Food Management based on Face Recognition

P. Divya Bharathi[1], V. Pranav Raj[2], P. Suresh Kumar[3], S. Venkata Narayana Reddy[4]
Assistant Professor, Department of Electronics and Communication Engineering
VelTech Rangarajan Dr. Sagunthala R&D Institute of Science and Technology
Avadi, Chennai-600062

Abstract:- **An Improved way of the token-based system in hostel using advanced technique of computer vision which helps us to train people image/face in the real-time and to have training internally with the specific id so that we can take attendance in real-time and python script will automatically print the tokens based on the update of recognized attendance in the comma-separated database file. This system takes one level advance in making only the recognized people get the token without the intervention of security or a separate staff to monitor the people. We have used Python 3.8 version and the main technology behind the scene is the computer vision technology which enables us to understand the pattern of a human face structure so that we can train and use it for future recognition activities. With the advancement of technology, we came up with an automatic token vending system based on recognized people of the community or organization. We also have built a GUI TKinter application for better usability.**

Keywords:- Computer Vision, Python, Training, Face Haar Cascade, GUI, Tkinter.

I. INTRODUCTION

An integrated system is created that can get user bio-information such as name, roll number, and ID number. With this, a person can train his or her face with his or her ID. So, oncethe person image shot is taken and saved in a certain folder, we must train the feature class so that it may be identified in the future. Also created a system that stores the user's name, roll number, date, and time of entry in a comma-separated file. Once the information is updated,a token can be printed, which is a thermal printer that publishes the person's bio when he or she is identified.Machine learning (ML) is a technique that allows the software to increase its accuracy in predicting events without needing to be explicitly programmed. Machine learning is built on the concept of constructing algorithms that can take in data and use statistical analysis to predict an output while updating results when new data is available.To forecast the stock market price, we employed a supervised machine learning approach in our situation. Deep learning is a type of machine learning that uses artificial neural networks exclusively. Deep learning is a type of brain mimicking because neural networks are developed to replicate the human brain. Deep learning does not require any explicit programming. Deep learning is a well-established idea. It's been around for quite a while.It's becoming more common now that we don't have nearly as much processing power or data as we formerly had. Deep learning and machine learning have arisen as processing power has expanded dramatically in the previous 20 years.The neuron is a formal definition of deep learning.

OpenCV (Open Source Computer Vision), a cross-platform, open-source library of functions, is based on real-time Computer Vision and supports Deep Learning frameworks for image and video processing.The main goal of Computer Vision is to extract pixels from an image toanalyze the objects and so comprehend what it contains.

II. LITERATURE REVIEW

Susanta Kumar Sarangi; Arunesh Paul; Harshit Kishor; Kritath Pande[1], Students' attendance in an educational institution is the most difficult aspect of the virtual platform. When done manually, it wastes a lot of time and effort. Due to a lack of a robust attendance mechanism, there was a lot of fraudulent attendance. The face is the most significant feature that distinguishes a person. As a result, we work on an attendance system that uses a real-time face detection algorithm and the frontal face recognition notion in this research. In this study, we use OpenCV, an open-source image processing framework, to explain an efficient haar cascade technique.

Kolipaka Preethi; SwathyVodithala[2],The face, which contains numerous critical information, is the most important component in recognizing each person in the human body. There are several common ways of capturing a person's presence, such as biometrics, which is a time-consuming procedure. To monitor student attending, this study constructs a model to categorise every character's face from a taken image employing a set of rules, i.e., the LBP technique. LBP (Local Binary Pattern) could be a common and self-made methodology for image illustration and classification that was chosen for its resistance to posture and light-weight alterations. the image are going to be captured by the planned ASAS (Automated sensible attending System) and compared to the image saved within the info. once a student enrolls, an automatic procedure updates the info, that contains the student's name and roll variety. Individual attending is marked by ASAS if the taken image matches the image within the info, that's if the 2 images area unit identical. The recommended technique saves time and energy by capturing daily management activities for every student and creating it easy to record their presence.

Karan Kacker; Samyak Jain; Shailendra Narayan Singh; Rakesh Garg[3],If attendance is kept by hand, it may be a significant strain for instructors. A smart and automatic attendance control gadget is getting used to triumph over this problem.Still, authentication is veritably important in this system. Biometrics are frequently used to apply intelligent companion systems. One of the biometric approaches to ameliorate this system is face recognition. Face recognition as an important aspect of biometrics is

used in a variety of Operations similar as videotape surveillance and CCTV systems, computer-mortal relations, inner access systems, and network security. Problems that are flagged indeed when the deputy and pupil aren't physically present can be fluently handled with this armature. Face discovery and recognition are the two most important perpetration phases in such a system. This study provides a model for erecting an automated in- class pupil attendance operation system(CNN) using facial recognition ways, top element analysis(PCA), eigenface scores, and convolutional neural networks. It should also be possible to assign linked faces by comparing it to the pupil face database. This strategy is an effective way to manage pupil attendance and recordings.

N Palanivel; S Aswinkumar; J Balaji[4],In educational institutions, as well as other businesses and workplaces, attendance is critical. Nowadays, attendance is recorded manually using an established technique. This procedure consumes a significant quantum of time and may affect in an error. A face recognition system is a technology that can identify or confirm a person from a digital picture or videotape source. In this work, we want to produce a system that automatically detects the presence of scholars or workers by feting their faces and publishing the attendance distance. Changes in lighting, posture changes, expression changes, and occlusion all affect the delicacy rate of Face Recognition. The face expression is studied using a K-means clustering algorithmic fashion in this composition. The biometric characteristics of the face unit are uprooted, and the face features are clustered using the K- mean clustering approach. The SVM approach is also used to classify the image's characteristics. It may be possible to get great recognition performance with smaller features. Eventually, an interpretation report(attendance distance) is prepared.
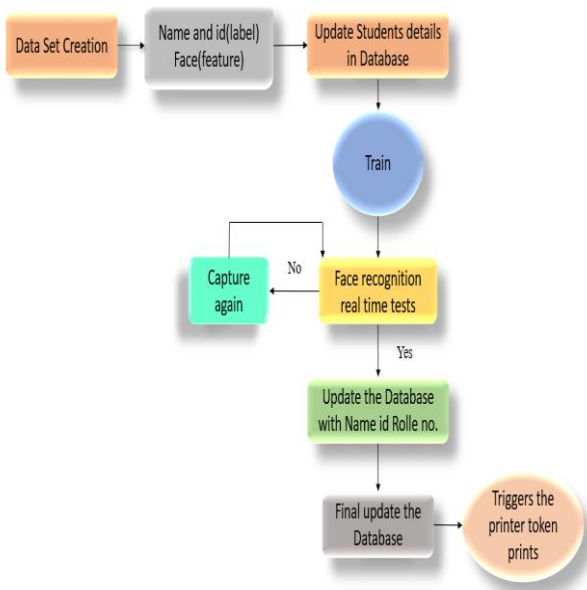
III. METHODOLOGY

Fig. 1: Block diagram

A. Proposed System:

In our proposed system we built an automatic system that can able to train any kind of human face image in the real-time with a dynamic single id per person and even with less no training example model gets recognized accurately. We also built an AI which is used for dataset creation training and attendance system which is later used for automatic ticket vending machine with the recognized face ID.

B. Proposed Method:

An integrated GUI system is built that is capable of getting the user bioinformation like name, Roll no / ID no as labels, and features such as face being captured inreal-time, and once the user is registered his details will be updated in the student'sdetails database. With that, a person can trainhis face by following his/her ID. So once got the person'simagesecaptured and stored in the specific folder then we have to train thefeature class so that in the future it can be recognized. After the training pro,cess one file called trainer.yml will be automatically saved as a model file. We have to use this model file for real-time face recognition with user details. We also have built asystem that updates the user entry name, roll no, date, and time of entryin a comma-separated file. Once the real-time attendance is started to work it will try to recognize the face on real if it got recognized it will update the details with the attendance database file and if it's not recognized it will recapture it until it recognizes. Once it is recognizedand then updated in the attendance database the printer connected externally will be triggered and print the token of that recognized user. Once the details are updated we can able toprint to a token which is a thermal printer automatically prints witha person's bio once he/she got recognized.

C. Inputof System:

This is the Input of the System where a person should register face by entering his/her name and Registration number.
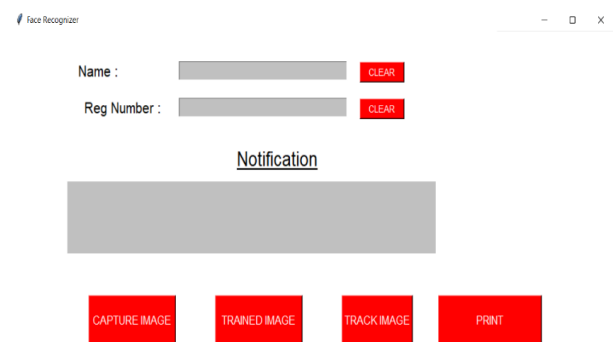

Fig. 2: Face Recognizer databaseportal

Now, Enter the student's details and register his face.Click CAPTURE IMAGE which starts up the program and takes several images per frame and it stores them in its database and it displays a Notification like the Student details Successfully saved in its database.
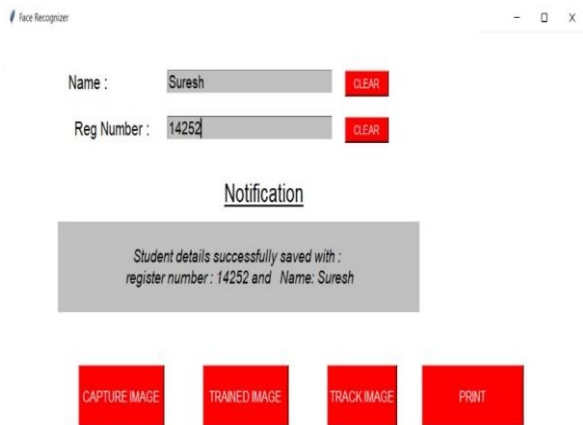
Fig. 3: Student Input Dataset

Now, Click TRAINED IMAGE which trains all the images taken in the before step and displays a message on Notification as Images Trained.

Fig. 4: Images Trained

Now that images have been trained, when we click TRACK IMAGE the webcam opens up and it starts detecting the person's face. If the face gets matched with the images that have been stored in a database it displays his name and registration number.

Fig. 5: Face Detection

D. Output of system:

When the face gets detected by showing his/her Name and Registration number then we have to press the PRINT button that is showing on the Database Portal which triggers the Thermal printer that has been connected to the pc through the USB portal.

Now, when the thermal printer gets triggered it prints all the information of the student like his Name, Registration Number, Time..etc.

IV. CONCLUSION

Food wastage is enormously increasing and due to impropersupply of the food, may lead to a major crisis of the food resources.The damage can be decreased impressively if a person gets his share of food properly and efficiently. In this paper, we fostered a GUIthat limits the food supply only to the inside people by cross-checking with the gathered information of every inside personin its database by using computer vision and GUI.This way when it compares the database information with the face of the person standing in front of the webcam it detects the face and prints out a slip/token to that particular person which includes all his/her info.

V. FUTURE SCOPE

This can be implemented by creating cloud management where there could be software that is installed only by the people inside and can register their info and can register the number of meals that they're gonna have in a day with which outsiders can't even know how these people get their food. This can beused in offices mainly for the working staff. This can also be implemented in CCTV and can recognize the person for future scope.

REFERENCES

[1.] W. Zhao, R. Chellappa, and A. Krishnaswamy, "Discriminant analysis of principal components for face recognition," Proceedings Third IEEE International Conference on Automatic Face and Gesture Recognition, 1998.

[2.] Chin-Seng Chua, Feng Han, and Yeong-Khing Ho, "3D human face recognition using point signature," Proceedings Fourth IEEE International Conference on Automatic Face and Gesture Recognition (Cat. No. PR00580), 2000, pp. 233-238, DOI: 10.1109/AFGR.2000.840640.

[3.] Guodong Guo, S. Z. Li, and Kapluk Chan, "Face recognition by support vector machines," Proceedings Fourth IEEE International Conference on Automatic Face and Gesture Recognition (Cat. No. PR00580), 2000, pp. 196-201, DOI: 10.1109/AFGR.2000.840634.

[4.] L. Xu, L. Huang, and C. Liu, "Raw vs. Processed: How to Use the Raw and Processed Images for Robust Face Recognition under Varying Illumination," 2010 20th International Conference on Pattern Recognition, 2010, pp. 2692-2695, doi: 10.1109/ICPR.2010.660.

[5.] Y. Lin and H. Xie, "Face Gender Recognition based on Face Recognition Feature Vectors," 2020 IEEE 3rd International Conference on Information Systems and

Computer-Aided Education (ICISCAE), 2020, pp. 162166,doi10.1109/ICISCAE51034.2020.9236905.

[6.] K. Jain, B. Klare and U. Park, "Face recognition: Some challenges in forensics," 2011 IEEE International Conference on Automatic Face & Gesture Recognition (FG), 2011, pp.726733,doi:10.1109/FG.2011.5771338.

[7.] J. Ueda and K. Okajima, "Face morphing using average face for subtle expression recognition," 2019 11th International Symposium on Image and Signal Processing and Analysis (ISPA), 2019, pp. 187-192, doi: 10.1109/ISPA.2019.8868931.

[8.] Cheng Zhong, Zhenan Sun and Tieniu Tan, "Learning efficient codes for 3D face recognition," 2008 15th IEEE International Conference on Image Processing, 2008, pp. 1928-1931, doi: 10.1109/ICIP.2008.4712158.

[9.] H. T. Chen et al., "Enhance Face Recognition Using Time-series Face Images," 2021 IEEE International Conference on Consumer Electronics-Taiwan (ICCE-TW), 2021, pp. 1-2, doi:10.1109/ICCE-TW52618.2021.9603226.

[10.] C. Tsai, Y. -Y. Ou, W. -C. Wu and J. -F. Wang, "Occlusion Resistant Face Detection and Recognition System," 2020 8th International Conference on Orange Technology (ICOT), 2020, pp. 1-4, doi:10.1109/ICOT51877.2020.9468767.