

Wrong-way vehicle motion detection system

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Abstract - A tunnel is an underground passageway, dug through the encompassing soil/earth/rock and encased aside from entry and exit, usually at each end. Tunnels are developed for the convenience of people. Some tunnels allow traffic to only move in one direction. But there may be incidents where people may break this rule, leading to traffic jams or accidents. Therefore, to avoid this real-time problem we have developed a system named Cloud based wrong-way vehicle motion detection system which will detect the movement of vehicles in the wrong direction and capture an image of the vehicle and store it in the cloud storage. Cloud-based wrong-way vehicle motion detection system will also be helpful to prevent accidents on one way and will reduce the manual work. As it is a onetime investment and as it reduces manual work it becomes cost effective. There is no requirement of policeman at the site to keep watch on people for 24 hours. It can detect multiple vehicles coming from the wrong direction and can capture images of the same. Whereas, manually it is difficult to catch more people coming from the wrong direction.

Keywords: Wrong- way vehicle detection, Traffic, Accidents, Vehicle Recognition, Road, traffic jams, Fine

1. INTRODUCTION

Now days, traffic management is one of the major problems which people are facing in India. Traffic congestion is when vehicles travel slowly due to too much traffic on roads. This makes trip times longer, and rise in queuing. This situation is well known as a traffic jam. Congestion may result due to narrow roads, accidents on the roads or roads being closed. Statistics show that in India, over 1,47,000 people were killed in road accidents in 2018 alone. In order to ensure a smooth flow of traffic in congested areas of cities, the traffic control authorities often designate parts of the streets as one-way streets. But there may be incidents where people break this rule, leading to traffic jams or accidents. Generally, the following issues are faced by people:

- Traffic jams/ road congestions
- Accidents
- Wastage of time

On the basis of above facts, we have developed a system titled —Cloud-based wrong-way vehicle motion detection system|| to tackle these problems. This system is designed to detect the movement of vehicles in the wrong direction and capture an image of the vehicle and store it in the cloud storage. It is a onetime investment and as it decreases manual work, it becomes economical. Once the system is fixed at the site, there is no need to check the system constantly. This system can easily detect multiple vehicles coming from the wrong way side.

2. LITERATURE SURVEY

Now days, traffic management is one of the major problems which people are facing in India. Traffic congestion is when vehicles travel slowly due to too much traffic on roads. This makes trip times longer, and rise in queuing. This situation is well known as a traffic jam. Congestion may result due to narrow roads, accidents on the roads or roads being closed. Statistics show that in India, over 1,47,000 people were killed in road accidents in 2018 alone. In order to ensure a smooth flow of traffic in congested areas of cities, the traffic control authorities often designate parts of the streets as one-way streets. But there may be incidents where people break this rule, leading to traffic jams or accidents. Therefore, to avoid these issues of traffic management we have developed a system which will detect the vehicle moving in the Wrong direction and capture an image of the vehicle.

For the demonstration purposes of this system, we have selected a site in our locality of Nashik which consists of a road tunnel which allows for city traffic to cross under the Mumbai-Agra Highway (NH-3) which passes through Nashik. Since the tunnel is a narrow one, only one-directional traffic is permitted. However, there are incidences of some vehicle drivers driving in the opposite direction and causing chaos. To tackle this issue, one way is evolving at various places including tunnels. A tunnel is an underground passageway, dug through the encompassing soil/earth/rock and encased aside from entry and exit, usually at each end. Tunnels are developed for the convenience of people. Some tunnels allow traffic to only move in one direction. A one-way street is a street facilitating only one way traffic. One way traffic or unidirectional traffic is a traffic that moves in a single direction.

3. OBJECTIVES

- To avoid accidents.
- Reduction in manual work: There is no requirement of policeman at the site to keep watch on people for 24 hours
- To reduce long traffic jams

4. Working

1. Our system uses two means to detect the direction in which the vehicles are moving.

a) The first means uses two pairs of limit switches which get pressed when a vehicle passes through the tunnel. The microcontroller monitors the sequence in which these pairs get pressed, thus acting as the primary means of detecting if something is wrong with the flow of traffic through the tunnel. This system remains active and waits till an irregularity is detected, after which it activates the ultrasonic sensors

b) The second means uses two ultrasonic sensors to verify if a vehicle is actually moving in the wrong direction. This is done using the fundamental usage of the ultrasonic sensor's working, i.e., measuring the distance between the sensor and the object (vehicle). This measurement of the distance is taken repeatedly, thus making sure that the vehicle is moving in the wrong direction. The combination of the two sensors makes sure that false positives do not occur. Both of them cover half of the area of the tunnel, thus distributing workload and increasing accuracy.

2. Once it is known to the system that a vehicle is moving in the wrong direction, the microcontroller triggers the camera to capture a frame instantly, so that the lawbreaker's vehicle and its number plate is seen clearly in the picture.

3. This picture is then uploaded to a database stored on a cloud. Storing the pictures on cloud storage enable remotely accessing the databases from anywhere, anytime

5. MODULES

1. A module is a software or hardware item that is separate from the rest of the system. The three aspects of our proposed system are as follows: -
2. Wrong Vehicle Detection and Tracking
3. Capturing image of Vehicle
4. Detecting Number plate of vehicle
5. Storing vehicle information on cloud

8. EXISTING SYSTEM

The existing system is Manual visual surveillance system. . This system does not affect the severity of the traffic. It diverts the traffic to another road. It consists of police personnel who monitor the direction of the vehicles. They are located at both the ends of the tunnel and issue challans to those breaking the law. Even though there is existence of police personnel and traffic is only meant to move in a single direction, people don't follow it and enter from the wrong direction. This is one of the most prominent causes of road accidents.

9. DRAWBACKS OF THE EXISTING SYSTEM ARE AS FOLLOWS:

1. High cost: As the existing system consist police personnel who monitors the direction of the vehicle, the Government has to pay wages to them monthly.
2. Low availability: Many times, the policeman is not present at the site. This may cause traffic problems and it becomes easy for people to enter from the wrong direction.
3. May led to traffic jams: Because of low availability of the policeman, it becomes easy for people to enter from the wrong direction and break the law.This may lead to traffic jams.
4. Ineffective in certain situations: During poor climatic conditions it is not possible for the policeman to stand at the site and keep watch on people for 24 hours.

10. PROPOSED SYSTEM

On the basis of above facts, Cloud-based wrong-way vehicle motion detection system is designed to detect the movement of vehicles in the wrong direction and capture an image of the vehicle and store it in the cloud storage. It is also helpful in preventing accidents on one way by detecting the vehicles moving in the wrong direction. This is a onetime investment and as it reduces manual work it becomes cost effective. There is no requirement of policeman at the site to keep watch on people for 24 hours. Hence it reduces manual work. Once the system is fixed at

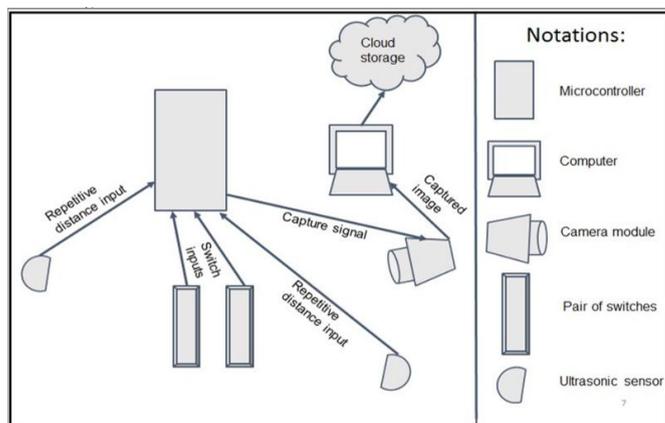


Fig 1:- Dataflow Diagram

the site there is no need to check the system frequently. It can detect multiple vehicles coming from the wrong direction and can capture images of the same whereas manually, it is difficult to catch more people coming from the wrong direction

11. CONCLUSION

Our system thus helps to solve major problems in road traffic management. The photos of the lawbreakers and their vehicles get stored on the cloud database, available to be accessed later by the police officials.

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