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Automatic Face Recognition to Assist Visually Impaired People using HOG - SVM

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ABSTRACT: Identification of people for visually impaired is one of the most difficult task faced by them. On the basis of world health organization reports, there are about 2.2 billion people who are having vision impairment in which at least 1.2 billion people are those whose vision impairment can't be healed. This project will assist the visually impaired to know the people around them and resolve their problem of spotting people around. The project implements face detection and recognition of person and vocalize their name using MATLAB 2022a. Method begins with capturing of Image through webcam, followed by HOG (histogram Oriented gradient) feature extraction. The extracted features are classified using SVM (support vector machine) algorithm with extracted features of images that are already present in database, followed by pronouncing the name of matched image by Voice over. Project is implemented for 5 Data sets of each 10 Images with different positions and can be done with 100 images as well.

KEYWORDS: MATLAB, Face Recognition Technique, Hog Feature Extraction, SVM Algorithm

I.INTRODUCTION

There are about 3.6% people in the world who are suffering from visual disability and 0.41% people are blind based on reports from world health organization. Most of people with vision impairment are over the age of 50 years. The main problem of these people is they could not recognize the people in their surroundings. In order to overcome this problem, the real time Face Recognition Technique is implemented using MATLAB .This project aim is to recognize the face of the people in the surrounding and notify visually impaired people. In this project what we do is first images of the people we want to recognize are captured and their images are stored. Then features of the captured images are obtained using Histogram of Oriented Gradient (HOG) feature. Then, next processing step is we are utilizing SVM known as Support Vector (Machine Learning) algorithm to characterize between various pictures and coordinate the captured picture accurately with the pictures present in the image set. When captured image is matched with image in database it will articulate the name of the person. Face recognition is a process of identifying a person in a digital image, by using feature extraction and SVM (Support Vector Machine) Algorithm. SVM is used to train the extracted data, where each data is plotted as a point in n-dimensional space. MATLAB (matrix laboratory) is a software platform where many applications can be executed like signal processing, image processing with the help of various tool boxes.. This project can be done in various methods but we use MATLAB because it is easy to access and visualize the data. There are lots of methods and algorithms for feature extraction and machine learning in it. And also it has the capability to handle large data sets by using distributed computing. The main keywords in our project are Face Recognition, Feature extraction, SVM, HOG

MATLAB:

MATLAB stands for Matrix Laboratory. MATLAB was developed by linear system package (LINPACK) and Eigen system package (EISPACK) projects. This MATLAB is used to visualize the data using different toolboxes which are provided by MATLAB. Using MATLAB toolbox, various operations on data are performed. MATLAB has various applications in signal processing and communications, Image and video processing, control systems, etc. MATLAB is a

high performance language which is used for technical computing. It provides an easy to use environment where computation, visualization, and programming can be done easily.

HOG:

Hog stands for histogram oriented gradient, which is a feature extraction technique that does the extraction of face features. Feature extraction is required as the raw pixel image, can't provide selective information in order to differentiate two images. Here in hog, it represents the structure or shape of an object which calculates both magnitude and angle of gradient. The image region obtained is generated into histogram using magnitude and orientation of gradient. The gradient of image measures how it changes ,it provides two pieces of information - The magnitude of gradient tells us how quickly the image is changing and direction of gradient tells in which direction the image is changing.

SVM:

Support vector machine is a machine learning algorithm that is used to differentiate data and classify them. In the SVM algorithm, each data item is represented by a point in n-dimensional space, where each feature is represented as a value of particular coordinate. Here 'n' represents the number of features. Following classification is done by identifying the hyper plane that classifies two objects by training and testing of the data in database.

II . LITERATURE SURVEY

K.SHARMA,V.GUPTA, S.VERMA, and S.AVIKAL proposed a study entitled as Study and Implementation of Face Detection Algorithm using MATLAB (2020), on the concept of Face recognition using Viola Jones Algorithm, AdaBoost Algorithm, integral Image in MATLAB. This algorithm detects the face when the captured image is not tilted i.e., all detected points should be captured.[1]

C.SANCHEZ,D.MARTINEZ AND R.NAVARRETE proposed a study entitled as MATLAB Simulation of Algorithms for Face Detection in Video Surveillance (2019), on the concept of Face recognition using Viola Jones Waterfall method and the method by geometric models using the Hausdorff distance. This algorithm detects the face when the captured image is not tilted i.e., all detected points should be captured.[2]

BHUPENDRAVISHWAKARMA, POOJA DANGE, ABHIJEET CHAVAN, AKSHAY CHAVAN proposed a study entitled as Face recognition for Blind people using Viola Jones Algorithm (2017), on the concept of Face recognition for Blind people using Viola Jones Algorithm, PCA Algorithm in MATLAB in which we can recognize an unknown image by comparing it with the known training images stored in the database and give information regarding the person which is recognized. This algorithm detects the face when the captured image is not tilted i.e., all detected points should be captured.[3]

K. REVATHI, JAYA BHARATHI, SARANYA as a team, they has proposed a study entitled as Face recognition using image processing for visually challenged (2015), on the concept of face recognition using the haar feature base cascade classifiers using Eigen face algorithm. Haar cascades is that they tend to be prone to false-positive detections, It has less accuracy compared to modern algorithms.[4]

FAIZAN AHMAD, AAIMA NAJAM , ZEESHAN AHMED proposed a study entitled as Image-based Face Detection and Recognition: "State of the Art" (2013), on the concept of Solution for image detection and recognition for video surveillance by evaluating various face detection and recognition methods for face based identification over other biometrics are unique. The accuracy in this model is low compared to the present model. [5]

CONG GENG, XUDONG JING proposed a study entitled as Face recognition using SIFT features (2009), on the concept of comparison of PSIFT and VSIFT using ERE in face recognition. As faces are non rigid, There are less structures with high contrast or high edge responses, so it is not optimal for face recognition.[6]

III. PROPOSED SYSTEM

In this system, the captured image which is taken by using the web cam undergoes processing step known as feature extraction and is classified with the Images in the Database that was created with different faces in different angles using Machine learning Algorithm (Support Vector Machine). First, the feature Extraction is done for the captured Image using HOG features followed by classification using SVM machine learning algorithm. When captured image is matched with image in database, then output will be name of matched image which is already stored in the database, and then by using the Voice over, the name will be pronounced by the system to assist visually impaired person.

Block diagram of FRS:

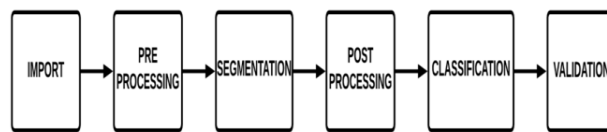


Fig 1: Block diagram of Automatic Face Recognition to assist visually impaired people using HOG - SVM

- Import
- Preprocessing
- Segmentation
- Post Processing
- Classification
- Validation

Work flow of FRS:

First, The Image is captured using web cam of the system then detection of face is done, if there is no face detected then it goes back. After capturing image, the extraction of features is done by HOG.

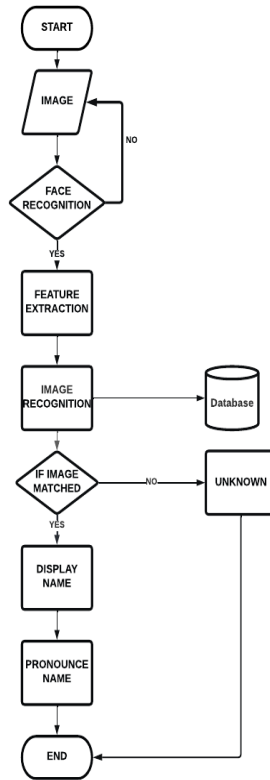
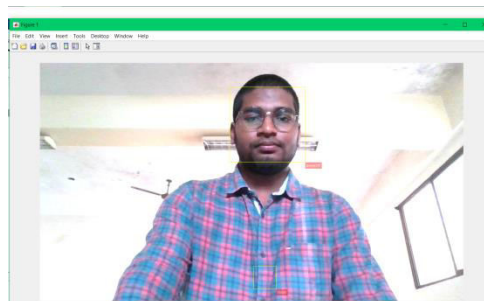


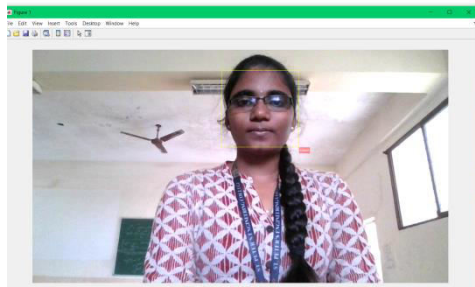
Fig 2: Work Flow of Automatic Face Recognition to assist visually Impaired using HOG – SVM.

Now, Image Recognition is done by comparing Images in database, If Image is matched then the name will be pronounced by Voice over and this is end of the Work flow.

IV.RESULTS



Screen 1: Face detection 1



Screen 2: Face detection 2

V.CONCLUSION

Visually Impaired People cannot see clearly and they cannot identify people, therefore in order to help them, this project is proposed. Using MATLAB toolboxes, Image Processing (HOG) and Machine learning (SVM), the code in the project is formulated. After all the processing steps, the person is identified and announced by Voice over. Thus helping visually impaired people to identify persons.

VI.FUTURE SCOPE

The model can be developed with good accuracy and interface the developed software with hardware in order to build a prototype. The work can be extended to detect the multiple faces at a time when the multiple persons appear on screen.

REFERENCES

- 1.Mr.G.Arun Francis , Dr.P.Karthigaikumar , Mr.G.Arun Kumar(2020),” Face recognition system for visually impaired people” JOURNAL OF CRITICAL REVIEWS ISSN- 2394-5125 VOL 7, ISSUE 17, 2020.
- 2.Navneet dalal, “Histograms of Oriented Gradients for Human Detection”, 1(01):886-893,July 2005.
3. Harshal V.Khodaskar, Shashank Mane,(2017), “Human Face Detection & Recognition using Raspberry pi” International Conference on Science and Engineering for Sustainable development, Special Issue-1,ISSN:2454-1311.
4. Laurindo Britto Neto, Felipe Grijalva, Vanessa Regina Margareth Lima Maike, Luiz Cesar Martini, Anderson Rocha “A Kinect-Based Wearable Face Recognition System to Aid Visually Impaired Users” IEEE Transactions on Human Machine systems.
5. Almaria Thomas K, Ancy Thomas, Bincy Tharakan T, Dinesh C,(2017) “Text Recognition and Face Detection Aid for Visually Impaired Person using Raspberry pi” International Conference on Circuits Power and Computing Technology,5090-4697-7/17.
6. Cong geng, Xudong jing, ”Face recognition using SIFT features” IEEE,2009
7. Akhilesh A. Panchal ,Shrugal Varde , M.S.Panse, (2016) “Character Detection and Recognition System for Visually Impaired People” IEEE International conference on Recent Trends in Electronics Information Communication Technology,978-1-5090-0774-5/16.
8. Faizan ahmad, aaima najam , zeeshan ahmed, “ Image-based Face Detection and Recognition: "State of the Art"”, IJCSI, 2013.
9. K. Revathi, jaya bharathi,saranya” Face recognition using image processing for visually challenged”, JCHPS, 2015
10. Bhupendra vishwakarma , pooja dange, abhijeet chavan, akshay chavan ,” Face recognition for Blind people using Viola Jones Algorithm “, IRJET,2017



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