

Vehicle Recognition based on Support Vector Machine



Vikash Yadav, Krishn Vir Singh, Deepak Kumar Singh

Abstract: *These days, there is a colossal progression in zones of computerization and PC vision. Item ID is a basic procedure in these innovations. It distinguishes a particular item from a picture or video arrangement and the move is made in like manner. AI calculations are widely utilized for article ID in different applications. The essential highlights are removed from the pictures and are prepared utilizing different classifiers. This paper proposes an article recognizable proof method utilizing Support Vector Machines (SVM). The proposed framework is contrasted and Decision Tree (DT) and K-Nearest Neighbor (KNN) characterization calculations. The item ID framework is surveyed on ID precision, prevision and review.*

Keywords: *Decision Tree, K-Nearest Neighbor, Support Vector Machines.*

I. INTRODUCTION

The quantity of purchaser vehicles is developing massively on consistent schedule. The need of strategies for effective administration of constant traffic thickness, count of toll charges as per the kind of the vehicle, control the traffic motion by distinguishing the quantity of vehicles in an expressway path of a specific sort, number of vehicles in a leaving framework, and so forth are expanding. Utilizing picture handling strategies target items can be identified from pictures and in this manner can be broadly utilized in assortment of use spaces. AI calculations empower increasingly effective recognition and order of items when contrasted with the conventional mechanical techniques. In item recognition process, occurrences of genuine articles, for example, vehicles, organic products, vegetables, structures, face, and so on are distinguished from pictures or recordings. The proposed framework utilizes bolster vector machines order calculation to distinguish the vehicle from a picture utilizing the different highlights separated from the pictures. The areas of the paper are organized as pursues. Segment II contains writing survey on comparative investigations.

Segment III subtleties the proposed framework. Segment IV delineates the outcomes and perceptions and the end is incorporated into segment V.

II. LITERATURE SURVEY

Noorpreet Kaur Gill and Anand Sharma [1] in their paper depicts a way to deal with discover the precision rate of the vehicles caught from the satellite pictures. In this examination they are finding the quantity of vehicles on an ideal space in the satellite picture and these vehicles are appeared underneath the bouncing box as little spots. Their proposed methodology utilizes picture improvement procedures like spatial and recurrence area systems. Different strategies are morphological picture preparing, division, limit and edge discovery utilizing identification rule, confinement standard and one reaction measure. Luigi Di Stefano, Enrico Viarani [2] proposed a way to deal with recognize and track the vehicle on the premise of Block Matching Algorithm. This calculation is utilized to apprise movement which works on MPEG pressure standard. Their proposed framework utilizes connection edge technique of BMA alongside versatile sifting, gathering of the vehicles and following them. A few vehicles are tremendous when contrasted with the square size due to which there might be over division impact. Their point is to build up a dream based traffic checking framework which would be solid in performing key traffic parameters estimations. A framework utilizing format coordinating, NN and SVM is proposed [3]. The identification of the articles is based on their shape and shading. The shading based methodologies utilized are shading thresholding, HIS or Other Color Space Change, Color Indexing. The shape based methodologies utilized are Fourier descriptor, Hough Transform and minute. The groupings of the articles are performed utilizing layout coordinating, neural system and backing vector machines. R. Muralidharan and Dr. C. Chandrasekar [4] concentrated on joining two well-known picture arrangement techniques for example SVM and KNN dependent on the geometric minute invariant element of the item. The edges of the picture were separated utilizing Canny's edge discovery strategy. To ascertain the component vector Hu's seven minute invariant are determined alongside the removed highlights of the picture. The proposed strategy demonstrated that combination is incorporated into area V. of SVM and KNN alongside geometric minute invariant element of the article creates preferable outcomes over the ordinary procedures like SVM and KNN. The bit capacity is polynomial. Khushboo Khurana, Reetu Awasthi proposed a framework to recognize numerous articles in a picture.

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* Correspondence Author

Vikash Yadav*, Department of Computer Science & Engineering,, ABES Engineering College, Ghaziabad, India. Email: Vikash.yadav@abes.ac.in

Krishn Vir Singh, Department of Computer Science & Engineering,, ABES Engineering College, Ghaziabad, India. Email: Singh.krishnavir@gmail.com

Deepak Kumar Singh, Department of Computer Science & Engineering,, Sachdeva Institute of Technology, Matura, India. Email: Yadav.k.deepak@gmail.com

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They too concentrated on the issues looked amid article discovery, for example, lightning, situating, pivot, reflecting, impediment and scale. To identify various articles from a picture k object locators are prepared. This paper completes a correlation think about on item recognizable proof strategies, for example, layout coordinating strategy, detached and dynamic, shape based, shading based, worldwide and nearby highlights. This paper likewise talks about on the utilizations of article acknowledgment [5].

III. SUGGESTED FRAMEWORK

The proposed framework recognizes and characterizes the vehicle as a van, transport, SAAB (vehicle) and OPEL (vehicle). The significant procedures in the proposed framework are appeared in Fig 1. The initial step is the information gathering. In this stage, pictures of various articles are taken from different edges. This information goes about as a contribution for highlight extraction. The separated highlights contrast as indicated by the article picked. The model is prepared utilizing the preparation dataset. To assess the model, testing dataset is utilized. Testing dataset is utilized to give fair assessment of the model and to check if the model is fit for applications. In this work, we have utilized a standard vehicle dataset with eighteen traits. The dataset has pictures procured utilizing a camera with the model beneath it. 60 pictures taken in sets of two were caught in 360 degree revolution for every one of the vehicles. The characteristics of this dataset are remove circularity, smallness, pr. hub viewpoint proportion, elongatedness, circularity, greatest length perspective proportion, scaled fluctuation along significant hub, disperse proportion, kurtosis among real pivot, most extreme length rectangularity, scaled fluctuation along minor hub sweep proportion, pr. pivot rectangularity, skewness along minor hub, , skewness about real hub, kurtosis among minor hub and hollows proportion [6]. The uniqueness of this dataset is that the picture utilized in structure the dataset was taken from one of a wide range of edges. This dataset has four classes to be specific opel, saab, van, transport. The dataset contains 212 instances of opel, 217 instances of saab, 218 instances of transport and 199 instances of van making a sum of 846 precedents. The preparation and testing information establishes a 80:20 conveyance. The proposed framework utilizing Support Vector Machines are contrasted and the condition of-craftsmanship grouping strategies K-Nearest Neighbor and Decision Tree.

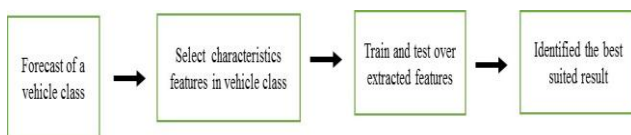


Fig 1: Identification process of vehicle class

IV. RESULT ANALYSIS

The assessment of the framework was performed with the test dataset from the vehicle dataset utilizing SVM, DT and KNN Algorithms. The recognizable proof precision acquired utilizing SVM classifier for different parts is appeared Table 1. By utilizing SVM calculation, the most astounding precision accomplished is 82.22% with Linear Kernel. Utilizing SVM Linear part the accuracy and review

accomplished is 80.80% and 81.1% individually. The perplexity lattice utilizing direct Kernel in SVM is appeared Table 2. It expresses that van was recognized multiple times definite, Saab was recognized as a van and transport once, multiple times as Opel and multiple times careful, transport was identified as Saab once, multiple times definite and Opel was recognized as a van twice and transport once, multiple times as Saab and multiple times careful.

Table 1: Effectiveness based on SVM [13]

Kernel Method	Accuracy percentage
Linear	81.17
Polynomial	77.64
Radial Basis Function	27.64

Table 2: Confusion Matrix using SVM [13]

Classes	Van	Sab	Bus	Opel
Van	35	0	0	0
Sab	1	34	1	10
Bus	0	1	44	0
Opel	2	16	1	25

The outcomes got utilizing K-Nearest Neighbor calculation for different k esteems are appeared Table 3.

Table 3: Accuracy achieved using K-NN [13]

K values	Accuracy %
1	67.64
3	68.235
5	68.235

The disarray lattice utilizing K esteems as 5 in KNN calculation is appeared Table 4.

Table 4: Confusion Matrix [13]

Classes	Van	Sab	Bus	Opel
Van	39	2	1	0
Sab	2	25	3	12
Bus	1	2	33	1
Opel	7	20	3	19

By utilizing KNN calculation, the exactness accomplished is 68.235%. The disarray framework expresses that van was identified multiple times accurate and as Saab multiple times and as a transport once. Saab was identified multiple times precise and as a van twice and as a transport thrice and as Opel multiple times. Transport was identified multiple times accurate and as van, Opel once and as a Saab twice. Opel was identified multiple times accurate and as Van multiple times, as a Saab multiple times and as a transport thrice. The outcomes acquired utilizing Decision Tree calculation is appeared Table 5.

Table 5: Accuracy achieved using Decision Tree [13]

Algorithm	Accuracy %
Decision tree	73.529

The ID network for Decision tree calculation is appeared Table 6.

Table 6: Confusion Matrix using Decision Tree [13]

Classes	Van	Sab	Bus	Opel
Van	36	4	1	1
Sab	1	27	1	13
Bus	0	0	37	0
Opel	4	20	0	25

Truck (Classification and Regression Tree) calculation is utilized in Decision tree Classifier. The exactness accomplished by this model is 73.529%. The disarray grid expresses that van was recognized multiple times precise what's more, as Saab multiple times and transport, Opel once. Saab was recognized multiple times precise, as a van and transport once and multiple times Opel, transport was identified multiple times precise and Opel was distinguished multiple times careful and as a van multiple times and as Saab 20 times. Subsequent to breaking down the outcomes, the class of a vehicle is anticipated utilizing SVM Classifier. In light of the component esteems go as information the normal class is 2 and the outcome gotten is likewise 2 which demonstrates the right forecast by the framework. The forecast is appeared in Fig 2.

V. CONCLUSION

The proposed research work was providing only the highlighted view in the concern field and investigation was performed on the vehicle dataset which had 18 highlights. This exploration demonstrated that distinguishing and characterizing the vehicle pictures utilizing SVM classifier with straight bit is unquestionably increasingly proficient in terms of exactness, accuracy and review when contrasted and KNN and choice tree arrangement calculations. For vehicle ID and characterization applications, we can utilize SVM classifier with straight bit to accomplish the most elevated conceivable outcome. Later on, progressively number of vehicles can be presented in the dataset. As soon as the complexity arises in various field of object identification then the concept of signaling has been provide a review in greater extant so in coming future this part of study further improve with complex identification process based on various investigations.

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AUTHORS PROFILE



Vikash Yadav is currently working as an Assistant Professor in the Department of Computer Science & Engineering, ABES Engineering College, Ghaziabad, India and has more the 8 years of Teaching/Research experience and published more than 25 research papers in various National/International Conferences/Journals. His area of interest includes Data Structure, Data Mining,

Image Processing and Big Data Analytics.



Krishna Vir Singh is currently working as an Assistant Professor in the Department of Computer Science & Engineering, ABES Engineering College, Ghaziabad, India and has more the 8 years of Teaching/Research experience. His area of interest includes Cyber Security, Network Security, Image Processing.



Deepak Kumar Singh is currently working as a Professor in the Department of Computer Science & Engineering, Sachdeva Institute of Technology, Mathura, India. He has more than 15 years of Teaching/Research experience. His area of interest includes Cyber Security, Network Security, Image Processing.