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Smart Traffic Management and Accident Response System

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Abstract: *The population of the world is increasing so is the number of vehicles on the road. with a large number of vehicles on the road, there will be issues with traffic management and law enforcement. Also, the need to prevent accidents and fast &timely response in the case of accidents will rise. This put a huge toll on already insufficient manpower. All these issues can be very well tackled through the use of technologies like Artificial Intelligence, Machine Learning, RFID Systems, etc. Through these technologies, we can manage large traffic. Law enforcement issues like over speeding, not wearing helmets, and moving on the wrong side of the lane can be identified through Machine Learning algorithms. A pre-existing system that is presently used for toll tax collection can be used in vehicle identification as well as in imposing fines in case of breaking the law. Whenever there are unfortunate events like road accidents then timely medical and other assistance can be provided by identification of the event and its location through sensors and a well-organized network. The use of modern technologies will save lots of money, time, and men power with higher efficiency.*

Keywords: AI (Artificial Intelligence), ML (Machine Learning), RFID (Radio Frequency Identification), GSM (Global System for Mobile Communication).

I. INTRODUCTION

Today over 1 billion cars travel on streets and roads. India alone has over 300 million registered vehicles. As the number of vehicles is increasing day by day issues like road congestion, traffic rule enforcement, and road accidents are also increasing at a higher pace. A report from Texas A & M transportation institute states that an average citizen of the US wastes 54 extra hours a year in traffic delays. While the case in India is much worse. A report by TomTom says that an average Bengaluru and New Delhi resident wastes 110 hours every year due to traffic congestion.

This wastes lots of time and fuel which puts a toll on the environment as well as the economy of the country. India has the second-largest road network in the world, if properly managed then these issues can be easily tackled. It is popularly said that "*Great economies do not necessarily build great infrastructure but great infrastructure built great economies*". By addressing traffic congestion issues, we can contribute to the development of the nation.

As per the data from WHO(World Health Organization) approximately 1.3 million people die each year as a result of road traffic accidents. This causes loss of life and livelihood of many people. India world's largest democracy ranks third in road accidents. Around 480652 road accidents have claimed more than 150,000 live.

In India, a person is four times more likely to die from an accident rather than from an act of terror. Based on 2014 statistics 1.25 lakh people have lost their lives in India almost 350 deaths per day.

There are various causes of road accidents. The primary cause which can be avoidable is violation and negligence of traffic rules for example:

- **Over speeding:** As per the data over speeding contributes over 71% of road accidents resulting in 67.3% of deaths.
- **Lane Violation:** Moving on the wrong side of the lane is dangerous not only to the violators but also to other persons following traffic rules. It leads to 5.4 % of road accidents and 6.1% deaths on road.
- **Not using safety devices:** Helmets and seat belts areone of those major devices which causea significant reduction in road accident fatalities.

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- **Jumping Traffic Signals:** Not respecting traffic signals not only causes a risk of accidents but also traffic congestion.

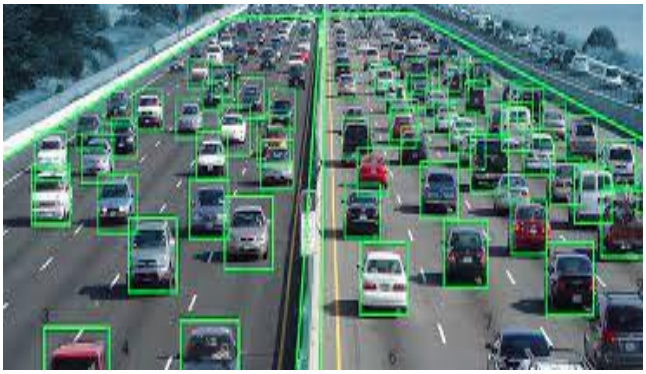
The traditional way of tackling these issues was deploying manpower like a policeman on different check posts, but traffic policeman cannot be present everywhere, this is the limitation we have as a human and we can overcome it through machines.

With the rapid growth of the population of the world, the number of vehicles on roadways are increasing consequently, the rate of traffic jams is also increasing in the same manner [3] [4]. Traffic jams are not just wasting time but in some cases, it is witnessed that criminal activities like mobile snatching at traffic signals also happen in metropolitan cities [5]. On the other hand, it is not only affecting the ecosystem badly [6] but the efficiency of industries is also being affected [7].

1.1 Solving Approach

Various aspects of present-day traffic management systems can be automated and transformed into smart processing systems based on real time data and analysis of the data through machine learning and using artificial intelligence.
By this approach, we can assess the real-time data and use it to prevent road casualties.

A. Solving Traffic Congestion



Source: www.Trafficvision.com

Today urban areas are struggling with traffic congestion which wastes time and fuel and is hazardous to environment. As of now, we are using timer bases traffic lights but this problem can be overcome by installing high-definition cameras at the road junction. These cameras will be connected to centralized servers. Through real-time video processing and machine learning algorithms, we can detect several vehicles in all lanes. This processed data then will direct traffic signals. This is a real-time approach, ere traffic lights and signals will be given based on several vehicles' ideal time. We can use real time object detection algorithm to find several vehicles on different lanes. The advantage of this algorithm is that it is highly accurate and efficient and works in real-time. This is an autonomous vehicle detection technology. It processes the image and then passes it through a neural network that analyses it. Through this, then we can manage different lanes of traffic and prevent congestion.

1.2 Law Enforcement

Source: www.newindianexpress.com

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As mentioned earlier, negligence of traffic rules is one of the major factors in road accidents and casualties. If most people start following traffic rules, then a hugee number of lives can be saved. Through these smart systems, it is easier for the authorities to implement traffic rules and apprehend the violators.

1. Through implemented AI algorithms it can be identified which vehicle is violating the traffic rules like not wearing helmets on a two-wheeler, moving on wrong side of a lane, over speeding(with the help of a speed sensor), overloading, road rage, etc.
2. Since we have already identified whether the passing vehicle is violating the rules or not, now the details of the vehicles can be acquired through a pre-existing system called RFID. Presently RFID systems are used in collecting toll taxes. We can also use the optical character recognition method to identify severallicenseplates. We can further enhance these systems for the identification of vehicles.
3. Now details of these identified vehicles can be transferred to the servers and then they can be used by authorities to bring violators to justice.

1.3 Quick Response in an Emergency

Source: www.Istockphoto.com

We can use this integrated system in providing emergency response in case of accidents.

1. We have provisions like a mandatory airbag in most vehicles, similarly, we can introduce a mandatory electronic system that consists of an accident detection, GPS, and SOS generating sensors.
2. We can develop such sensors which can detect accidents by integrating them with airbag opening mechanisms and front bumpers.
3. After detecting any accident, it should be able to send an SOS signal to the traffic management server.
4. After receiving these servers then send necessary help like ambulance, police, and fire management.
5. Through this timely medical intervention can be provided to the victim. Nearest hospitals and helps become more approachable.

II. CONCLUSION

The proposed work focuses on Smart Traffic management Systems using newage technologies like AI and Machine learning integrating them with RFID modules. This will eliminate the drawbacks of the previously existing system such as high implementation cost, wastage of human resources, dependency on the environmental conditions, etc. proposed system aims at effective management of traffic as well implementation of rules. It is efficient as well as cost-effective. Furthermore, this System when Integrated with each vehicle can prove to be life-saving by providing timely helps like Medical Interventions, Fire Management, etc. in case of an Accident by providing the location of the accident to authorities. Traffic Congestion have developed into a big problem, particularly metropolitan areas are the worst hit, which affects economies worldwide. Congestions have a have a negative impact on the financial situation of a country, on the

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environment, and hence the overall quality of life. The Smart automated system aims at solving this issue by deploying AI and Machine learning algorithms.

REFERENCES

[1]. W.H.O. (World Health Organization) report on accidents around the world.
[2]. Department of Statistics, Government of India.
[3]. International Journal of Computer Application.
[4]. T. e. a. Osman, "Intelligent traffic management system for a cross-section of roads using computer vision," in Computing and Communication Workshop and Conference (CCWC), 2017 IEEE 7th Annual, 2017.
[5]. Ministry of Transportation, Government of India.
[6]. Ministry of Health.
[7]. T. C. N. K. Kartikeya Jain, "Smart vehicle identification system using OCR," in 3rd International Conference on Computational Intelligence & Communication Technology (IEEE-CICT 2017), Ghaziabad, India, 2017.