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SUPERVISED LEARNING MODELS FOR PERCEPTION OF MULTI-TRAFFIC SCENE

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ABSTRACT

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. Lee and Kim propose intensity curves arranged to classify four fog levels by a neural network [1]. Liu et al. propose a vision-based skyline detection algorithm under image brightness variations [2] etc.

Below are the key problems for implementing this article:

Impact of complex weather on driver

Low visibility conditions will bring the driver a sense of tension. Due to variations of human physiological and psychological, driver's reaction time is different with the different driver's ages and individuals. The statistics show that driver's reaction time in complex low visibility weather conditions is significantly longer than on a clear day. In general, the driver's reaction time is about 0.2s ~ 1s. If the driver needs to make a choice in complex cases, driver's reaction time is 1s ~ 3s. If the driver needs to make complex judgment, the average reaction time is 3s~ 5s.

Keywords: Multi-traffic scene perception, multi-class weather classification, supervised learning.

1. INTRODUCTION

Highway traffic accidents bring mass losses to people's lives and property. Advanced driver assistants (ADAS) play an important role in reducing traffic accidents. A multi-traffic display of complex weather conditions is valuable information for help organizations. Special approaches can be used to improve visibility based on different weather conditions. This will contribute to the expansion of ADAS. There has been little work in weather-related issues for automotive cameras so far. Classification of interior and exterior images through the margin intensity. Concentration curves to form four fog levels by a neural network. Providing a novel structure to recognize different climates. Milford and many others. Current view-based localization and mapping in altering external environments. Find important changes Driving is an important task during driving Help Systems. propose a sight-based skyline Finding algorithms under picture brightness variations Fu and Al. Automatic traffic data collection varies Lighting conditions. Freatch and many others. Classes to use Detecting Road segment in many traffic scenes.

2. LITERATURE SURVEY

Jin et al. presented a multi-class weather classification method 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 showed that extracted features can accurately describe the image semantics, and the classifiers have high recognition accuracy rate and adaptive ability. The proposed method provided 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.

Tripathy et al. presented a multi-class weather classification method based on multiple weather features and supervised learning to improve machine vision in bad weather situations. 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.

Kim et al. proposed an original probabilistic threat assessment method to predict and avoid all possible kinds of collision in multi-vehicle traffics. The main concerns in risk assessment can be summarized as three requirements: 1) a description of a traffic situation containing the geometric description of the road, dynamic and static obstacle tracking, 2) a prediction of multiple traffics' reachable set under the reasonable behavior restriction, and 3) an assessment of collision risk which corresponds with driver sensitivity and can be applied to many complex situations without loss of generality.

Yang et al. proposed an online multi-object tracking for intelligent traffic platform that employs improved sparse representation and structural constraint. This work first builds the spatial-temporal constraint via the geometric relations and appearance of tracked objects, then this work constructed a robust appearance model by incorporating the discriminative sparse representation with weight constraint and local sparse appearance with occlusion analysis. Finally, completed data association by using maximum a posteriori in a Bayesian framework in the pursuit for the optimal detection estimation.

Lu et al. proposed a new data augmentation scheme to substantially

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enrich the training data, which is used to train a latent SVM framework to make the solution insensitive to global intensity transfer. Extensive experiments are performed to verify the method. Compared with previous work and the sole use of a CNN classifier, this paper improved the accuracy up to 7-8 percent. This weather image dataset is available together with the executable of our classifier.

Fu et al. presented an approach to integrate and evaluate the performance of thermal and visible light videos for the automated collection and traffic data extraction under various lighting and temperature conditions in urban intersections with high pedestrian and bicycle traffic. The two technologies were evaluated in terms of road user detection, classification, and vehicle speed estimation.

Kuang et al. presented an effective nighttime vehicle detection system that combined a novel bioinspired image enhancement approach with a weighted feature fusion technique. Inspired by the retinal mechanism in natural visual processing, this work developed a nighttime image enhancement method by modeling the adaptive feedback from horizontal cells and the center-surround antagonistic receptive fields of bipolar cells. Furthermore, this work extracted features based on the convolutional neural network, histogram of oriented gradient, and local binary pattern to train the classifiers with support vector machine. These features are fused by combining the score vectors of each feature with the learnt weights. During detection, this work generated accurate regions of interest by combining vehicle taillight detection with object proposals.

3. 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 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. Propose an image fusion technique to improve imaging quality in low light shooting. Present global and local contrast measurements method for single-image defogging. 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. To improve visibility. Propose an improved EM method to transfer selective colors from a set of source images to a target image propose a multi-vehicle detection and tracking system and it is evaluated by roadway video captured in a variety of illumination and weather conditions. Propose a vehicle detection method on seven different weather images

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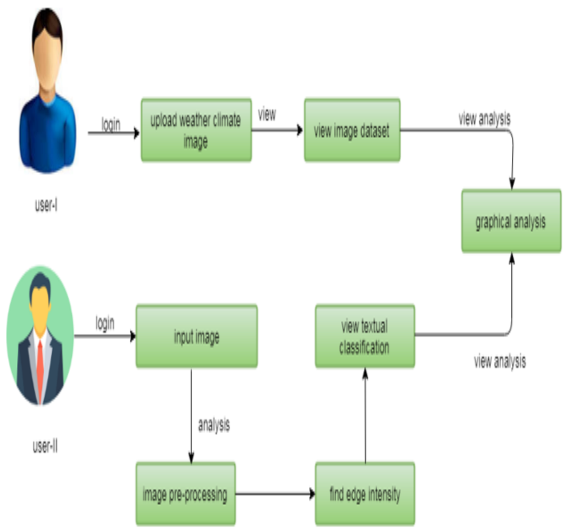
that captured varying road, traffic, and weather conditions. So reduce the traffic and accident issues.



3.1 Support Vector Machine

"Support Vector Machine" (SVM) is a supervised machine learning algorithm which can be used for both classification and regression challenges. However, it is mostly used in classification problems. In this algorithm, we plot each data item as a point in n-dimensional space (where n is number of features you have) with the value of each feature being the value of a particular coordinate. Then, we perform classification by finding the hyper-plane that differentiate the two classes very well (look at the below snapshot). The SVM algorithm is implemented in practice using a kernel. The learning of the hyper plane in linear SVM is done by transforming the problem using some linear algebra, which is out of the scope of this introduction to SVM. A powerful insight is that the linear SVM can be rephrased using the inner product of any two given observations, rather than the observations themselves. The inner product between two vectors is the sum of the multiplication of each pair of input values. For example, the inner product of the vectors [2, 3] and [5, 6] is 2*5 + 3*6 or 28.

3.2 Pre-processing

Data Pre-processing in Machine learning

Data pre-processing is a process of preparing the raw data and making it suitable for a machine learning model. It is the first and crucial step while creating a machine learning model.

When creating a machine learning project, it is not always a case that we come across the clean and formatted data. And while doing any operation with data, it is mandatory to clean it and put in a formatted way. So, for this, we use data pre-processing task.

Why do we need Data Pre-processing?

A real-world data generally contains noises, missing values, and maybe in an unusable format which cannot be directly used for machine learning models. Data pre-processing is required tasks for cleaning the data and making it suitable for a machine learning model which also increases the accuracy and efficiency of a machine learning model.

- Getting the dataset
- Importing libraries
- Importing datasets
- Finding Missing Data
- Encoding Categorical Data
- Splitting dataset into training and test set
- Feature scaling

3.2.1 Splitting the Dataset into the Training set and Test set

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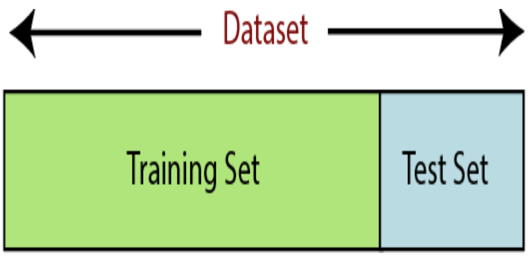
In machine learning data pre-processing, we divide our dataset into a training set and test set. This is one of the crucial steps of data pre-processing as by doing this, we can enhance the performance of our machine learning model.

Supposeif we have given training to our machine learning model by a dataset and we test it by a completely different dataset. Then, it will create difficulties for our model to understand the correlations between the models.

If we train our model very well and its training accuracy is also very high, but we provide a new dataset to it, then it will decrease the performance. So we always try to make a machine learning model which performs well with the training set and also with the test dataset. Here, we can define these datasets as:



Training Set: A subset of dataset to train the machine learning model, and we already know the output.

Test set: A subset of dataset to test the machine learning model, and by using the test set, model predicts the output.

3.3 Digital Image Processing

It is method to convert an image into digital form and perform some operations on picture or image, in order to obtaining an enhanced image or to extract some useful information from image or picture. In computer science, digital image processing is the use of computer algorithms to perform image processing on digital images. As a subcategory or field of digital signal processing, digital image processing has many advantages over analog image processing.

3.4 Advantages of Proposed System

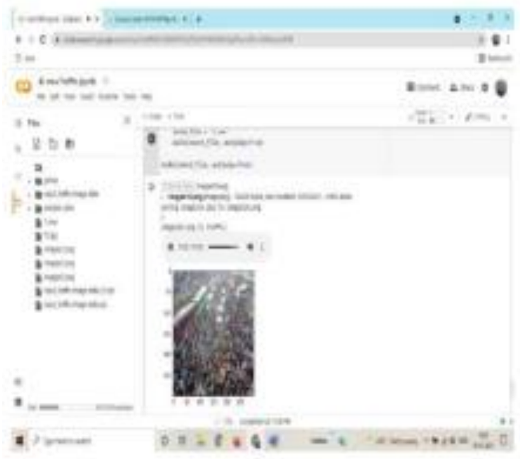
- Predict the accurate weather conditions for this process.
- Reduce the traffic issues and another one is accident issues it is major one of problems for nowadays.
- Using digital image processing so time consume is save.

4. RESULTS

Modules

1. Weather Reports
2. Find Weather
3. Analysis Reports
4. Graphical Representations

No	Input File	Accuracy Rate	Remarks
1.	Foggy Image	100	Successfully Output Displayed
2.	Foggy Image	100	Successfully Output Displayed
3.	Traffic Image	100	Successfully Output Displayed
4.	Traffic Image	100	Successfully Output Displayed
5.	Non accidental	100	Successfully Output Displayed



5. CONCLUSION AND FUTURE SCOPE

Road signals based on road images are a new and challenging subject, which is widely needed in many sectors. Therefore, the study of weather authorization based on images is an urgent request, which helps detect weather conditions for many visual systems. Classification is a method to classify optical properties for more efficient vision development protocols. In this sheet, eight global basic features are extracted, and 5-tracking learning algorithms are used to understand the multi-traffic road view used to evaluate color features, protocol features, and range features. Thus, the extracted features are more detailed. The proposed eight features have demonstrated that the image attributes cannot accurately describe but have strong weakness and stability in a complex climate environment.

In the future, the proposed instructions should be checked with a larger image package. Integrated learning is a new paradigm in the field of machine learning. It is worth to learn about the generalization of a machine learning system. Visual image expansion mechanisms used in the public film are desirable to further investigate.

REFERENCES

[1] Y. Lee and G. Kim, "Fog level estimation using non-parametric intensity curves in road environments," Electron. Lett., vol. 53, no. 21, pp. 1404-1406, 2017.

[2] Y. J. Liu, C. C. Chiu, and J. H. Yang, "A Robust Vision-Based Skyline Detection Algorithm Under Different Weather Conditions," IEEE Access, vol. 5, pp. 22992-23009, 2017.

[3] L. Jin, M. Chen, Y. Jiang and H. Xia, "Multi-Traffic Scene Perception Based on Supervised Learning," in IEEE Access, vol. 6, pp. 4287-4296, 2018, doi: 10.1109/ACCESS.2018.2790407.

[4] Tripathy, Jyostnarani, Kamalakanta Shaw, and SSN Malleswara Rao. "Multi-traffic Scene Perception Model using Different Machine Learning Classifiers." Turkish Journal of Computer and Mathematics Education

(TURCOMAT) 13.1 (2022): 381-385

[5] B. Kim, K. Park and K. Yi, "Probabilistic Threat Assessment with Environment Description and Rule-based Multi-Traffic Prediction for Integrated Risk Management System," in IEEE Intelligent Transportation Systems Magazine, vol. 9, no. 3, pp. 8-22, Fall 2017, doi: 10.1109/MITS.2017.2709807.

[6] YANG, Honghong, et al. "Multi-Traffic Targets Tracking Based on an Improved Structural Sparse Representation with Spatial-Temporal Constraint." Chinese Journal of Electronics 31.2 (2022): 266-276.

[7] C. Lu, D. Lin, J. Jia and C. -K. Tang, "Two-Class Weather Classification," in IEEE Transactions on Pattern Analysis and Machine Intelligence, vol. 39, no. 12, pp. 2510-2524, 1 Dec. 2017, doi: 10.1109/TPAMI.2016.2640295.

[8] T. Fu, J. Stipancic, S. Zangenehpour, L. M. Moreno, N. Saunier, "Automatic Traffic Data Collection under Varying Lighting and Temperature Conditions in Multimodal Environments: Thermal versus Visible Spectrum Video-Based Systems", Journal of Advanced Transportation, vol. 2017, Article ID 5142732, 15 pages, 2017. https://doi.org/10.1155/2017/5142732.

[9] H. Kuang, X. Zhang, Y. -J. Li, L. L. H. Chan and H. Yan, "Nighttime Vehicle Detection Based on Bio-Inspired Image Enhancement and Weighted Score-Level Feature Fusion," in IEEE Transactions on Intelligent Transportation Systems, vol. 18, no. 4, pp. 927-936, April 2017, doi: 10.1109/TITS.2016.2598192.