Traffic Signal Controlling using Sift Algorithm

V.SahayaSakila, Ajay Krishna Gamidi, Sai Krishna Nalluri

Abstract: India is the second most populous country in the world. So there are large no vehicles eventually cause traffic congestion in India. Congestion is the slow moving of vehicles in traffic. Traffic congestion was the main problem in India. Due to traffic congestion, the emergency vehicle doesn't reach its destination very quickly so many lives are at risk. In this traffic congestions, two-wheeler riders don't even wear a helmet which risks there life they don't even care about their life. Due to a large number of vehicles, there is the most number of vehicle theft case registered. So the security for vehicles was decreased.

Index Terms: SIFT Algorithm, ZigBee, RFID, Vechile Theft

I. INTRODUCTION

India is the second most populated country in the world and its economy is also growing faster so it is most common to see traffic congestion in Indian cities. The number of vehicles in India is growing day by day so it results in slow-moving traffic in India known as traffic congestion. So Indian Traffic needs the solution for its slow-moving traffic. The traffic congestion results from Ambulance to reach its hospital more slow there is an increase in time of arrival of an ambulance in the hospital. It needs a solution which decreases traffic congestion.

In recent year there was a large development in IOT and M2M communication these technologies are the cost-effective solution for our problem. Technologies like RFID, ZigBee and GSM can be used as a solution in order to control traffic to provide cost-effective solutions. RFID is defined as a Radio Frequency Identification Device. It is a wireless technology that uses radio frequency electromagnetic energy to carry information between the RFID reader and the RFID tag. The ZigBee operates at very low power and can be used to perform predefined tasks.

The main reason behind the paper is to provide a traffic-free lane to reach the emergency vehicle to its destination in time safely and also by minimizing the delay caused by traffic congestion.The algorithm used in our paper is SIFT Algorithm This algorithm helps in this project to detect the motor vehicle in an image, and by the image, it detects the whether the person is with a helmet or not and also our system helps to find the vehicle which is lost by using RFID.

II. LITERATURE SURVEY

Traffic is a major problem of the transportation system in mostly in all the cities of Countries. This is true for Countries like India and China with the highest population, where the population is increasing at a higher rate as, For example, Bangalore city has the highest growth in the vehicle population in these recent years.

In the existing System, they use RFID to locate the ambulance which is in the long distance but the range of RFID is very low it is maximum up to 30m. Traffic congestion was not controlled by them. In some projects they disturb traffic flow for emergency vehicle later they use same time flow for each lane even though one lane is completely cleared. In some other System, they use IR sensor which is placed in all sides of the road to calculate the traffic congestion but they use many IR sensors to calculate the density of traffic congestion on one lane.

III. PROPOSED MODELLING

From the above problem statements, it is clear that they cannot clear the traffic congestion and problems related to traffic congestion and bike riders without a helmet. And also the Emergency vehicle clearance without disturbing the flow of traffic and also they cannot find the stolen vehicle. So we proposed a model called "Traffic Signal controlling using SIFT algorithm". In our project there are four separate parts in the first part is about Emergency vehicle clearance so first, we keep a long-range ZigBee receiver and when the ambulance is in reach of the transmitter then the person in ambulance gives the direction by using ZigBee transmitter then his lane becomes green and other becomes red. In the second part, we use RFID (Radio Frequency Identification Device) This is fixed to the traffic pole it has a range of 30m.RFID has a receiver place on the pole and the tag is placed on the vehicle so when the vehicle comes into the range of the RFID reader then it finds the number of tags in the lane if there are more tags it gives more time green if less gives less time for green. In the third part, we find a stolen vehicle as I tell you before RFID tags these tags have a unique id which is different from each other tags. So when the stolen gets into the range of this RFID then it reads the stolen tag and searches in the database if it matches with the stolen tag then it changes the green to red and sends SMS to the owner and to the police station to catch them. In our fourth part we find the people without helmets for this we use sift Algorithm. Whenever a vehicle in traffic then it takes the photo then sift clear the background it keeps the vehicle and riders then search for the user without a helmet then catch them.

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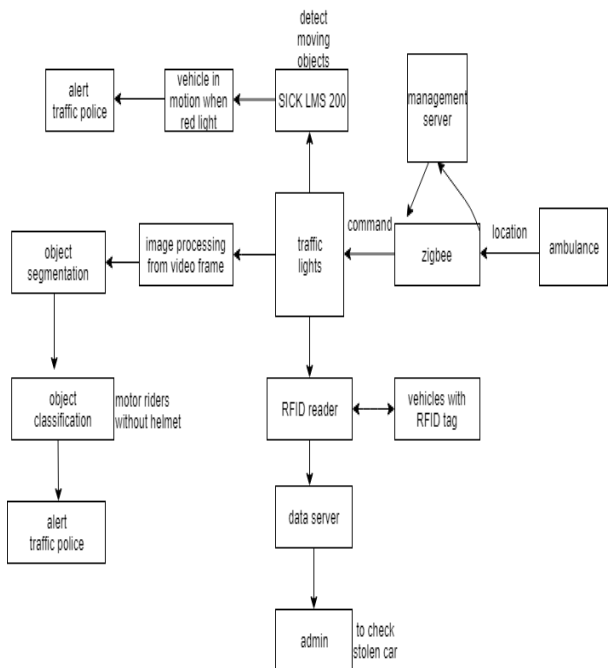
A. Architecture flow Diagram

Figure 1 : Architecture

B. Module Identification

Figure 2: Zigbee

Figure 3: GSM MODULE

ZigBee is a high-level communication protocol and which is used to create personal area networks. It is very less compared to Bluetooth, Wi-Fi are any other networks. It is low power and low data rate and low proximity it is used for small scale projects like in any medical devices are any other. It has a range of 10-100 meters range in line of sight it depends on the environmental conditions.

Fgure 4: RFID Module

RFID is a Radio-frequency identification Device. It consists of an electromagnetic field in which it automatically identifies and tracks tags that are attached to an object. These tags have a unique id different from each other. These tags contain electronic information stored in it. Passive tags need to collect energy from a nearby RFID reader whereas Active tags have a local power source such as a battery is built in it and it has an operating range of hundreds of meters from the RFID reader. There is no need for a tag to be within the line of sight of the reader, so it may be embedded in the tracked object. RFID is used in the automatic identification of data.

These RFID tags are used in a huge number of industries. For example; implanting RFID microchips in livestock and pets helps in the positive identification of animals.

The GSM module is connected with the microcontroller and used to send to communicate with the other mobile networks. This GSM module has a sim slot to keep SIM so that we can send SMS and MMS to any other person by GSM. These GSM modules most commonly used for Internet Communication. These GSM modems must support an "extended AT command set" for sending/receiving SMS messages.
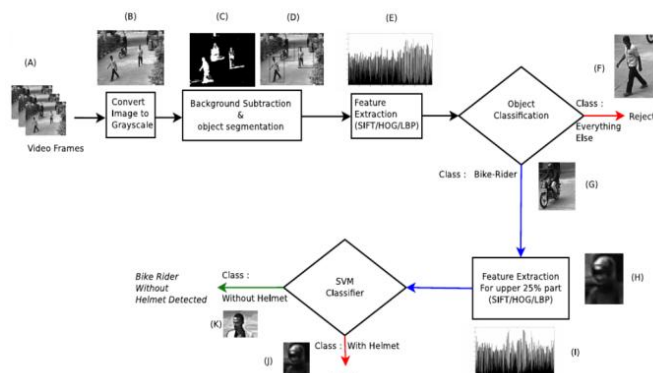
IV. SIFT ALGORITHM

Figure 5: Flow Chart

The scale-invariant feature transforms, in short, it is called as SIFT.

It is an algorithm with feature detection in a computer vision in which it is used to detect and analyze local features in an image. Applications include robotic mapping, object recognition, and image stitching, navigation, gesture recognition, 3D modeling, individual identification of wildlife and match moving, video tracking.SIFT key points are objects in which the first extracted from a set of the reference image and stored the relevant information in a database.

In the First phase from video surveillance convert the image to grayscale to detect the image more clearly. Then it subtracts the background image from that image. Then it takes each individual in the image for image classification later it checks each image if the person is with a vehicle with a helmet then it rejects it.else if a person is without a vehicle it rejects it. Else if a person with a Vehicle and without a helmet is found then it accepts and stops the vehicle by changing the signal to Red and sending a message to Admin

V. RESULT ANALYSIS

So from the above flow diagram we can clearly understand how the algorithm works if any bike riders without helmet can be found by that and By using RFID we can find the stolen vehicle and congestion in the road and also control the congestion By using ZigBee which is long range sensor we can control traffic signal and allow the ambulance to reach its destination more faster and efficient way so we can save many life's by our project.

VI. CONCLUSION AND ENHANCEMENTS

We described about IOT and our project Traffic Signal Controlling Using SIFT Algorithm from the project we can control Traffic Signal during an emergency for Ambulance and Fire engine so it can save many lives. In our project, we can control the traffic signal by using RFID and tags we can control the traffic congestion problems and also we can find the stolen vehicle by using our project. It uses RFID and Tags these are attached to Car and each tag has a unique ID by using it we can find the stolen vehicle. We can find the two-wheelers who don't use their Helmet by using SIFT Algorithm. SIFT Algorithm deletes the background of an image later it detects helmets and vehicles then it checks each people with vehicles and then checks for the Helmet if it is found then it leaves and checks the other if the vehicle with no helmet is found then it sends the data to the police by using GSM module and changes the light to red.

Further improvements can be done to the prototype by implementing it with longer range RFID readers. Also, GPS can be placed into the vehicle detection module, so that the specific location of the vehicle is known. Currently, we have done this system by considering only one road of the traffic junction. It can be improved by taking it to all the roads.

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