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Automatic Attendance Tracker using Face Recognition

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Abstract: ***This project addresses the structure, implementation and application of automated attendance tracker with the help of face recognition and identification which can be used in schools, colleges, offices and many other places where security and automation is required. Automated attendance system using face recognition is a system in which tracking of daily attendance is in an automatic manner and done by the program itself which is done by the recognition and identification of the face with the help of a camera module which is connected with the system. The camera module helps the system with the initial part of the program which is initialization of the camera on which the system can perform its operation. When the face comes in front of the camera, the program compares the face in the camera with the images in the database and recognizes it. These image data are basically known data for the system and is the data on which the system is trained. The system, if recognizes the face after the comparison with the database, displays the name of the person's face or else displays "UNKNOWN" if the faces don't match. Then it tracks the attendance of the person file of only the matched faces. This attendance is stored in an excel file format.***

I. INTRODUCTION

Face recognition is the technology in which the human face is detected and matched with the digital image which is already stored in the database in a file. Face recognition is a biometric system which is accurate, safe and more secured as compared to various other systems such as fingerprint systems. When an attendance tracker program is made on the basis of facial identification, it is a precise system as attendance record along with details of the person stored by recognizing the face will be accurate. Face recognition system is more beneficial over other ID scanning systems because if a person forgets his ID, he will not be able to track his attendance and will not be an efficient process. Face recognition system also helps to avoid the possibility of false and fake attendance which can be likely and easily done with the system that involves id scanning. In this system, the details of the person can be acquired quickly just by scanning the face. This technology can also be used in various other security areas as well for the purpose of detection an identification of faces of criminals if their digital image is available on the basis of previous records. This will make it easy for cops to find criminals also in crowed areas as these face recognition programs also have the feature of multiple face detection. The detection done on the basis of faces is a more accurate system because the detection is done on points and locations on the face and then matched with the database faces locations and faces. If these points match, only then the result is declared as true by the system and faces match, otherwise the result is declared as False. The another reason for accuracy in this system is because faces of each and every person in this world is unique in some or the other manner, due to which the face points and locations differ of each and every person. Thus, these benefit helps in precise recognition of faces and have applications in various technologies in various places in the world and are used extensively.

II. RELATED WORK

There are multiple places where automated attendance tracking system have their application. Each type of system used have their own various features and process of building the system. Samridhi Dev, Tushar Patnaik published an IEEE paper. In this paper, they have described a simple attendance system using face recognition and trained a model on the same. They have also stated how the system responds to different camera angles. Nandhini R, Duraimurugan N, S.P.Chokkalingam published paper in IJEAT. In this paper they have compared different attendance system. They have stated the advantages of using automatic attendance system over the traditional system and also proposed an easy way to develop automatic attendance system. Mayank Srivastava, Amit Kumar, Aditya Dixit, Aman Kumar published paper in IEEE. In this paper they have developed attendance system using python programming language. They have used OpenCV for developing the system. They used data science technique for training the model. Smitha, Pavithra S Hegde, Afshin published paper in IJERT. In this paper they have described various steps for creating attendance system. They have used Haar-Cascade algorithm for image detection. They have developed the system in which the generated attendance will be received to the students via e-mail.

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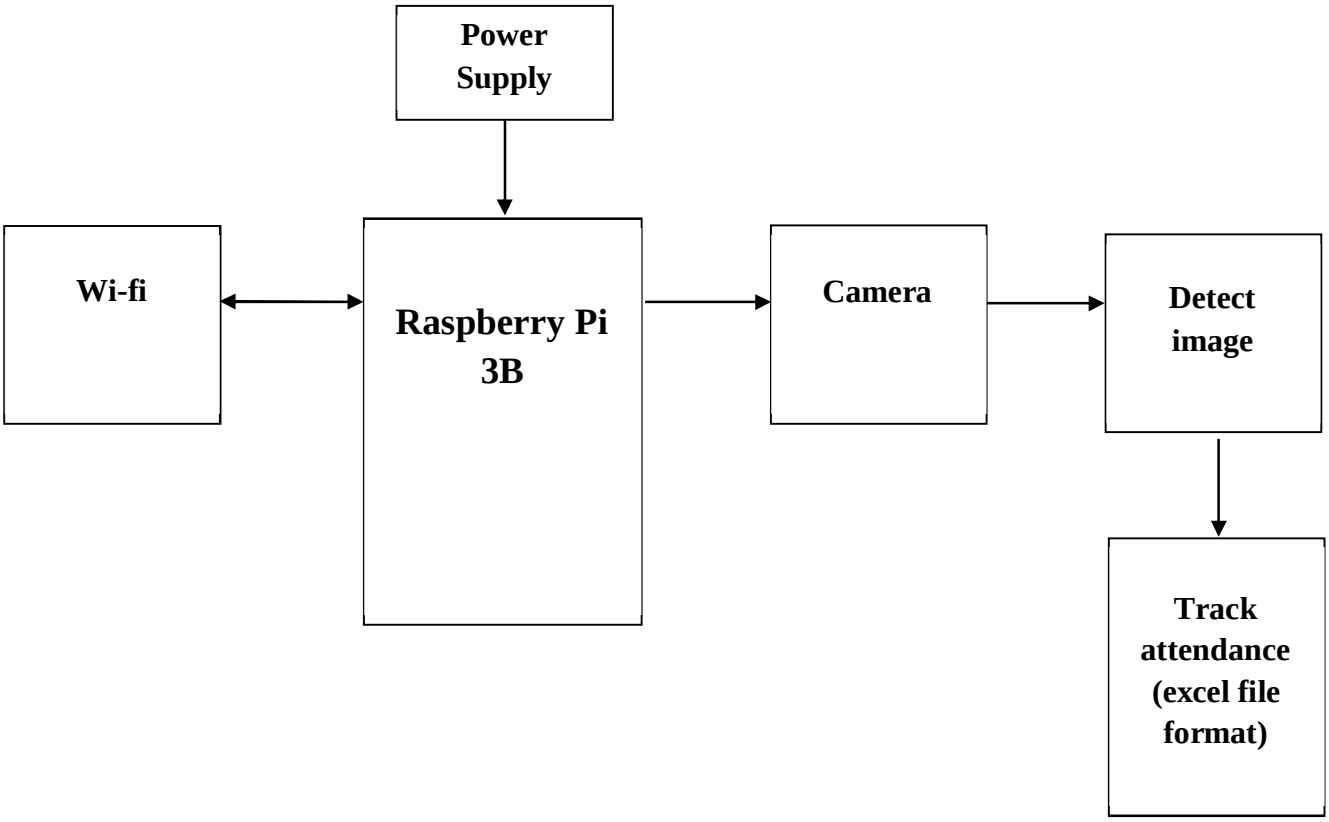
III. BLOCK DIAGRAM



IV. METHOD

This system is based on face recognition which involves image processing. This system is based on OpenCV library. The library is open source library supported by Python as well as JAVA. When the software first runs it opens the camera connected to controller. When the camera is turned on it will scan the face that is which is in front of the camera. The image captured by camera will then be compared with the pre stored images in the system. When a face or multiple faces are in front of the camera, it starts to locate faces visible in the screen. This is done using the OpenCV and face-recognition libraries. The OpenCV is an open-source library built in python for working on image processing and computer vision related problems. The library is used at the initial stage of the program at which the data processing is done. The data used here majorly are image data. Through the library, we can perform multiple operations such as accessing the camera, image reading, image cropping, conversion of image from BGR(Blue-Green-Red) to RGB(Red-Green-Blue) format for faster and efficient performance of the software, drawing rectangles around faces and adding text as well, and various other operations. The face-recognition library, on the other hand, is primarily used for locating faces and their identification. Using this library, we can find the faces in an image by finding their locations and also find their encodings. Once the software has found the face, it checks the face with the images stored in the database (known images) by comparing the encodings of the face seen in the screen with the encodings of the face in the images in the database. If the face matches with one of the faces in the database, it shows the name of the person's face as a label in the webcam itself. If the face doesn't match with the database images, then it labels the image as "UNKNOWN". The software then stores the attendance of the person of the current date in an excel file format. The software stores the attendance only if the faces match with the database which prevents false attendance. Also, the program creates a new file on every new date for attendance tracking which helps in maintaining attendance of the individual on each date. The data will be processed by the system using Raspberry Pi. Raspberry Pi is connected to the screen using Wi-fi. The camera module is connected to the dedicated slot available in raspberry pi. When the camera scans the image it will send the data to the pi and the raspberry pi will then process the scanned image. It will check the data(image) given by camera with pre stored data. If the data matches it will store the attendance.

V. ADVANTAGES

Automatic attendance system is very a quick, secured, accurate and an efficient system if compared to manual attendance tracking system that is used. This system tracks the attendance of students or employees without any errors as the it is tracked by scanning the face. Also, the load on the person because of the effort required to count each attendance which is a hassle will become considerably less as the count will be taken by system itself. This system is time efficient system as the time needed to mark attendance manually is of high amount but for the system, it is done within seconds. Hence, the load on the person will be reduced. Also it will become more efficient to keep the record as the system will store the attendance in new excel file each day. This will help to keep better track of attendance. This system records the exact time at which the students or employees arrive at the institute.

VI. OUTPUT

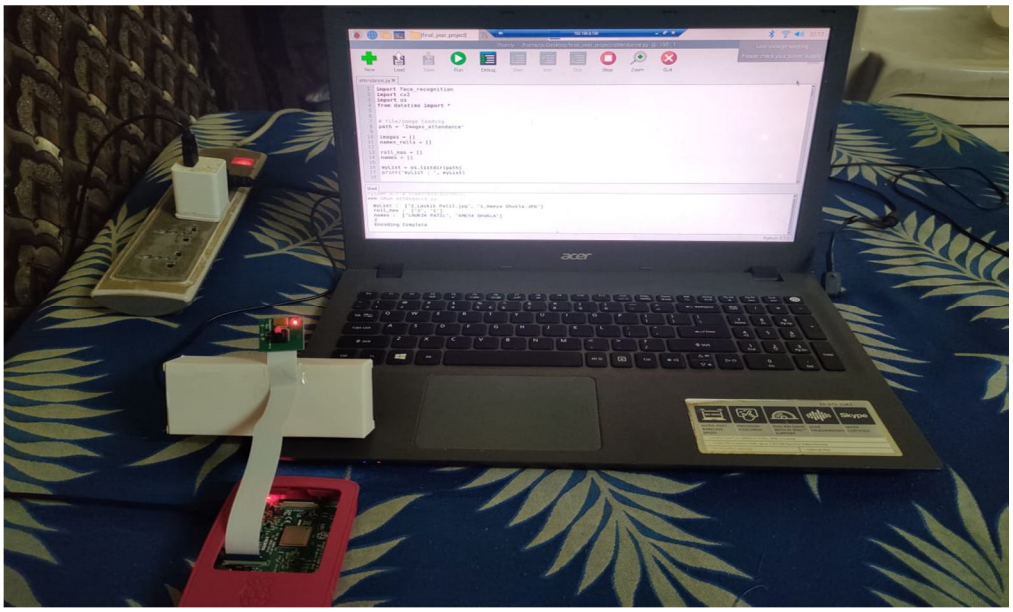


Fig 6.1

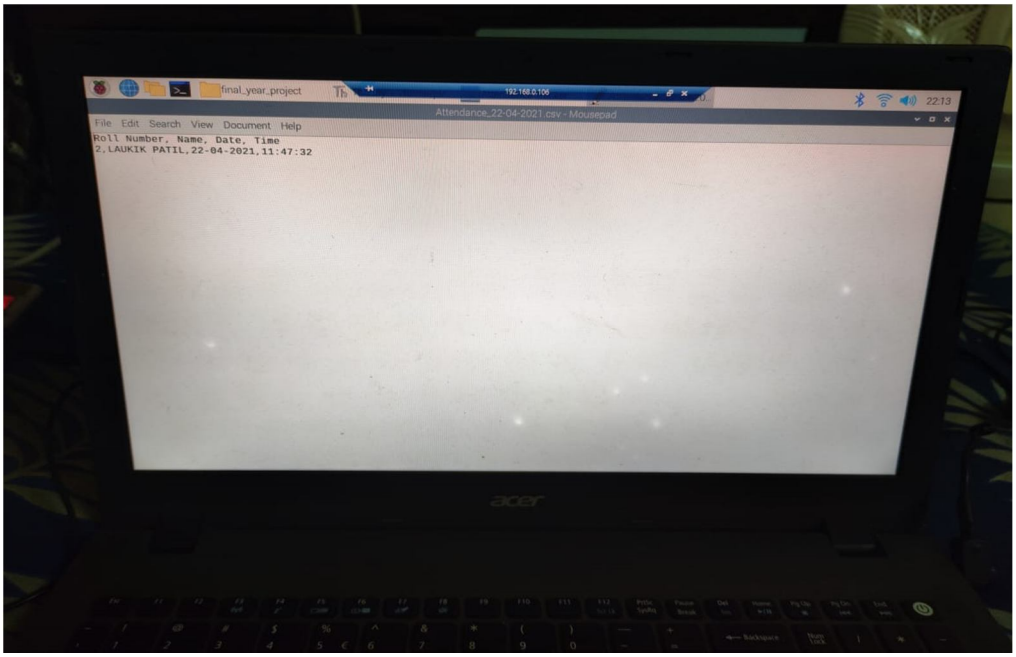


Fig 6.2

VII. CONCLUSION

Hence, the aim of this project is to automate the attendance tracking process through a software which is capable of storing daily attendance of people in an excel file format through the process of facial recognition. The stored attendance record can be maintained and accessed any time as the stored attendance files and program will be in same directory. The automatic attendance system using face recognition helps in achieving high accuracy and security to meet the need for automated classroom

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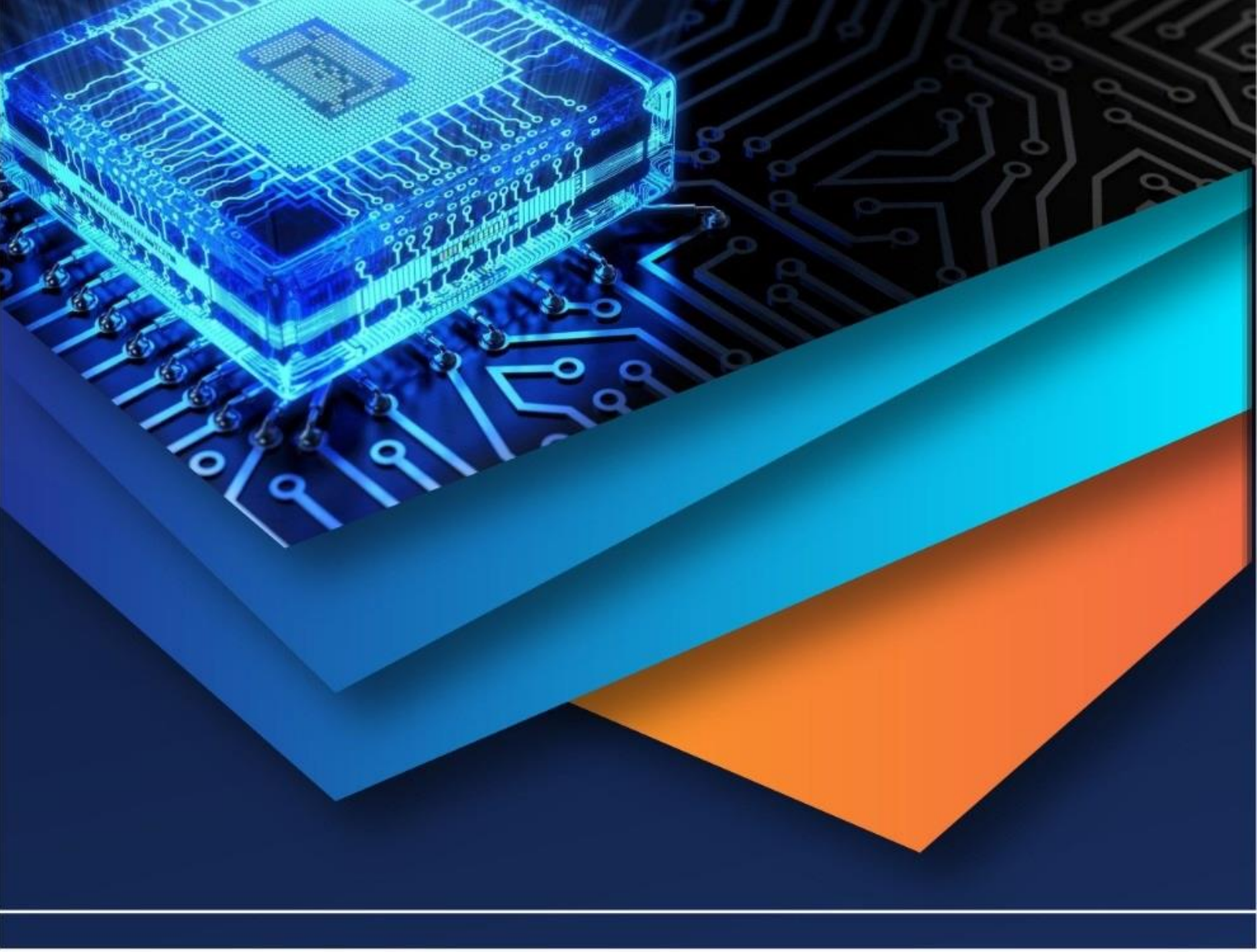

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