust from the environmental factors like dust, smoke, sunlight or wind .By using IOT and Radar the proposed system can effectively control the traffic on the road. In this way using IOT and smart micro radar we are proposing smart traffic management system to avoid number of problems.

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