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ROAD SIGN INTIMATION THROUGH VOICE ALERT SYSTEM USING DEEP LEARNING

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ABSTRACT:

To ensure a smooth and secure flow of traffic, road signs are essential . The proposed system is trained using Convolutional Neural Network (CNN) which helps in traffic sign image recognition and classification.A set of classes are defined and trained on a particular dataset to make it more accurate. The German Traffic Sign Benchmarks Dataset was used, which contains approximately 43 categories and 51,900 images of traffic signs.The accuracy of the execution is about 98.52 percent. Following the detection of the sign by the system, a voice alert is sent through the speaker which notifies the driver.

INTRODUCTION

Traffic signs are road facilities that convey, guide, restrict, warn, or instruct information using words or symbols. With the development of automotive intelligent technology, famous car companies, such as Mercedes-Benz, BMW, etc., have actively invested in ADAS (Advanced Driver Assistance System) research. Commercialized ADAS systems not only include Lane Keep Assist Systems, but also include TSR (Traffic Sign Recognition) systems to remind drivers to pay attention to the speed. If drivers and pedestrians do not notice this information, it can lead to the occurrence of traffic accidents. With the increasing demand for the intelligence of vehicles, it is extremely necessary to detect and recognize traffic signs automatically through computer technology. Research in this area began in the 1980s, to solve this problem. To make them easy for drivers to read and recognize, traffic signs are often designed to be of a particular shape and color with symbols inside, so that there is a significant difference between the traffic signs and the background. For example, the speed limit 60 traffic sign is a circular shape with a strong number "60". These features are also important information for traffic sign recognition systems.

However, traffic sign recognition is not an easy task, because there are many adverse factors, such as bad weather, viewpoint variation, physical damage, etc.

There have been a lot of technological advancements and cars with auto-pilot mode have come up. Autonomous

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vehicles have come into existence. There has been a boom in the self driving car industry. However, these features are available only in some high end cars which are not affordable to the masses. We wanted to devise a system which helps in easing the job of driving to some extent. On conducting a survey we found that the magnitude of road accidents in India is alarming. Reports suggest that every hour there are about 53 mishaps taking place on the roads. Moreover, every hour more than 16 deaths occur due to these mishaps . When someone neglects to obey traffic signs while driving, they are putting their life as well the life of the other drivers, their passengers and those on the road at risk. Hence, we came up with this system in which traffic signs are automatically detected using the live video stream and are read out aloud to the driver who may then take the required decision.

The difficulties in this area that we faced, were as follows: Although the same kind of traffic signs have some consistency in color, in outdoor environments the color of the traffic signs is greatly influenced by illumination and light direction. Therefore, the color information is not fully reliable. As vehicle mounted cameras are not always perpendicular to the traffic signs, and the shape of traffic signs are often distorted in road scenes, the shape information of traffic signs is no longer fully reliable. Traffic signs in some road scenes are often obscured by buildings, trees, and other vehicles; therefore, we needed to recognize the traffic signs with incomplete information. Traffic sign discoloration, traffic sign damage, rain, snow, fog, and other problems, are also given as challenges in the process of traffic sign detection and classification. Another area of focus GPS. Also, all the traffic signs will be stored in a database along with their location so that the driver will be notified in advance regarding the next approaching Traffic Sign. in our system is the idea of getting the location of the user using.

LITERATURE SURVEY

In the project “Smart health prediction system using data mining” the author has discussed many topics related to data mining techniques such as Naive Bayes, KDD(Knowledge discovery in Database). The Bayesian statistics can be applied to economic sociology and other fields. This checks the patients at initial level and automatically suggest the possible diseases. The system uses Naive Bayes classifier for the construction of the prediction system. The advantage of this system is that the initial consultation cost of doctor fees can be avoided. Eclipse IDE is used for creating the front end Graphical User Interface and Navicat Mysql is used for backend database purpose. Here java is used as a programming language to connect the database and GUI purpose. The only disadvantage of the system the efficiency in detecting the symptoms or symptom mapping. The project “A Smart Health Prediction Using Data Mining” is explaining the similar topics to the paper. But there is detailed explanation of the internal algorithms used in the system. The Naive Bayes

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algorithm can be used for developing models that are used to assign class labels of different format. Naive Bayes algorithm is not a single, but a group of algorithm based on common principle. The steps involved in the Naive Bayes algorithm include (i) Division of segments, (ii) Comparing the first character of pattern until match occurs, (iii) Comparing the last character of pattern, (iv) Perform each character comparison. Also the hardware requirements used are processor of 2.0 GHZ and Ram of 2GB. The software requirements are JAVA programming language, Mysql 5.0 database and Tomcat server. In the project "Smart E-Health Prediction System Using Data Mining" most of the topics covered are on the system architecture. In this paper the design aspects of the system are primarily focused. In this paper the author has given a detailed framework to beat the downside of existing system. The smart health framework is used to implement the design aspects of the project. This framework asks for uses input and gather the symptoms to predict the disease based on data mining techniques. There are various modules such as login- used for authentication of patient and doctor, Diseases prediction, Doctor Searching, Feedback and Chatting with doctor for clearing patient doubts. There are some advantages such as finding the nearest doctor option to find doctor near to our location. These features can be used for better implementation of the system to help patients

The proposed of this project gives more accuracy than the present machine learning algorithms. Generally, Naive Bayes classifier is used for the prediction of heart diseases. The main advantage of Bayes classifier is the short training models is used to predict large datasets. But the author has divided the data into two class namely 0- Absent and 1- Present. Later the probability of each attribute of different classes are compared and maximum probability is calculated. By this method the paper shows that 97% accuracy is achieved in predicting the heart diseases. This paper fails to explain the in-depth analysis of the prediction process. In the project "Heart Diseases Detection Using Naive Bayes Algorithm" some of the machine learning algorithms such as Naive Bayes classifier. This paper is used for analyzing the various data mining techniques that can be used for healthcare services. The author has discussed about the different types of datasets that can be used in various fields of medical and healthcare services. The methodologies for preprocessing of data and probabilities used in the algorithm are explained clearly. The parameters of heart disease are specified and visualization of datasets are shown. The disadvantage is that maximum accuracy is not achieved in prediction. The project "Data Mining Technique and Applications" discusses about the various data mining techniques that can be utilized and applied in various field of medical and technical sciences. The logical process is used to search large amount of data in order to extract structured data. The steps involved are

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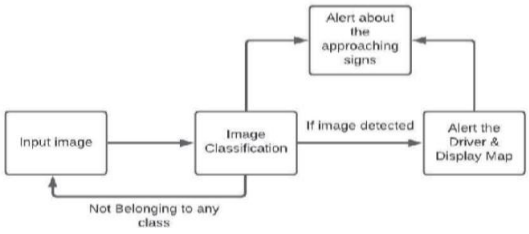
exploration, pattern identification and deployment. In the exploration part the data is analyzed and transformed to various forms until we get the prescribed pattern. Later these patterns are deployed by applying data mining techniques. There are various algorithms and techniques such as Classification, Clustering, Regression, Artificial intelligence, neural networks, Association rules and Decision trees. The advantage is various data mining techniques are clearly explained. The real time examples are not mentioned in detail. In the "project Smart Health Prediction using Machine Learning" the techniques like association rule mining, clustering, and classification algorithm such as decision tree are used for different heart-based problems. The K-means clustering techniques can be used to improve the accuracy of diseases prediction. The primary task for implementing the project is selecting the domain. The target data should be chosen carefully and preprocessing of data should be done. The desired knowledge should be obtained and final evaluation need to be performed. The detailed explanation of how to implement an algorithm is given, where the data is spitted as training set and target set. The formulation of Naive Bayes algorithm and its working is explained clearly. The "project GDPS - General Disease Prediction System" discusses about how data mining techniques can be used for prediction of different kinds of diseases based on the symptoms selected by users. Here the system is implemented as two different parts, admin module and user module. The admin takes care of data preprocessing, training the system for creating disease prediction model. A special algorithm called ID3 algorithm is used for training the datasets. ID3 stands for Iterator Dichotomiser 3. The algorithm can be used to generate the decision tree from the given datasets. The ID3 mainly works on entropy of each attribute, information gained and entropy of whole dataset. The attributes having the lower entropy value is selected as root node. The new attributes are discovered with the subsets and decision tree is formed. In the project "Heart Disease Prediction using Data Mining with Map reduce Algorithm" the datasets used are obtained from university of California Irvine (UCI) which is a machine learning repository. The structure of RFNN was clearly explained which was used in preparing the datasets. The Recurrent Fuzzy neural network has about 7 hidden layers, 13 input and 1 out layers. But the problem here is that it requires high configuration hardware for smooth functioning. Results are obtained only at hardware configuration having Intel i7 CPU, 16 GB ram and LINUX system with java.

Architecture:



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EXISTING SYSTEM:

With the help of e Decision Tree classifier, we can derive the pairs of disease and generate a tree based on Gini index and weights of each symptom. The first step is to classify the data to fit the model of decision trees for the given dataset. We split the data into test data and training data for the model. Construct a node table to assign the different classifiers and Gini for splitting the nodes. Classify the model using Decision Tree Classifier. The value of target variable needs to be predicted using simple decision rules created using in the dataset and tf-idf features. The only extra advantage of using this is to apply it for both numerical and categorical dataset classification. This helps in reducing data cleaning based on what type of data is used for processing for each of the algorithm. Statistical testing is also easy compared to other methods. It uses 3 main criteria for determining the correct split. Gini Index, Information gain and Entropy. The Gini Index is subtracted sum of the squared probabilities of each class from one. Information Gain specifies the lowest entropy for each split and accordingly produces each node for lowest entropy calculated for each split. Figure 1 shows the section of the decision tree built with the count vector matrix after classification.

LIMITATIONS OF EXISTING SYSTEM

1.They delay the traffic by stopping the vehicles at the intersection during peak hours.

2.During signals breakdown, there are serious and wide-spread traffic difficulties during peak hours.

PROPOSED SYSTEM:

We propose simplified Gabor filters to preprocess the grayscale images of traffic scenes, to enhance the edges and strengthen the shape information. In addition, this could make the non-edge areas of painted artificial objects, such as traffic signs, more stable and reduce the noise in such areas.

We use the maximally stable extremal regions (MSERs) algorithm to process the simplified Gabor filtered map to find the regions of interest more effectively, and we used our defined rules to filter out significant negative samples.

We first used an eight-channel simplified Gabor feature as the input of the CNNs, which were defined as a pre-convolution layer of the convolutional neural networks (CNNs) for traffic sign classification.

Our method performs only one feature extraction through the detection and classification stage, which causes feature sharing throughout the two stages. Compared with algorithms used in the different feature extraction methods, in the detection and classification stage, this saves a lot of processing time and makes it feasible for use in real time applications.

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ADVANTAGES OVER EXISTING SYSTEM

1. Traffic signals help for movement of traffic securely without any collision.

2. They can reduce the number of accidents on roads like pedestrian accident and right-angle collision of two cars.

METHODOLOGY

Convolutional Neural Network (CNN):

It is a type of feed-forward artificial network where the connectivity pattern between its neurons is inspired by the organization of the animal visual cortex. Convolutional neural network is composed of multiple building blocks, such as convolution layers, pooling layers, and fully connected layers, and is designed to automatically and adaptively learn spatial hierarchies of features through a backpropagation algorithm. Familiarity with the concepts and advantages, as well as limitations, of convolutional neural network is essential to leverage its potential to improve radiologist performance and, eventually, patient care. It is one of the techniques to do image classification and image recognition in neural networks. It is designed to process the data by multiple layers of arrays. This type of neural network is used in applications like image recognition or face recognition. The primary difference between CNN and other neural network is that CNN takes input as a two-dimensional array. And it operates directly on the images rather than focusing on feature extraction which other neural networks do. CNNs are regularized versions of multilayer perceptrons. Multilayer perceptrons usually mean fully connected networks, that is, each neuron in one layer is connected to all neurons in the next layer. The "full connectivity" of these networks makes them prone to overfitting data. Typical ways of regularization, or preventing overfitting, include: penalizing parameters during training (such as weight decay) or trimming connectivity (skipped connections, dropout, etc.) CNNs take a different approach towards regularization: they take advantage of the hierarchical pattern in data and assemble patterns of increasing complexity using smaller and simpler patterns embossed in their filters. Therefore, on a scale of connectivity and complexity. CNN takes an image as input, which is classified and process under a certain category such as dog, cat, lion, tiger, etc. The computer sees an image as an array of pixels and depends on the resolution of the image. Based on image resolution, it will see as h * w * d, where h= height w= width and d= dimension. For example, An RGB image is 6 * 6 * 3 array of the matrix, and the grayscale image is 4 * 4 * 1 array of the matrix.

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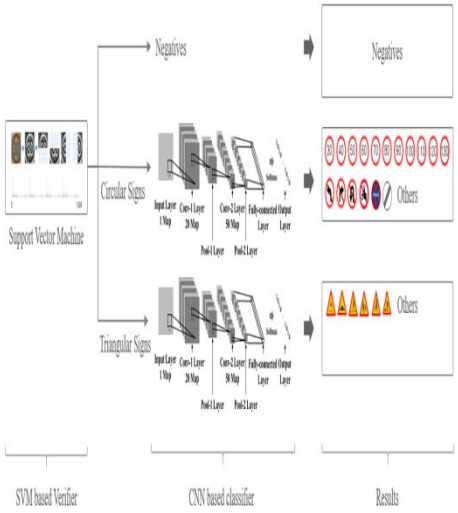
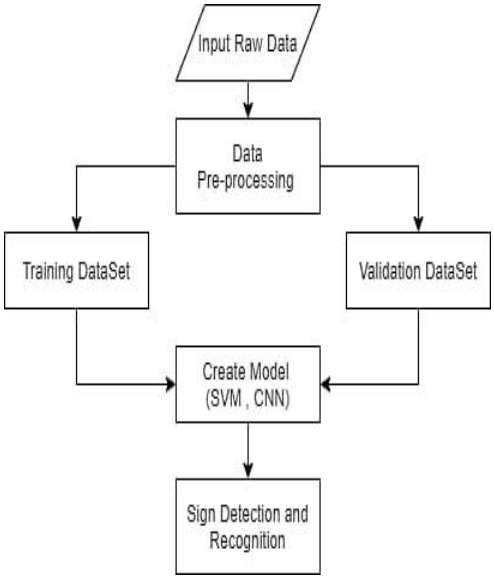


Fig:CNN Process

FLOW CHART:



RESULT:

Fig.Image for traffic sign stop

Fig.Uploading the traffic sign

Fig.Output of traffic sign

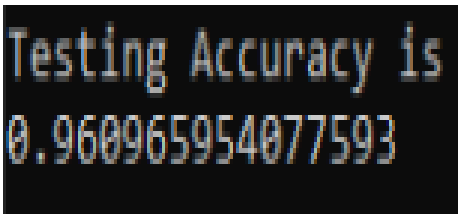


Fig. Accuracy

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CONCLUSIO AND FUTURE SCOPE

This project proposed a system that is able to detect and classify a set of 28 traffic signs in different environments. The results are moderate and it can be improved by testing different neural network structures. As a neural network is often called a black box, there is no guarantee that it will perform best with the defined set of parameters stated above. New methods of data augmentation can also be applied to make the classifier more robust. Real-time detection and recognition can also be implemented in the future. The Traffic Sign Board Detection and Voice Alert System is implemented using Convolutional Neural Network. Various models under the CNN heading were studied and the one with highest accuracy on the GTSRB dataset was implemented. The creation of different classes for each Traffic sign has helped in increasing the accuracy of the model. A voice message is sent after recognition of the sign which alerts the driver. A map is displayed on which the signs in the vicinity of the driver are displayed thus helping him/her take appropriate decisions. This paper is a significant advancement in the field of driving as it would ease the job of the driver without compromising on the safety aspect. Also this system can easily be implemented without the need of much hardware thus increasing its reach. The goal of this research is to develop an efficient TSDR system based on Malaysian traffic sign dataset. In the image acquisition stage, the images were captured by an on board camera under different weather conditions and the image preprocessing was done by using RGB colour segmentation. The recognition process is done by SVM with bagged kernel which is used for the first time for traffic sign classification. The developed system has shown promising results with respect to the accuracy of 95.71%, false positive rate (0.009), and processing time (0.43 s). The recognition performance is evaluated by using ROC curve analysis. The simulation results are compared with the existing methods showing the correctness of the implementation.

The prototype can be expanded to include an inbuilt alert system with a camera in the vehicle's centre. Also, the feature of getting the estimated time for reaching that particular traffic sign can be added. This system can also be expanded for identification of traffic signals and hence prompt the user about the time to reach that particular signal and its status as well. The user can accordingly plan their trip start time and hence cross all signals without having to wait. Also the driver verification will be done with the help of an API providing the information about the license holder and the license number. In the future, the recognition phase can be sped up using dimension reduction of feature vectors. The number and parameters of Gabor filters will greatly influence the results of the classification results. It is necessary to research the optimization of Gabor parameters using optimization algorithms, to improve the efficiency and accuracy of traffic sign detection and classification. Finally, we

accelerated our method by a GPU and further improved the efficiency

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