Comparison of Different Face-Detection Algorithm

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Abstract— It is based on finding faces from an image or video by using new techniques such as single reading to get better face recognition and create a student learning guide. Image features are visualized based on subtle visual features such as color, size, edges, movement etc. The face detection algorithm is very specific to the type of problem and cannot be guaranteed to work unless it is used and results are obtained. We followed a multi-faceted algorithm approach, which is a collection of simple rejection algorithms. In the development of final algorithms many different strategies have been attempted. The first step is skin separation, which is okay by rejecting too much detail. So this forms the first step of the final algorithm again. Neural networks have also been used. Seeing someone's face from the picture. Face detection can be done in the following ways: Geometry: Based on the geometric relationships between facial features, or in other words the spatial configuration of facial features. That means that the basic geometric features of the face such as eyes, nose and mouth are the first to be identified and the face is classified on the basis of geometrical distance that does not differ between the features. Photometric stereo: It is used to obtain the composition of an object from many images taken under different light conditions. The structure of the find is described by a map that looks great, formed by a collection of common places.

Keywords: Face Detection, K-Neighbor Neighborhood, Nevolin Neural Network, Cross-Box, Haar cascade

I. INTRODUCTION

A face is one of the easiest ways to divide an individual's identity. Face recognition is a personal identification system that uses one's own attributes to identify one's identity. The process of recognition of the human face basically consists of two stages, namely the acquisition of faces, in which the process occurs very quickly in humans, except in cases where the object is located at a distance, following the introduction, which shows the face as humans. The platform is also replicated and developed as an example of facial recognition (facial recognition) is one of the most widely studied and recommended biometrics technologies. There are two types of methods that are currently popular in the advanced face recognition pattern namely, the KNN method and the CNN method. KNN tries to find the nearest neighbors to k, passing through all the data points to find those points closest to k. The KNN model has already created a graph that shows all the points of the training data and the model needs to search the region when it crosses an invisible point that is incorrect. The system includes a sample of local photos, a self-map map of the area itself, and a neural network for verification. The CNN method is able to be easily distinguished, requires only fast, general assumptions and pre-processing, and shows better classification performance than the eigenface dataset considered for the number of images per person in the training database varying from 1 to 3 The project face recognition area with facial recognition image processing. Software requirements for this project are Psycharm, Visual Studio. Keywords: Face Detection, K-Neighbor Neighborhood, Nevoline Neural Network, Cross-Box, Harcascade.

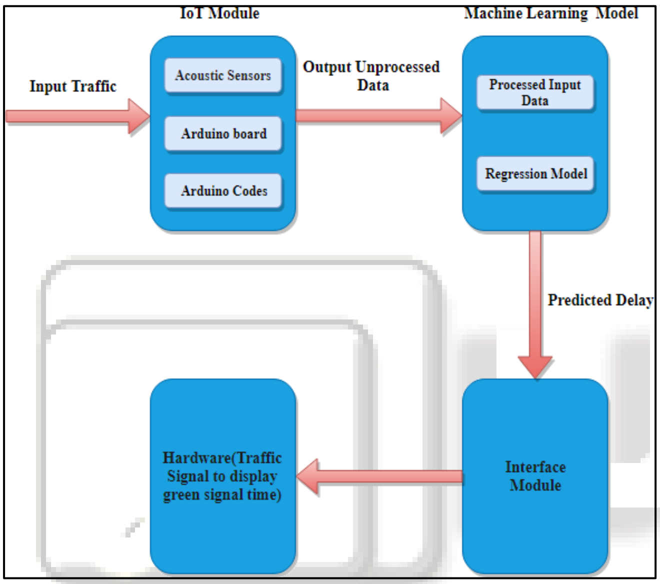
II. LITERATURE SURVEY

At the present time the problem of road traffic in the municipalities is a big problem because the number of traffic jams is increasing day by day. The area with the most traffic is near the traffic jams where all passing traffic stop for a moment. Therefore a sound and efficient system of traffic flow and sensitivity is needed at meeting points. Existing traffic management systems are less efficient in terms of cost and efficiency. So choosing the right sensor for traffic flow is important.

We investigate the problem of active traffic light using real-time traffic data collected by the wireless sensor network (WSN). Existing studies mainly focused on determining the length of green light in the optimized sequence of traffic lights. In this paper, we propose an efficient traffic light control algorithm that alters the sequence and duration of traffic lights according to the actual time received. Our algorithm looks at a few traffic factors such as traffic volume, wait time, and vehicle traffic, etc., to determine the sequence of green light and total light duration. Simulation results show that our algorithm produces significantly higher time by setting the vehicle's minimum wait time, compared to the fixed-time control algorithm and the limited-time control algorithm. We also apply the proposed algorithm to our travel band, iSensNet, and the result shows that our algorithm is efficient and effective.

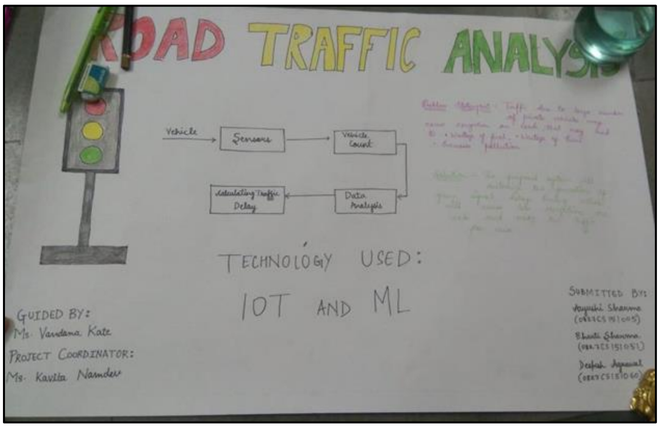
The development of smart communication systems has had a positive impact on many aspects of road travel. In particular, traffic measurement technology, conducted using various types of detection devices, has contributed to the analysis of traffic flow. Loop Detectors, installed under the surface, have been used mainly to measure traffic. However, with OPEN ACCESS Sensors 2014, 14,22892 loop diagnoses often rupture due to damage to vehicles passing through them, and have a high repair cost. Ultrasonic sensors are often used as vehicle detection devices because they are cheaper and more accurate than other types of devices. A lot of ultrasonic sensors detect vehicles by measuring from top to bottom or from side to side diagonally. However, these methods require the installation of each detector because each detector measures only one lane on the road. In addition, ultrasonic sensors require considerable road infrastructure.

In our proposed system the traffic size can be estimated by detecting traffic counts using IoT sensors and that traffic counts will be conducted and used to generate the green signal time (delay function) that will be predicted using the machine record recording model and delay will be given the following signal. An IoT and Machine-based framework for studying traffic signals for assembly networks. The main objective of the proposed solution is to increase traffic coverage and reduce the average waiting time at the intersection leading to reduced pollution and time savings. An Internet based traffic signal system has many advantages such as low cost, high reliability, never been affected by bad weather etc. and the power of the app in various conditions will improve as the system learns from previous events with the help of the ML algorithm. In our future research, we intend to extend the initial results obtained to include additional performance metrics, such as the probability of stopping and the velocity jitter of the vehicle. In addition, the basic network of connections considered here will be expanded to include major road networks.



Establish a good system that regulates traffic delays.

Activities can accelerate the use of more traffic forecasts and make the system more efficient. The main objective of the proposed solution is to increase traffic coverage and reduce the average waiting time at the intersection leading to reduced pollution and time savings. An Internet based traffic signal system has many advantages such as low cost, high reliability, never been affected by bad weather etc. and the power of the app in various conditions will improve as the system learns from previous events with the help of the ML algorithm. In our future research, we intend to extend the initial results obtained to include additional performance metrics, such as the probability of stopping and the velocity jitter of the vehicle. In addition, the basic network of connections considered here will be expanded to include major road networks.

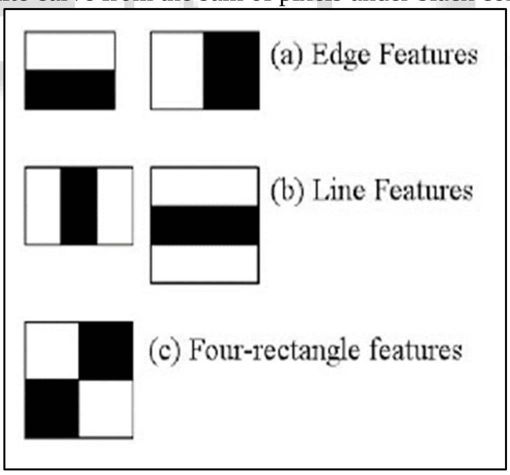


III. RESEARCH METHODOLOGY, PROCESS (DIAGRAM)

A. Haar Cascade

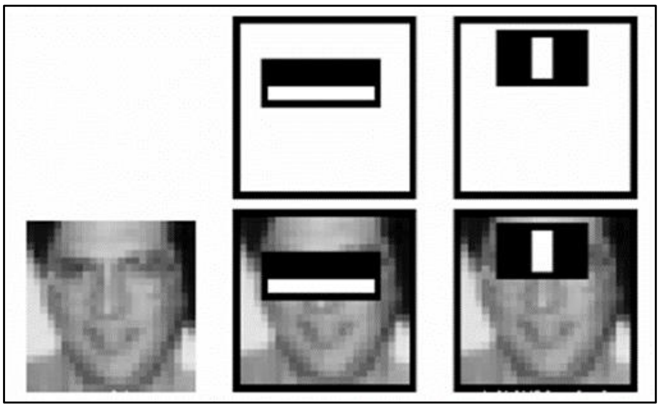
Object discovery using the Haar-based Casar classifier is an effective method for object discovery proposed by Paul Viola and Michael Jones in their paper, "Accelerated Acquisition using the Boosted Cascade of Simple Features" in 2001. It is a machine learning system where masker work is trained from many positive and negative images. After that it is used to find objects in other images.

Initially, the algorithm requires many good images (face images) and negative images (images without faces) to train the student. After that we need to extract features from it. In this case, using the Haar features shown in the image below. They are like our confession head. Each element is a single value obtained by subtracting the sum of pixels under the white curve from the sum of pixels under black concrete.



Now, all possible sizes and locations of each kernel are used to calculate multiple features. To calculate each element, we need to find the sum of pixels under the white and black squares. To solve this, they introduced an important image. Even though your image is large, it limits the pixel count provided to functionality that involves just four pixels.

But among all the features we have listed, many of them do not work. For example, consider the image below. The top row shows two good features. The first feature selected seems to focus on the properties of the eye region that is often darker than the nose and tire region. The second factor selected depends on the material that is darker than the bridge of the nose. But the same windows used in the woods or elsewhere do not work. A selection of the best features of the 160000+ features is available through Adaboost.



In this case, we apply each element to all training images. At each stage, you get a really good edge that will separate the face from good and bad. Obviously, there will be errors or misinformation. We select the features with a small error rate, which means they are the features that distinguish the faces from the non-face images. (The process is not as simple as this. Each image is given the same weight at first. After each partition, irregular image weights are added. Then the same procedure is performed. New error rates are calculated. And new instruments.).

The final classifier is a weighted sum of these weak learners. It is called weak because it alone will not distinguish the image, but in association with others it creates a strong bonding phase. The paper states that even 200 features provide 95% accuracy. Their final set consisted of 6000 items.

For an image, most of the image is surface area. So it's a good idea to have a simple way to check that a window is not a surface. If not, get rid of it by firing one, and never do it again. Instead, focus on regions where there may be faces. This way, we spend a lot of time looking at potential regions of the face.

B. Convolution Neural Network

A neural network (CNN or ConvNet) is a class of deep neural networks, often used in the analysis of virtual images.Transformational networks are inspired by natural processes in that the pattern of communication between neurons is similar to the organization of the animal's visual cortex.

Given the input image, the CNN model works with a variety of filters to identify edges, parts of the image to get the item in a given image.

Augmentation transforms a single image into multiple images by using various functions such as compression, zoom, zoom, zoom, out, zoom, rotate, etc. This ensures identifying faces at different scales and directions

Convolution:

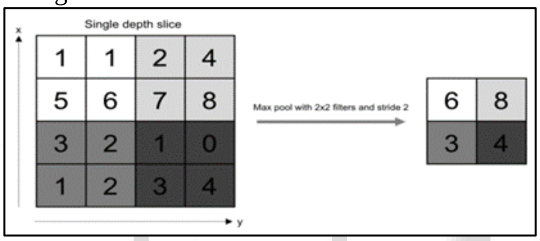
1) Edge Detection –

Finding edges can be considered the most important part of a decision. In order to distinguish between the edges of two objects play an important role. On the CNN network, we use the Sobel edge detection method to get the edges. In this method, we use a mask / kernel with the same tensor size and we use the decision functionality between the image kernel sensor.

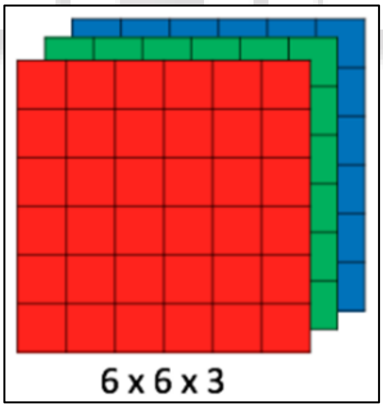
2) Max-Pooling –

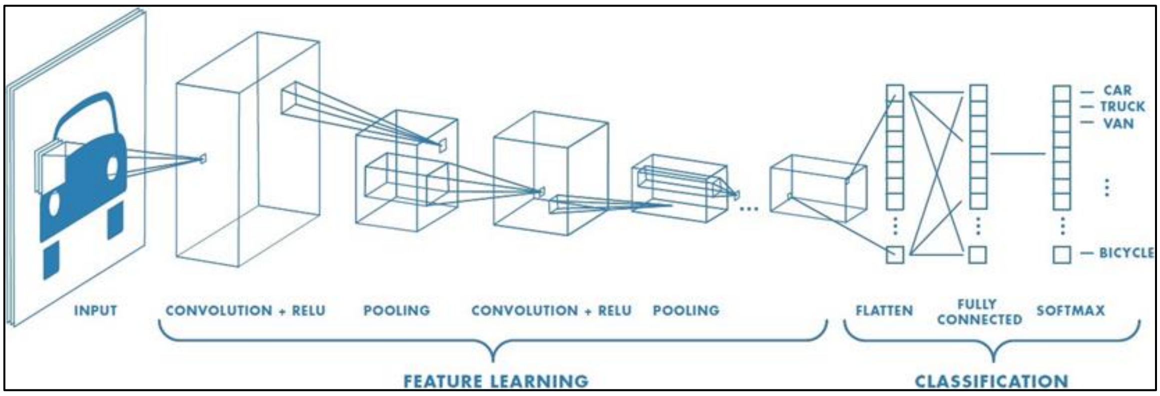
Max-Pooling is a layer that helps to identify the face or object in a given image. Attacked to find the location, scale and rotation, which means it gets the face / object of the image regardless of the location, size or position of the face / object in the image.

Given the effect from the pre-wrap layer applied over it to a given kernel size then the slower takes a higher value and gets the surface / material



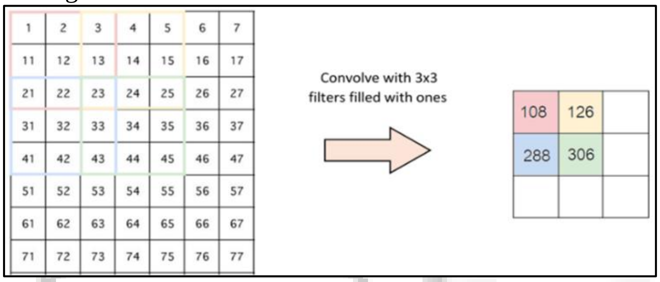
We use a combination of specification, activation and max-pooling layer.





3) Strides

It is the number of pixels that travel over the input matrix. When the stride is 1 then we move the filters to 1 pixel at a time and where the stride is 2 then we move the filter 2 pixels at a time and so on. The figure below shows that the findings will work to activate 2.



4) Padding

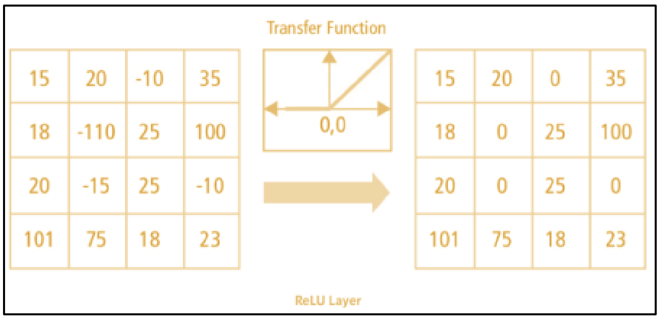
Sometimes the filtering doesn't match the input image. We have two options:

– Attach the image with zeros (zero-padding) to fit
– Discard part of the image when the filters do not match. This is called a valid padding that stores only the legal part of the image.

5) Non-Linearity

ReLU represents the Registered Linear Unit in offline operations. The results are f (x) = max (0, x).

The purpose of ReLU is to introduce inconsistencies in our ConvNet. Since, real-world data may require that our ConvNet is readable it may be incorrect values.



ReLU represents the Registered Linear Unit in offline operations. The results are f (x) = max (0, x).

Why ReLU is Important: The purpose of ReLU is to introduce inconsistencies in our ConvNet. Since, real-world data may require that our ConvNet is readable it may be incorrect values.

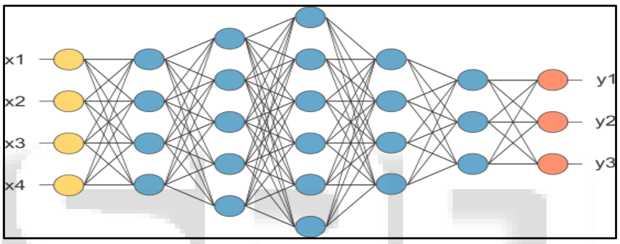
6) Pooling Layer

This section would reduce the number of parameters when the images are too large. Local swimming is also known as reducing or reducing the sample which reduces the size of each map but retains important details. Local swimming can be of different types:

– Max Pooling
– Calibration Pools
– Sum Pooling

7) Fully Connected Layer

The layer we call the FC layer, we narrow our matrix into a vector and we feed it into a fully connected layer such as a neural network.



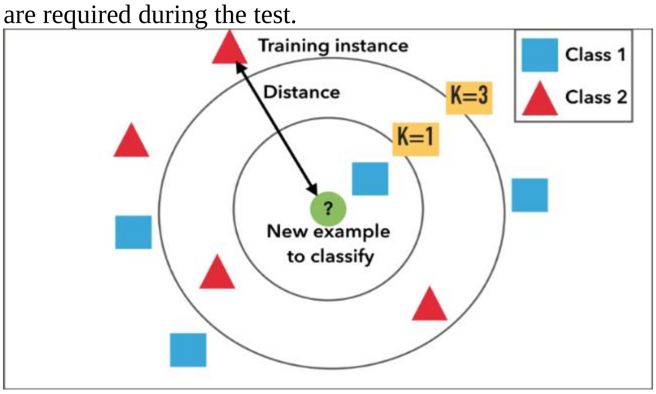
In the diagram above, the feature map element will be converted as a veteran (x1, x2, x3,…). With fully integrated layers, we combined these elements together to make a model.

C. K-nearest neighbour

KNN can be used for both isolation and tracking problems. However, it is widely used in problems of segregation in the industry.

KNN is a non-parametric, lazy learning algorithm. Its purpose is to use a database where data points are grouped into several categories to predict the classification of a new sample point.

There is no explicit or narrow training phase. This also means that the training phase is much faster .The lack of generalization means that KNN stores all training information. To be precise, all (or most) of the training data are required during the test.



The algorithm can be summarized as:

- The absolute value of k, together with the new sample, is specified
- We select the entries for our k database that are closest to the new sample
- We find the most common distinctions of these entries
- This is the classification we give you a new sample

A few other things for KNN:

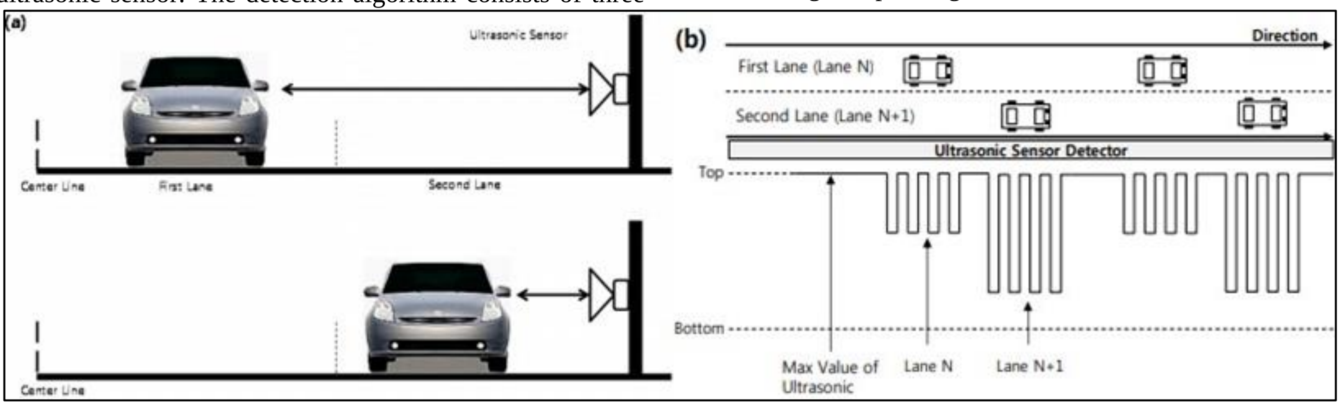
- KNN stores all training data that it uses as a comment.
- KNN does not read the model.
- KNN makes time-based prediction by calculating the similarity between the input sample and each training sample

D. Traffic measurement on multilane using wireless ultrasonicsensor

The development of smart communication systems has had a positive impact on many aspects of road travel. In particular, traffic measurement technology, conducted using a variety of available devices, has contributed to traffic analysis Loop Detectors, installed underground, have been widely used to measure traffic. However, with OPEN ACCESS Sensors 2014, the diagnosis of loop 14 14892 tends to deteriorate due to damage from vehicles passing through them, and they have a high maintenance cost [1]. Ultrasonic sensors are often used as vehicle detection devices because they are cheaper and more accurate than other types of devices. A lot of ultrasonic sensors detect vehicles by measuring from top to bottom or from side to side diagonally. However, these methods require the installation of each detector because each detector measures only one channel in the path. In addition, ultrasonic sensors require considerable road infrastructure.

In this system the scanning method used to measure traffic on many roads uses a wireless sensor network and ultrasonic sensors. The proposed system identifies and classifies vehicles along the route. Whenever an ultrasonic sensor detects the movement of a car on the road, the system measures the distance of the vehicle relative to its location. Vehicle detection and classification can be performed using the vehicle's remote data and time required cartoon passes through the detection range of the ultrasonic sensor. The detection algorithm consists of three parts. The first part lists the thresholds, which are the points at which the vehicles are located in each line. The second part filters unnecessary data, such as noise from the natural environment. The third part determines the most traffic areas of most routes and calculates the amount of traffic, based on filtered data and calculated limits. To test our proposed system, we developed a wireless ultrasonic sensor mote (WUSM) wireless, small and easy to install and can be adapted for use on various road surfaces. The accuracy and effectiveness of the proposed vehicle detection system and classification system using WUSMs were evaluated. The results of the detailed inspection indicate that the proposed system can be easily built and maintained at various road locations and can estimate the amount of traffic by vehicle size and number of driving lanes. The remainder of this paper is organized as follows: first to analyze the existing ultrasonic sensor technology. A proposed vehicle detection algorithm and system module are described. The tests performed to evaluate the effectiveness of the proposed system and the results of the tests are summarized. Finally, conclusions can be drawn from the results and future work plans.

The system proposed in this paper uses a detection algorithm based on ultrasonic sensors. The term “Ultrasonic” refers to the frequency of sound waves beyond a person's range. Frequency waves are used between 25 and 50 kHz. The main equipment is similar to that of microwave radar. Sounds are transmitted, drums are pulled, and the distance from the sidewalk or car location is calculated from the time of the wave. The performance of ultrasonic sensors is much better than other types of pulse devices. Ultrasonic detection systems can detect vehicles in many locations and measure their speed, and they are much cheaper than integrated systems. Also, they have difficulty with their performance being affected by changes in temperature and precipitation. However, some modern models, such as those used in our proposed system, are compensated by the existing heat. Typically, an ultrasonic sensor transmits a sound cone from the top of the road and measures the output from the vehicle or ground, as shown in Figure 1a. Once the default distance from the detector to the ground is set, when the vehicle exceeds the ultrasonic sensor range, the distance value changes depending on the v-size.



1) Detection using ultrasonicsensor

Traffic monitoring technology can be considered as complex or unrelated technology. Inaccessible traffic sensors are included in or across the road and have obstacles that include high repair costs and traffic inconvenience for repairs, repairs, or re-installations of road repairs or redesigns. Incompatible sensors can be mounted above or beside roads with minimal disruption to traffic and thus provide the benefits of low input costs and ease of maintenance. However, one of the disadvantages of inaccessible nerves is that one has to get rid of them.

In this paper, we propose a system for measuring vehicles using ultrasonic sensors positioned along the road. The proposed algorithm consists of three components that can accurately detect vehicles on multiple routes. The proposed method was found to show error rates of up to 3%, compared to actual traffic flow rates, at three locations under two conditions (daytime and nighttime). However, there have been a few exceptions to the results of the one-lane highway and the rural highway. Lost vehicle errors occurred when multiple vehicles entered the sensor area at the same time. This happens often on very difficult roads. However, their effectiveness was limited in our experimental results. The proposed ultrasonic sensor is small and can communicate with other sensors over a wireless network. Therefore, when sensors are installed on both sides of the road, vehicles can be identified more accurately than one sensor on one side. In addition, because WUSM is inexpensive and easy to maintain, it can be used on national roads as well as on complex city streets. Due to the low rates of errors found in vehicle acquisition and its low installation costs, WUSM can assist in vehicle acquisition as part of the ITS. In future work, we plan to use the sensor network system for more traffic. Therefore, the power management of our system will be monitored so that the sensors can be monitored longer and continue to be able to transmit data.

- Advantages

It is less expensive and can easily be used in a shorter range also provides a definite price

- Disadvantage

Feeling the precision that affects soft objects. Limited recovery found. Sensing accuracy is affected by changes in temperatures of 5-10 degrees.

IV. Result

Among the three different algorithms for face detection.

- CNN (Convolution Neural Network) is the most accurate of the 3 but is not used in real-time applications because it takes more time than one.
- Haar Cascade is the most accurate but can be used with real-time applications because it takes less time to process than others.
- KNN (Near K-Near) is more accurate than Haar cascade and less accurate than CNN and takes less time to process than CNN but more than Haar Cascade.

V. Conclusion

This paper presented an IoT and Machine Learning-based framework for organizing traffic signals in networking environments. The main purpose of the proposed solution is to increase traffic coverage and reduce the average waiting time leading to reduced pollution and time savings. An Internet based traffic signal system has many advantages such as low cost, high reliability, never been affected by bad weather etc. and the power of the app in various conditions will improve as the system learns from previous events with the help of the ML algorithm. In our future research, we intend to extend the initial results obtained to include additional performance metrics, such as the probability of stopping and the velocity jitter of the vehicle. In addition, the basic network of connections considered here will be expanded to include major road networks.

VI. Future Enhancement:

Speaking of future applications we can use AWS cloud services to save real time generated data and then send it to a cloud storage so that any traffic plan can be used effectively. This real-time information is very useful in dealing with heavy traffic on major cities.

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