MULTI TRAFFIC SCENE PERCEPTION BASED ON SUPERVISED LEARNING

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ABSTRACT:

Traffic accidents are particularly serious on a rainy day, a dark night, an overcast and/or rainy night, a foggy day, and many other times with low visibility conditions. Present vision driver assistance systems are designed to perform under good-natured weather conditions. Classification is a methodology to identify the type of optical characteristics for vision enhancement algorithms to make them more efficient. To improve machine vision in bad weather situations, a multi-class weather classification method is presented based on multiple weather features and supervised learning. First, underlying visual features are extracted from multi-traffic scene images, and then the feature was expressed as an eight-dimensions feature matrix. Second, five supervised learning algorithms are used to train classifiers. The analysis shows that extracted features can accurately describe the image semantics, and the classifiers have high recognition accuracy rate and adaptive ability. The proposed method provides the basis for further enhancing the detection of anterior vehicle detection during nighttime illumination changes, as well as enhancing the driver's field of vision on a foggy day. **INDEX TERMS** Underlying visual features, supervised learning, intelligent vehicle, complex weather conditions, classification.

1. INTRODUCTION:

Highway traffic accidents bring huge losses to people's lives and property. The advanced driver assistance systems (ADAS) play a significant role in reducing traffic accidents. Multi-traffic scene perception of complex weather condition is a piece of valuable information for assistance systems. Based on different weather category, specialized approaches can be used to improve visibility. This will contribute to expand the application of ADAS. Little work has been done on weather related issues for in-vehicle camera systems so far. Payne and Singh propose classifying indoor and outdoor images by edge intensity [1]. Lu et al. propose a sunny and cloudy weather classification method for single outdoor image [2]. Lee and Kim propose intensity curves arranged to classfy four fog levels by a neural network [3]. Zheng et al. present a novel framework for recognizing different weather conditions [4]. Milford et al. present vision-based simultaneous localization and mapping in changing outdoor environments [5]. Detecting critical changes of environments while driving is an important task in driver assistance systems [6]. Liu et al. propose a visionbased skyline detection algorithm under image brightness variations [7]. Fu et al. propose automatic traffic data collection under varying lighting conditions [8]. Fritsch et al. use classifiers for detecting road area under multi-traffic scene [9]. Wang et al. propose a multi-vehicle detection and tracking system and it is evaluated by roadway video captured in a variety of illumination and weather conditions [10]. Satzoda and Trivedi propose a vehicle detection method on seven different datasets that captured varying road, traffic, and weather conditions [11].

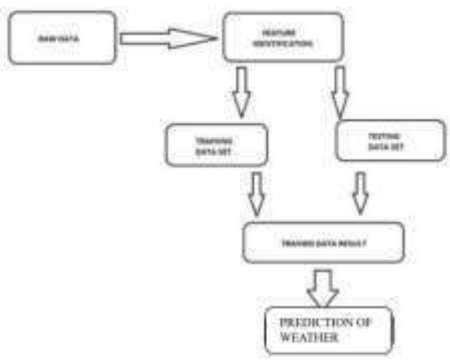
LITERATURE SURVEY:

Automatic detecting and counting vehicles in unsupervised video on highways is a very challenging problem in computer vision with important practical applications such as to monitor activities at traffic intersections for detecting congestions, and then predict the traffic /of which assists in regulating traffic. Manually reviewing the large amount of data they generate is often impractical. H.S. Mohana [45-47] ET.AL., developed a new approach in detecting and counting vehicles in day environment by using real time traffic flux through differential techniques. Counting object pixel and background pixel in a frame leads to the traffic flux estimation. The basic idea used is variation in the traffic flux density due to presence of vehicle in the scene. In this paper a simple differential algorithm is designed and tested with vehicle detection and counting application. Traffic flux estimation will play vital role in implementing vehicle detection and counting scheme. Real time dynamic scene analysis has become very important aspect as the increase in video analysis. The technique developed is having simple statistical background. Dynamic selection of images from the sequence is implemented successfully in order to reduce the computation time. The designed technique are evaluated such a 20 different video sequences and weighed thoroughly with simple confidence measures. To make the design illumination invariant, a section of the background is taken as reference, which will not be affected by the traffic flow. Threshold is fixed and used to discriminate the low, medium and high traffic flux. There is a plot for traffic flux density; it's basically 1% flux density versus number of frames scene, then there is a flux change according to vehicle size. Obviously if there is big vehicle (or object), there is maximum or if there is small vehicle (or object), there is minimum amount of flux (white pixels. Laura Munoz ET.AL., [50] proposed a system to estimate traffic density with the cell transmission model. This uses cell densities as state variables instead of cell occupancies, and also accepts non uniform cell lengths, and allows congested condition to be maintained at the downstream boundary of a modeled freeway section. Using cell densities instead of cell occupancies permits to include uneven cell lengths, which leads to greater flexibility in partitioning the highway. Tomas Rodriguez ET.AL., [51] proposed a system on real-time traffic monitoring; the system is self-adaptive and is able to operate autonomously for long periods of time, i.e. no hidden parameters to be adjusted. It performs in all weather condition and automatically selects the appropriate algorithm for day, night and transition periods. The system is robust against fast and slow illumination changes and is able to cope with long broken shadows, and shadows from parallel roadways. Ordinary camera movements (i.e. wind vibrations) hardly affect its performance because the system is tolerant against temporal tracking errors and strict constraints are used to identify the vehicles. They also provide an adequate treatment of occlusions and heavy vehicles, and obtained reasonable results in dense traffic. An exhaustive analysis of the operational environment; an effective calibration and image rectification method; an original segmentation approach, complemented with an innovative method for the automatic selection of the segmentation parameters; a detection and tracking approach specially designed for traffic environments .In recent research, the Hidden Markov model was used in classifying the traffic congestion state automatically. Another approach is using a static Support Vector Machine (SVM) approach to model the traffic flow in real-time. Compared with the HMM approach, the SVM approach simplifies both training and testing processes and offers a strict real-time process. Unfortunately, similar with a HMM approach, the static SVM could not work correctly on a video sequence with anomalies in its background such as a static shadow. Additionally, the whole process required certain huge number of training samples to achieve good performance. On the other hand, a background modeling approach has been widely used in shadow detection and is able to complement a traffic density estimation process. However, it is problematic under different weather conditions, rapid changing illumination and traffic congestion.

PROPOSED SYSTEM Image feature extraction is the premise step of supervised learning. It is divided into global feature extraction and local feature extraction. In the work, we are interested in the entire image, the global feature descriptions are suitable and conducive to understand complex image. Therefore, multi-traffic scene perception more concerned about global features, such as color distribution, texture features outdoor conditions. Propose night image enhancement method in order to improve nighttime driving and reduce rear-end accident. Present an effective nighttime vehicle detection system based on image enhancement. Present an image enhancement algorithm for low-light scenes in an environment with insufficient illumination. Present single image dehazing by using of dark channel model. Present a novel histogram reshaping technique to make color image more intuitive. Present a framework that uses the textural content of the images to guide the color transfer and colorization. In order to improve visibility. Propose a vehicle detection method on seven different weather images that captured varying road, traffic, and weather conditions. So reduce the traffic and accident issues. In this proposed system, we focus on predicting the weather using machine learning algorithms like support vector Machine classifier and PNN classifier. In this proposed system, we were able to train the machine from the various attributes of data points from the past to make a future prediction. We took data from low vision areas to train the model. We majorly used machine-learning libraries to solve the problem. The first one was pandas, which was used to clean and manipulate the data, and getting it into a form ready for analysis.. The data set we used was from the various areas, images are collected from the public database available online, Some of data was used to train the machine and the rest some data is used to test the data. The basic approach of the supervised learning model is to learn the patterns and relationships in the data from the training set and then reproduce them for the test data. We used the python pandas library for data processing which combined different datasets into a data frame. The raw data makes us to prepare the data for feature identification. Most of the data is used for training and some of the data can be used for testing .based on the obtained trained data set weather cane be predicted.

METHODOLOGY

The first step in this is collection of raw data from the various sources and the data of the organization. From the raw data we can extract the attributes which are used for the prediction. After extraction, we can train the data model using these previous datasets. Here we should give Testing data(input) to data analytical tool it will compare data with the trained data and gives the Predicted price as output to us.



ALGORITHM : We used the python pandas library for data processing which combined different datasets into a data frame. The raw data makes us to prepare the data for feature identification.. We also quantified the accuracy by using the predictions for the test set and the actual values. Step1:Importing Data manipulation library files. //Pandas Step2: preprocessing i. convert rgb to gray color image ii. noise removal

Step3: Feature Extraction

i. feature represention Such as, color features, texture features and edge features.

ii. ii. average gray

iii. iii. standard deviation iv. variance v. average gradient vi. spatial frequency vii. edge intensity

Step4: Supervised learning algorithms

i. each image will be transformed into a learning bag by extracting features. After extracted global and local features, machine learning classification approaches come into operation.

ii. A histogram intersection kernel and support vector machine classifiers are presented for image classification iii. PNN are calculated by neurons, the models are different. A new function is used to create the BP network and a new pnn function is used to create a probabilistic neural network.

Step5: calculate feature value i.e., ACCURACY, PRECISION AND RECALL

Step6: predict and detect accuracy of traffic.

MODULES

I. Data Collection

Firstly, Dataset can be collected from various sources of any organization. The right dataset helps for the prediction and it can be manipulated as per our requirement. Our data is in the form of images it may be based on night, fog, and rainy. The data can be collected from the organization based on the areas where the weather can be seen unusual. By collecting these it makes accurate in prediction.

II. Data Processing

All the data was collected, the data is in the form of the images. Images are collected by the use of driving recorder and the image set is established for training.in the first step the matching values for all pixels and all disparities are calculated. In the second step the disparity values are interpolated to sub-pixel accuracy by fitting a quadratic curve to the matching values in the neighbourhood of the best matching value.

III. Training the Data Deploying the Model After the data has been prepared and transformed, the next step was to build the classification model using the support vector classifier technique. This technique was selected because the construction of support vector classifiers does not require any domain knowledge . By using the attribute we have considered in the dataset we train the model by using the algorithm. The training sets are used to tune and fit the models.

IV. Deploying the model

The classification rules are generated from the support vector. The trained data can be used for the Testing the data. It helps to give the output or accurate prediction of weather using this model.

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8 .CONCLUSION AND FUTUREWORK

CONCLUSION

Weather recognition based on road images is a brand-new and challenging subject, which is widely required in many fields. Hence, research of weather recognition based on images is in urgent demand, which can be used to recognize the weather conditions for many vision systems. Classification is a methodology to identify the type of optical characteristics for vision enhancement algorithms to make them more efficient.

In this paper, eight global underlying visual features are extracted and five supervised learning algorithms are used to perceive multi-traffic road scene. Firstly, our method extracts colour features, texture features and boundary feature which are used to evaluate the image quality. Thus, the extracted features are more comprehensive. Secondly, the ten categories traffic scene image are marked as labels 1-10. Owing to the category label represents the whole image, there is no need to mark the specific area or key point of image. Thirdly, by using of five supervised learning that mentioned in Section IV, we can greatly simplify the manual annotation process of feature sample and improve the classifier efficiency. At last, experiments and comparisons are performed on large datasets to verify the effectiveness of the proposed method in Section V. It proved that the proposed eight features not only can accurately describe image characteristics, but also have strong robustness and stability at the complex weather environment and the ELM algorithm is superior to other algorithms.

FUTURE SCOPE:

In the future, the proposed algorithms will need to be further verified by the larger image set. Integrated learning is a new paradigm in machine learning field. It is worth to be studied improve the generalization of a machine learning system. And visual image enhancement algorithms in fog and night time applied to general image are worth to be further studied.

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