Yolo Based Intelligent Traffic Monitoring System Using Darknet-CNN

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Abstract - Vehicle traffic between cities has grown dramatically due to the quickening rate of urbanization. As a result, a variety of traffic-related issues have surfaced, including gridlock and an overabundance of both kinds and numbers of cars. In order to address traffic issues, gathering road data is crucial. In this technology, traffic flow is calculated by combining a vehicle-counting techniquewith YOLO, which is initially used to detect automobiles. Therefore, in order to operate traffic light signals based on traffic density, adaptive traffic signals that can monitor traffic in real time are required. This study presented an adaptive traffic signal management systemthat takes pictures of each lane at a junction and uses image matching and processing techniques to govern traffic efficiently.

I.INTRODUCTION

With increasing traffic volumes and limited road capacities, traffic congestion has become a big issue for civil engineers in almost all modern metropolitan cities like Delhi, Mumbai, London,New York and Singapore. Traffic congestioncan lead to a variety of social, economic and environmental problems. First drivers, when stuck in traffic congestion, are facing a higher risk of arriving late at their destination, causing greatlevels of stress. The stress may further transform into impatience, carelessness.As demand grows, a condition known astraffic congestion develops on transportation networks. It is typified by slower travel times, longer trip times, and more car lines. The most prevalent example is how cars actually use the roadways. Congestion occurs when there is so much traffic that the interaction of the moving cars slows down the flow of traffic.When ambulances are called to save lives,time is of the essence. However, because of traffic, they frequently have to slow down to passthrough intersections. This makes things more difficult in cases where the patient in the ambulance need immediate care that can only be provided in a hospital.

The government of Karnataka, India, has launched the 108 ambulance service. Patients are admitted via this 108 service to the closest hospital. For example, in Bangalore, India, this service is being used, but everything gets thrown for a loop whenever an ambulance gets stuck in traffic and in the meantime, the patient's situation may become critical. Traffic controlis a challenging issue in the urban cities of India,as is the case in much of the rest of the world. ZigBee technology is a wirelessstandard designed to operate low-power wireless sensor networks, and it can aid emergency vehicles in dealing with traffic congestion. The Proliferation of Vehicles Urbanization is a global phenomenon, and its effect is more pronounced in developing countries like India. In these countries, there is a drastic improvement in industrialization. Due to an increase in industrialization, the usage of vehicles has developed countries but with the number of fatalities somewhat less due to modern infrastructure. In developing nations, due to alack of infrastructure, motor vehicle fatalitiesare comparatively higher. Globally, road accidents claim livesof 1.24 million people per year with as highas 50 million people injured. The statistics show that countries have various numbers of fatalities and accidents. In India, statistics show that fatalities and accidents have been increasing. "Bus priority control system based on wireless sensor network (WSN) and Zigbee" (Wu et al., 2006) provides an overview of howbuses are routed along roadways with all of the necessary information to control traffic congestion. Here, a bus priority.

II.OBJECTIVES OF THE PROJECT

- Traffic jams not only cause extra delay and stress for the drivers, but also increase fuel consumption, add transportation costs, and increase air pollution.
- The signal timing changes automatically on sensing the traffic density at the junction.
- Traffic congestion is a severe problemin many major cities across the world andit has become a In this project, our proposed system develop to design a traffic controller based on Computer Vision that can adapt to the current trafficsituation nightmare for the commuters inthese cities.
- It uses the traffic videos at traffic junctions for traffic density calculation bydetecting the vehicles at the signal and setting the green signal or red signal timeaccordingly.

- The traffic videos are monitored then vehicles are detected and counted using proposed Mask R-CNN algorithm.
- The traffic videos are input to the system then converted into frames and identify the vehicles count. In which frame vehicle density is high then decideto display the green signal otherwise the traffic system display the red signal.
- This helps to optimize the green signaltimes, and traffic is cleared at a much faster rate than a static system, thus reducing the unwanted delays, congestion,and waiting time, which in turn will reducethe fuel consumption and pollution.

III.AIM OF THE PROJECT

The project aims to develop a system that can identify various types of faults as soon as they occur. In this project, we propose a novel multi- agent phenomenon based traffic management framework to reduce traffic congestion. It bridges vehiclererouting and traffic light control by bringing about the notion of digital “pheromone.” Specifically, each vehicle agent deposits two types of pheromones (i.e., traffic pheromone and intention pheromone representing the current and future traffic densities, respectively) along its route. Roadside infrastructure agents combine the pheromones using a fusion or regression model, to forecast the short-term traffic conditions without resorting to the central ITS server, achieving the distributed property.

An intelligent traffic-monitoring system was developed to record real-time information about traffic volume, and vehicle types. A mYOLOv4-tiny model was proposed to achieve real-time object detection and improve detection efficiency.Two effective models (CNN and Vector- CNN) that adopt a new network mapping fusion method were implemented to increase the classification accuracy and greatly reduce the number of model parameters.

IV.PROPOSED METHOD

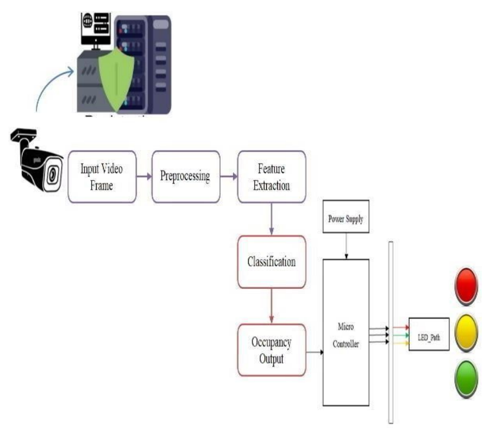


Fig .1 Proposed block diagram

This system involves the design of fault finding in railway tracks. This system uses controller for interfacing the Vehicle based detection using IoT sensors such asSound sensor, IR sensor and Ultrasonic sensor. The sensing device senses the voltage variations from the ultrasonic sensor and then it gives the signal to the microcontroller. The microcontroller checks the voltage variations between measured value and threshold value and controls the devices.

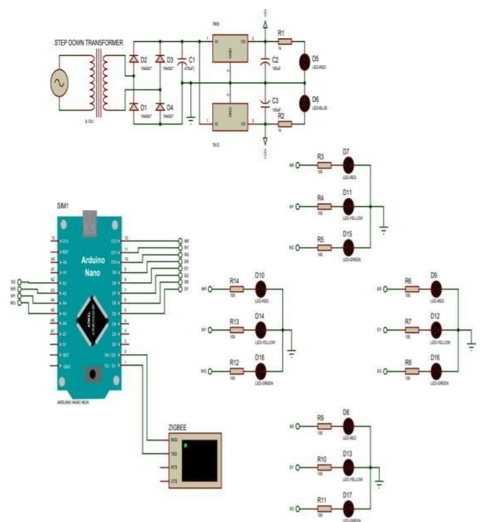
Preprocessing is used to improve the quality of the image and to make it easier for the feature extraction and classification algorithms.Feature extraction is the process ofextracting relevant features from an image. These features will be used by the classification algorithm to classify the image.Classification is the process of assigning an image to a specific class. The class may indicate the presence or absence of a fault, or it may indicate the type of fault.

Image processing techniques is used to improve the quality of the images, to segment the images into different regions, or to extract specific features from the images. The trained features can be used to classify new railway track images into different categories, such as "normal" or "faulty". This project uses regulated 5V Power supply. The system can be operated at tunnels also, without interruption. Sound sensors are used for fault detection.

The Convolutional Neural Networks and image Classification methods is used to identify the railway track fault.
Hardware Requirements
Arduino Nano

- The Arduino Nano and Arduino Duemilanove share many of the same features.
- The Nano is inbuilt with the ATmega328P microcontroller, same asthe Arduino UNO.
- Arduino Nano V3 is used.
- 7800 series
- There are common configurations for 78xxICs, including 7805 (5 V), 7806 (6 V), 7808 8 V, 9 V, 10 V, 12 V, 7809, 7810,7812,15 V, 18 V, and 24 V (7815, 7818, and 7824) versions.

V. PROPOSED CIRCUIT DIAGRAM



It is worth noting that the modern data collection technologies make it feasible to instantiate our digital pheromone into a realistic intelligent transportation system (ITS). The intentions about which road links to enter next for vehicles can be obtained if they communicate with the local roadside infrastructure. Thus, our digital pheromone canbe easily applied into ITSs. In case we cannot get the speed of each vehicle, we could adopt some machine learning techniques to learn the average speed of relevant road links by relying on sparse traffic data. Regarding thevehicle counts, they might be estimated basedon historical traffic data if digital camera cannot count them correctly. Further, in absence of complete vehicle intentions, we may use probabilistic inference to estimate them, or employ machine learning techniques to predict them.Our rerouting strategy in this paper relies on the k shortest path algorithm. In some cases, two consecutive shortest paths might be very different even though the difference of travel cost is small, and the recommended path may not be accepted by user if he is not familiar with that path. However, our rerouting algorithm in this paper focuses on reducing traffic congestion so as to improve the overall traffic performance. Thus the degree of difference from original path, i.e., user preference is not our major concern in this work. We wish to notethat the graphs of two testing road networks (Grid and Cityhall) in this paper are highly connected, and thus two consecutive shortest paths should always share most of the road links. Nevertheless, it is definitely worth considering the difference of consecutive shortest paths and user preference in rerouting strategy in our future work.

TRAFFIC LIGHT CONTROL

Low power LEDs are used for every traffic light with different color, namely red, yellow and green. The red LEDindicates “stop”, the yellow LED indicates “listen” and the green LED indicates “drive”. The sequence of altering the LEDsaccording to their color is as shown: Green-Yellow-Red-Green. Twelve LEDs are used; three to each traffic light Drive click the path and is in turn compared with the default traffic light path by microcontroller and TLC. If any of thesound signal matched with the received TLC, then microcontroller changes the state of signal by giving green signal along the path of the ambulance. The microcontroller generates the value of output data ranging to receiver to change the path.

VI.WORKING PRINCIPLE

In order to lessen traffic congestion, we suggest a novel multi-agent pheromone- based traffic management framework in this research.It introduces the idea of a digital “pheromone”, which connects traffic signal control and vehicle rerouting. Specifically, each vehicle agent deposits two types of pheromones (i.e., traffic pheromone and intention pheromone representing the current and future traffic densities,respectively) along its route. In order to estimate the short-term traffic conditions without requiring the central ITS server, roadside infrastructure agents integrate the pheromones using a fusion or regression model, achieving the distributed property.Our framework uses a proactive vehicle rerouting technique if road congestion is foreseen. It first identifies the cars that require rerouting and then assigns alternate routes to them. Once road congestion is predicted, our framework adopts a proactive vehicle rerouting strategy, which first selects vehicles that need rerouting, and then assigns alternative routes to them before they enter congested roads. We want to emphasize that the suggested generates signal to corresponding path using WiFi which vehicles exchange traffic information with the local and distributed roadside infrastructures.

A novel plan for automatically managing traffic lights and accomplishing the aforementioned goal would enable the ambulance to traverse every intersection without having to wait.

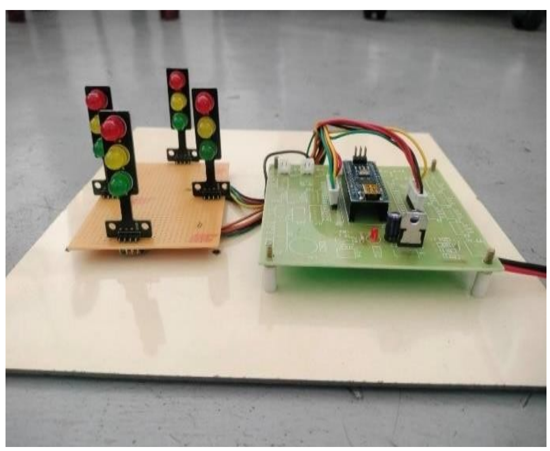
VII.RESULT

Global dynamic traffic information is desirable in an ideal rerouting plan toprevent congestion.However, in that case, it always falls into a centralized method which might becomeprohibitively expensive as the roadnetwork size and the numbers of involved vehicles scalepheromone. The global distance information on a map is static and readily available on any in- vehicle system, and the local dynamic pheromone information can be collected from roadside units.

Traffic Light Control

Generally speaking, color phase and time length are the two main components oftraffic light regulation. A series of typical hues, such asred, yellow, and green, make upthe color phase.

The time duration describes the displayingperiods of the color phases. We suggest twoonline traffic signal control techniques inside the unified traffic management framework.Both of the two strategies automatically set color phases and calculate the time duration of these phases on competing roads according to the amount of digital phenomenon.



VI.CONCLUSION

In this project, A novel intelligent traffic- monitoring system combining a YOLOv4-tiny model and counting method was proposed for traffic volume statistics and vehicle type classification. Once congestion is predicted, we first select vehicles according to the distance to theconcerned road and their drivingintentions, then we use one probabilisticstrategy based onglobal distance and localpheromone to reroute those vehicles. In parallel, we create two pheromone-based ways to dynamically managetraffic signals to further reduce traffic congestion, depending on whether or not they take intoaccount the downstream traffic status.

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