Object Detection in Noisy Environment

Devashish Pandit
Department of Engineering Information Technology,
Medi-Caps University, Indore, India

Jyoti Kukade
Medi-Caps University, Indore,
India

Abstract:- With the development in the image/ video processing technologies we are able to process data at very high speeds, useful for the purpose of training machines. While training machines it is generally preferred that the data is less noisy and the features to be extracted are clearly separated from the background also the subject is in a well lit environment. These types of data sets generally provide us highly accurate results, nevertheless the models trained on these datasets may sometimes fail when used in the open world. The images and videos are not always fitting the above mentioned categories. Low light object detection is a challenging problem in the field of computer vision and machine learning.This paper describes the advances made in the field and the approaches used for the recognition of data in low lit and noisy environments.

Keywords:- Facial recognition, road sign recognition, Yolo, Open Cv

Introduction:- This paper describes Low mild item detection for a Laptop digital digicam that is capable of recognizing open international records in a loud environment. Nowadays, many computer imaginative and prescient technology are capable of apprehending day by day items. A not unusual place technique to apprehend the transferring open international items from video is Yolo that is a previous detection machine repurpose classifier and localizer to carry out detection. Yolo is used to use the version of a photo at exclusive locations. High scoring, dense areas of photo are taken into consideration detection. We want a reputation software for spotting the records with models to the extrade of light situations and noisy environments. Noisy records are one of the essential problems.

Here we use colorations to split the records. There are consultant strategies for colour transformation : grey and white.

- Gray international set of rules assumes all of the mirrored image of the records is grey .

● White international set of rules assumes the brightest pixel has the most reflectance.

It is tough for the digital digicam machine to get more than one hues in low lights situations.

Our approach calls for the handiest one colour for estimating transformation.

Object Recognition

- Automatic object recognition

A procedure of automatic recognition of a user-specified object contains 5 steps:

(1) extraction of the features,

(2) color transformation of models,

(3) extraction of candidate regions for objects,

(4) determination of object types and

(5) matching of the extracted regions to the model.

Firstly the system extracts the edge lines of the facial region by Hough

transformation . Also the system extracts the average color c r of the data and next uses the data for color transformation estimation.

Fig. 1 shows an example of facial recognition.

Fig. 2 shows an example of object recognition.

The user uses a Red stop sign in this example.

The system first extracts the object's regions with the representative color and determines the object's regions by evaluating the size of the edges.

When the color of the object is changed due to the change of the lighting condition, the system is still able to track and recognize the object.

Finally, the system recognizes the target object in the noisy environment .

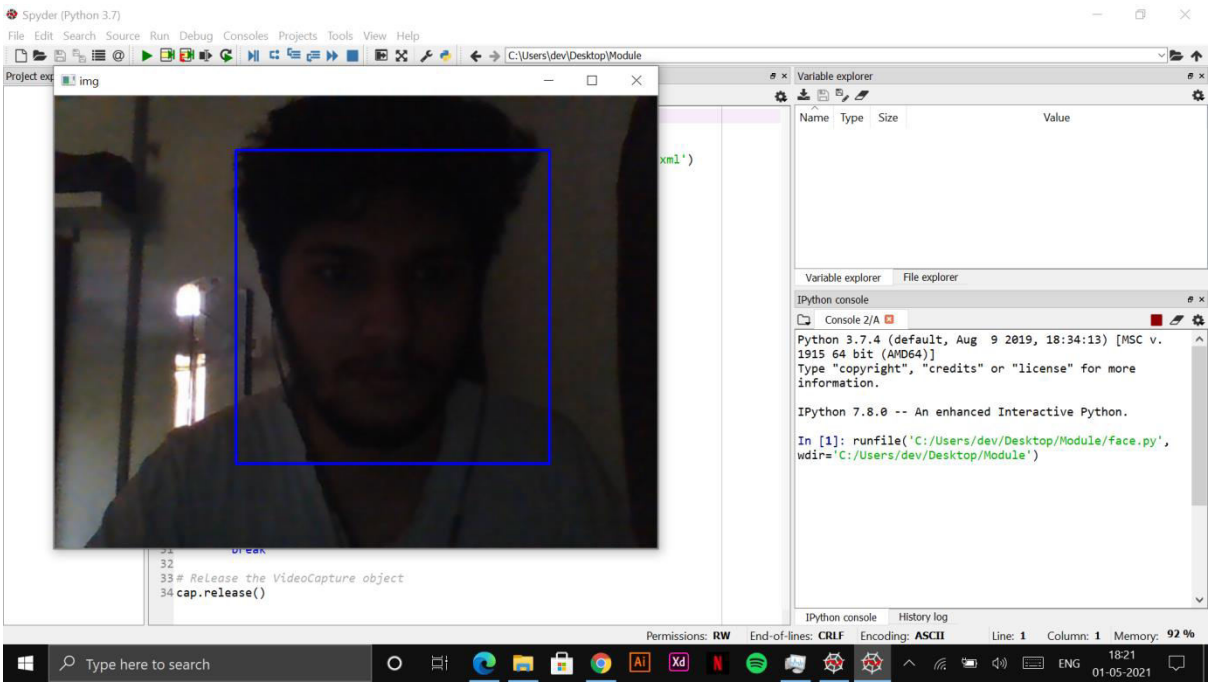

Fig 1

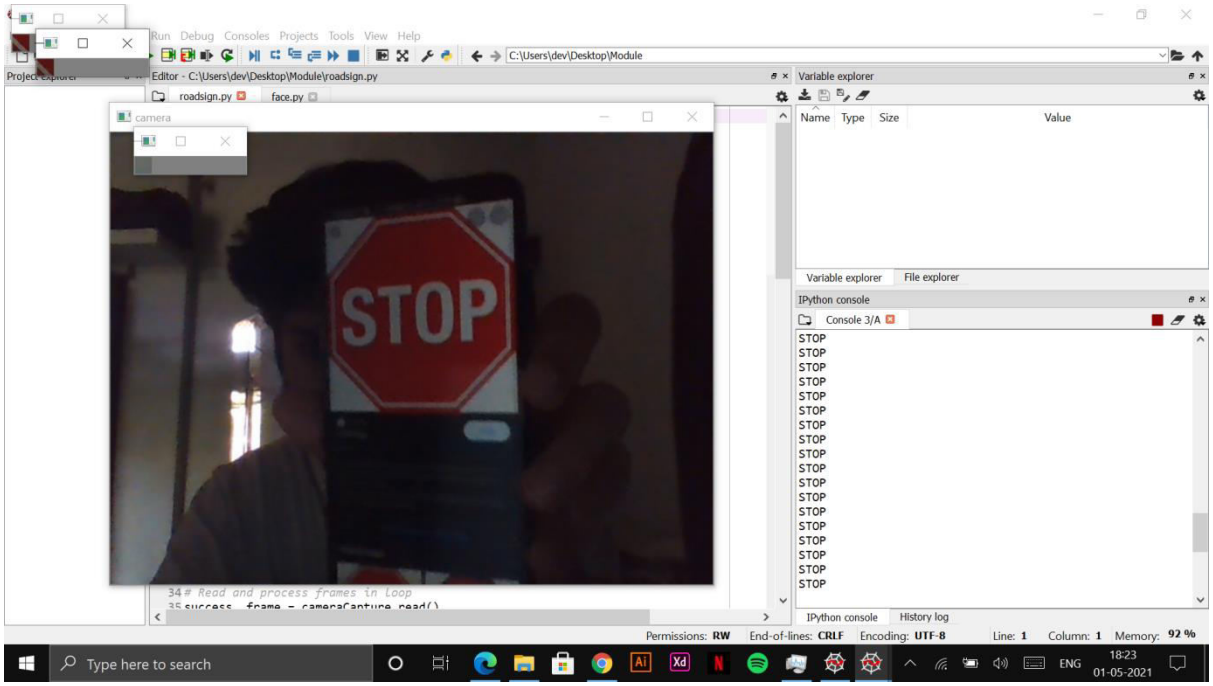

Fig 2

Extraction of Model Features

The system segments the image/video into different color regions. For every viewing angle the system rebuilds an object piece image of the presented color and extracts the color of the largest region. Then, the system selects the unique color region as the region of the secondary feature.

Performance results:- To measure the performance of proposed algorithms and methods and check the results accuracy, the system has been evaluated using Precision. The same datasets were used for both training and testing by dividing the datasets into training samples and testing samples in the ratio of 7:3. The Precision from the dataset was 73.437%.

Conclusion:- This project proposes an approach for recognizing the category of objects present in low lit environments. Object detection is useful in many applications, such as robotics vision, video surveillance, digital cameras, security, and human computer interaction. This project's objective was to develop a Low light object detection system implementing the computer visions and enhancing the advanced feature extraction and classification in computer vision. Low light object detection is a very challenging problem. More efforts should be made to improve the classification performance for important applications.

Our future work will focus on -

- Recognition of specular objects and transparent objects.
- Improving the performance of the system and deriving more appropriate classifications which may be useful in many real world applications.

Future work:-

- Lidar sensors can be used for increasing the accuracy of the separation.
- Cameras with capability to capture high and detailed images can be used.
- With a capable computer system we will also be able to sharpen and separate the features more precisely.

References:-

[1] Z. Cao, T. Simon, S.-E. Wei, and Y. Sheikh, "Realtime multi-person
2d pose estimation using part affinity fields," in CVPR, 2017.

[2] Z. Yang and R. Nevatia, "A multi-scale cascade fully convolutional
network face detector," in ICPR, 2016.

[3] X. Chen, H. Ma, J. Wan, B. Li, and T. Xia, "Multi-view 3d object
detection network for autonomous driving," in CVPR, 2017.

[4] R. J. Cintra, S. Duffner, C. Garcia, and A. Leite, "Low-complexity
approximate convolutional neural networks," IEEE Trans. Neural Netw.
& Learning Syst., vol. PP, no. 99, pp. 1–12, 2018.

[5] S. H. Khan, M. Hayat, M. Bennamoun, F. A. Sohel, and R. Togneri,
"Cost-sensitive learning of deep feature representations from imbalanced data." IEEE Trans. Neural Netw. & Learning Syst., vol. PP,
no. 99, pp. 1–15, 2017.

[6] D. Chen, G. Hua, F. Wen, and J. Sun, "Supervised transformer network
for efficient face detection," in ECCV, 2016.

[7] D. Ribeiro, A. Mateus, J. C. Nascimento, and P. Miraldo, "A real-time
pedestrian detector using deep learning for human-aware navigation,"
arXiv:1607.04441, 2016.

Devashish Pandit is a student of Medi-Caps University, Indore, M.P., India in the Department of Information Technology. He is currently pursuing his bachelor's degree in Information Technology.