

Pedestrian Detection with ID

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Abstract— Pedestrian detection and tracking are widely applied to intelligent video surveillance, intelligent transportation. We select OpenCV as the development tool for implementation of pedestrian detection, tracking, counting and risk warning in a video segment. We introduce a low-dimensional soft-output SVM pedestrian classifier to implement precise pedestrian detection. Experiments indicate that the system has high recognition accuracy and can operate in real time. The concept can be used for the maintaining Hygienic saving the memory of data base and count the number of people passes in the fame. This is done under the Digital Image processing. We use the concept of Feature Extraction and Feature Selection. This paper of the project will undergo under many methods like Deep Neural network, Convolution Neural network, MNSIT, HOG and YULU etc. The paper is based on the project which used concepts as Machine Learning, Deep Learning and code is written in Python.

Index Terms— Pedestrian Detection, OpenCV, Tensornets, Yulu and camera.

I. INTRODUCTION

The growing interest in computer vision of the past decade. Fueled by the steady doubling rate of computing power every 13 months, face detection and recognition has transcended from an esoteric to a popular area of research in computer vision and one of the better and successful applications of image analysis and algorithm based understanding. Because of the intrinsic nature of the problem, computer vision is not only a computer science area of research, but also the object of neuro-scientific and psychological studies, mainly because of the general opinion that advances in computer image processing and understanding research will provide insights into how our brain works and vice versa. Because of general curiosity and interest in the matter, the author has proposed to create an application that would allow user access to a machine based on an in-depth analysis of a person's facial features. This application will be developed using Intel's open source computer vision paper, OpenCV and Microsoft's .NET framework. The growing interest in computer vision of the past decade. Fueled by the steady doubling rate of computing power every 13 months, face detection and recognition has transcended from an esoteric to a popular area of research in computer vision and one of the better and successful applications of image analysis and algorithm based

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II. OBJECTIVES

The main objective of our paper is human detection and recognition to provide unique ID's to every individual who is captured under that camera.

- Providing unique id to each and every person helps to collect more information about that person accurately.
- This paper also aims at removing occlusion which is mainly a biggest drawback in current pedestrian detection.

III. METHODOLOGY

This system consists of pre-installed softwares of open cv and machine learning algorithms. This camera is installed in a highly populated area and focused at a certain angle.

- A single will be able to focus on multiple objects and extract the features of an object, humans etc., SVM algorithm helps in predicting and classifying different objects, according to the existing data that is fed into the system.
- It is also installed with the HOG algorithm that detects faces of humans and helps in extracting various features in it. CNNs Algorithm helps to find the

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specific and accurate pattern values formed by the individual while his motion.

- One of the best algorithms used to detect fast and real time multi object detection called YOLO algorithm is used. When a camera is focused on multiple objects and humans it forms paths by recording its motion and activities.
- YOLO: it is an extremely fast real-time multi object detection algorithm. YOLO stands for “You Only Look Once”. This algorithm applies a neural network to an entire image.
- CNN: A convolutional neural network is a specific type of artificial neural network that uses perceptron in machine learning for supervised learning to analyze data.
- It is one of the main categories to do image recognition, image classification, object detections, recognition faces are some of the areas where CNN is used.
- MNIST: The MNIST database (Modified National Institute of Standards and Technology database) is a large database of handwritten digits that is commonly used for training various image processing systems. The database is also widely used for training and testing in the field of machine learning.
- OPEN CV: it was built to provide a common infrastructure for computer vision apps. It’s a kind of library used in python consisting of more than 2500 algorithms which includes both computer vision and machine learning algorithms.

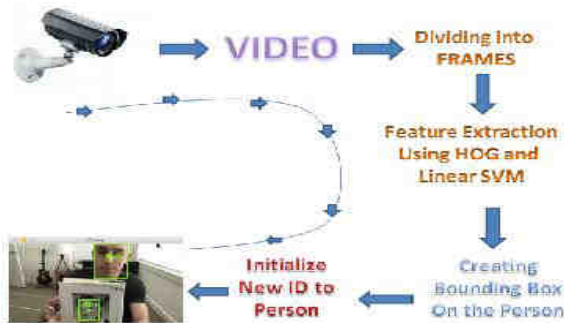


Figure 1: Process of Object Detection.

Feature Extraction is a process of dimensionality reduction by which an initial set of raw data is reduced to a more manageable group of processing.

Feature Selection is a process where you automatically or manually select those features which contribute the most to your prediction variable or output in which you are interested in.

OpenCV is an open source library used in real time image processing. It’s used to process images, videos, and live streams.



Figure 2:- Image Processing using OpenCV.

HOG is called Histogram of Oriented Gradients is a feature descriptor used in computer vision and image processing to detect the object detection. This technique counts the gradient orientation in the localized portion of the image.

SVM is fundamentally a binary classification algorithm. It falls under the umbrella of machine learning. Image processing deals primarily with manipulation of images. If you want to use the two, SVM might be used as the image classification.

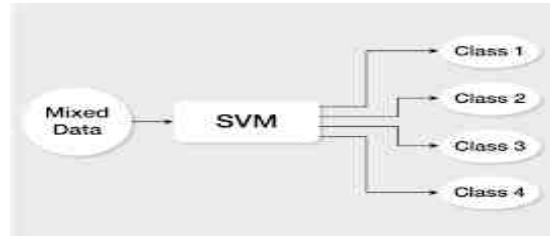


Figure 3: SVM Classifier.

IV. SYSTEM HARDWARE & SOFTWARE CONFIGURATIONS

4.1 WEBCAM: It is a video camera that feeds or streams its image in the real time to our computer through a computer network. When captured by the computer, the video stream may be saved, viewed or sent on to other networks via systems such as the internet.



Figure 4: Camera.

System/PC: A computer system or personal computer is required to execute this paper. Softwares like python, numpy, yolo, tensornets, flask, xampp are installed on it. System should consists 4GB or greater RAM for smooth functioning and execution of this paper.

PYTHON: Created in late 1980’s, python is a high level, multipurpose, programmer - friendly language. It has a huge compendious standard library. Its ease of use helps to integrate systems effectively.

NUMPY: It is a library for Python used to handle large multidimensional arrays and matrices. It is open source with an active community.

OPENCV: It is an image processing library written in optimized C/C++.It uses multi core processing. It supports various platforms like Windows, Linux, Mac OS. It paves way for using different languages like Java, Python, C++,C.

YOLO: It is a clever convolutional neural network for doing object detection in real time. The algorithm applies a single neural network to the whole image and then divides the image into regions and predicts the bounding boxes and probabilities for each region. These bounding boxes are weighted based on predicted probabilities.

It's so popular because it's able to achieve high accuracy even in real time. The algorithm YOLO "You Only Looks Once" at the image in the sense that it requires only one forward propagation pass through the neural network to make predictions.

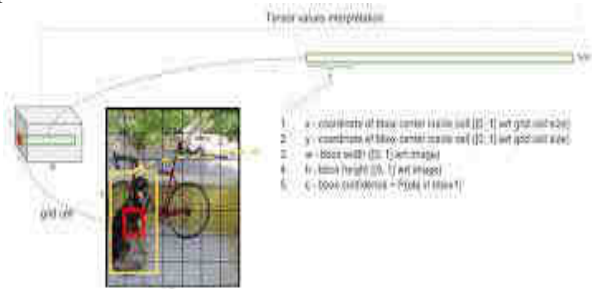


Figure 5: YOLO Image Prediction.

Xampp: It is an AMP stack which lets you install Apache, MYSQL, PHP, on your computer together with some other useful softwares. It has been designed to provide you easy experience to run any website from your local server. Xampp behaves as a local server. We have deployed Xampp to run a site developed using Flask and for storing data. It's open source and available for Windows, Linux and MacOs.

Flask: It is a micro web framework written in python. It is classified as a micro framework because it does not require any particular tools or libraries. It has no data abstraction layer, form validation, or any other components where pre-existing third party libraries provide common functions.

V. EXPERIMENTAL RESULTS

Step 1: Initialize Xampp using terminal and run the flask file. This file consists of detected frames after execution of the paper.

Step 2: A path of video is already given in the object-detection.py script. Also can change it for the required video to be used for object detection.

Step 3: A object-detection.py script is executed using terminal, the objects will be detected in the loaded video.



Figure 6: A video frame before object detection.



Figure 7: A video frame after object detection.

The Figure 7 is a frame of undetected objects or before execution of object-detection.py script. When the object-detection.py script is executed, the detected frames, objects are detected and counted in it, simultaneously it shows the count of objects on the terminal of the objects detected. These detected object frames are also stored in a database in app.py python script. which can be logged in and find the object detected at a particular time interval.

Step 4: Check the detected objects in the database at a particular time.

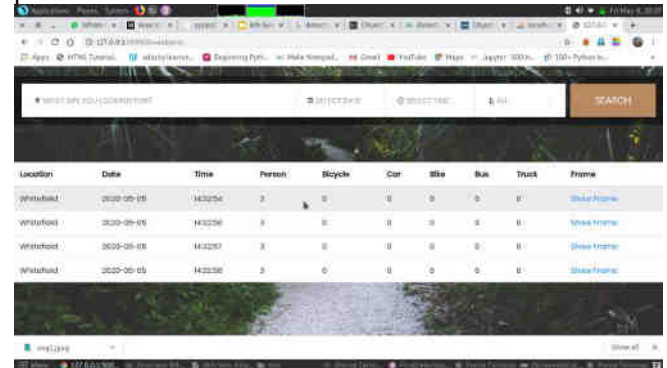


Figure 8: No of objects detected at particular time interval.

CONCLUSION

By using this thesis and based on experimental results we are able to detect objects more precisely and identify the objects individually with the exact location of an object in the picture in the x, y axis. This paper also provides experimental results on different methods for object detection and identification and compares each method for their efficiencies.

The object recognition system can be applied in the area of surveillance system, face recognition, fault detection, character recognition etc. The objective of this thesis is to develop an object recognition system to recognize the 2D and 3D objects in the image. The performance of the object recognition system depends on the features used and the classifier employed for recognition. This research work attempts to propose a novel feature extraction method for extracting global features and obtaining local features from the region of interest. Also the research work attempts to hybrid the traditional classifiers to recognize the object. The object recognition system developed in this research wasted with the benchmark datasets like COIL100, Caltech101, ETH80 and MNIST. The object recognition system is implemented in MATLAB7.5 It is important to mention the difficulties observed during the experimentation of the object recognition system due to several features present in the image. The research work suggests that the image is to be preprocessed and reduced to a size of 128x128. The proposed feature extraction method helps to select the important feature. To improve the efficiency of the classifier, the number of features should be less in number. Specifically, the contributions towards this research work area follows, An object recognition system is developed that recognizes the two-dimensional and three dimensional objects.

VI. REFERENCES

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