e-ISSN: 2582-5208
International Research Journal of Modernization in Engineering Technology and Science
Volume:02/Conference:01/July -2020 www.irjmets.com
International Conference on Recent Trends in Engineering and Technology-2020 (ICRTET)
Organized by VSM College of Engineering, Ramachandrapuram, Andra Pradesh

TRUSTED AUTHENTICATION OF HOSTELERS USING BIOMETRIC FACE RECOGNITION FOR FOOD MANAGEMENT SYSTEM OF HOSTELS WITH OPENCV

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ABSTRACT

For the past few years, the number of educational institutions is increasing rapidly. Thereby the number of hostels is also increasing for the accommodation of the students in the institutions. Hence there is a lot of problems in the hostels like lack of food quality, facilities provided by hostels, etc. There is no direct contact between management and students to discuss these problems. The students are facing health problems due to the poor quality of the food. On the other side, the students are wasting food due to a lack of interest in the food items. This paper deals with implementing the authentication of hostelers, the biometric face features of 71 samples are captured at the registration and stored in the cloud database which stores securely and the features extraction is performed by using OpenCV-Python and also deals with the real-time problems of the hostel by providing the web application to interact with the admin and management directly and to get information about the day to day menu items.

Keywords-HTML, OpenCV-python, MYSQL, menu, pre-attendance of each student, feedback, issues, suggestions

I. INTRODUCTION

Most of the newly established educational institutions, however, are using the old conventional techniques for managing their assets especially hostel facilities. These old techniques with its inherent limitations have impacted negatively the overall organizational efficiency of these educational systems[1].

Identification of the problems of the existing hostel management leads to the development of a computerized solution that will be compatible with the existing hostel management with the solution which is more user friendly and more GUI oriented. In this paper, we can improve the efficiency of the hostel management, thus overcome the drawbacks of the existing management.

This user-friendly application package specifically designed to automate, coordinate, and look after all the processes of managing hostel facilities. It is useful especially in large educational institutions with college hostels, school hostels[2].

Here, the multi-factor biometric face authentication is used to check the identity of the hostelers. The biometric face features of 71 samples are captured at the registration and stored in the cloud database which stores securely and the features extraction is performed by using OpenCV-Python

II. RELATED WORK

The existing authentication technique is the finger-based authentication system. Fingerprint authentication automatically compares a user's fingerprint to a stored fingerprint template to validate a user's identity. Although the fingerprint recognition system has various advantages, this system has some drawbacks. This biometric system has some complexity in obtaining high-quality images of finger patterns. Due to the issues of dirty, cuts, tear, and wear that can easily affect the ridges and minutiae of fingertip[3,4].Existing hostel food management system has some drawbacks, some of which are human error, low security, data redundancy, difficulty in data recovery in case of disaster, feedback is taken by alternative students, food wastage, etc.

A Face recognition based biometric authentication system became one of the most conducted, popular, and successful authentication techniques among other biometrics security methods for both identification and verification processes of one's identity[5,6]. This particular paper deals with the real-time problems of the

stakeholders of the hostel by providing the web application to interact with the admin and management directly and to get information about the day to day menu items.

Admin of the college can register hostelers data and captures 71 face samples of each person and stored in the database. The proposed application provides the GUI for the hostelers to give their attendance and also to give feedback on the food quality on a day-day basis. Based on the attendance count the food will be prepared daily. The feedback report will be monitored by the chief warden, admin, and the management of the college.

The visualization and analytics of the feedback are performed by Hive.

III. ALGORITHM FOR REGISTRATION

Input: Details of the User

Output: Details stored in the database

Algorithm for log in to the application:

Input: Credentials of the User

Output: Status of the user

userId←userId if userId has not existed previously

Password←hash(password)

Face image←capture (Face)

Store (Cloud DB)

Capture Face Image using OpenCV- HaarCascade []

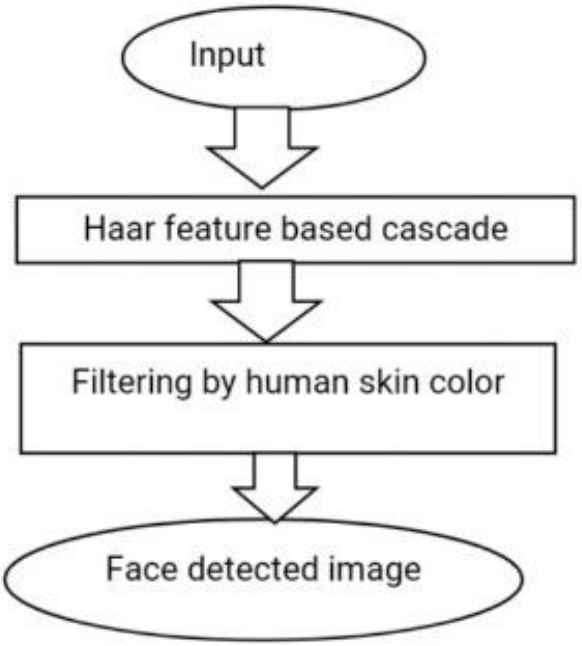
Algorithm for face detection:

Step1: Input face

Step2: Apply haar feature-based cascade classifier

Step3: Filtering by human skin color

Step4: Output as face detected image



Algorithm for face recognition:

Step1: Input face image

Step2: Divide face image into blocks

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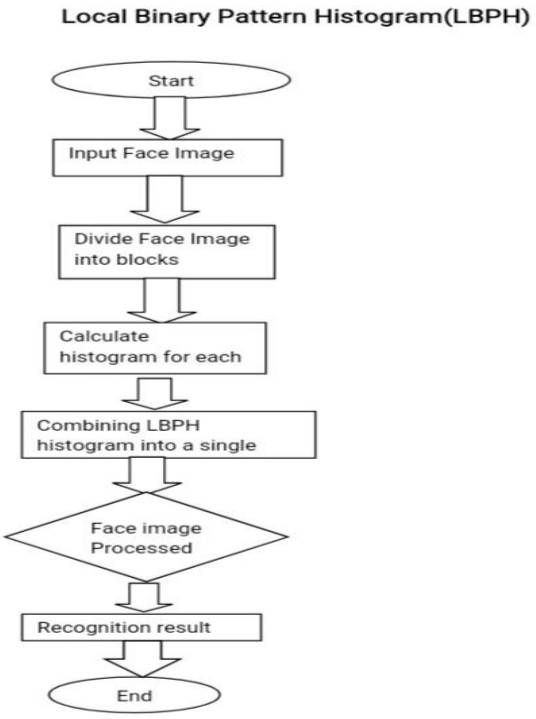
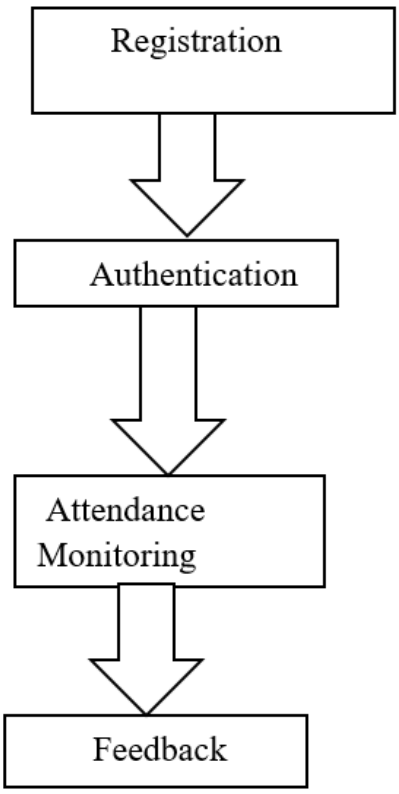
Step3: Calculate histogram for each block

Step4: Combining LBPH histogram into a single histogram

Step5: Face image processed and give recognition result

Phases:





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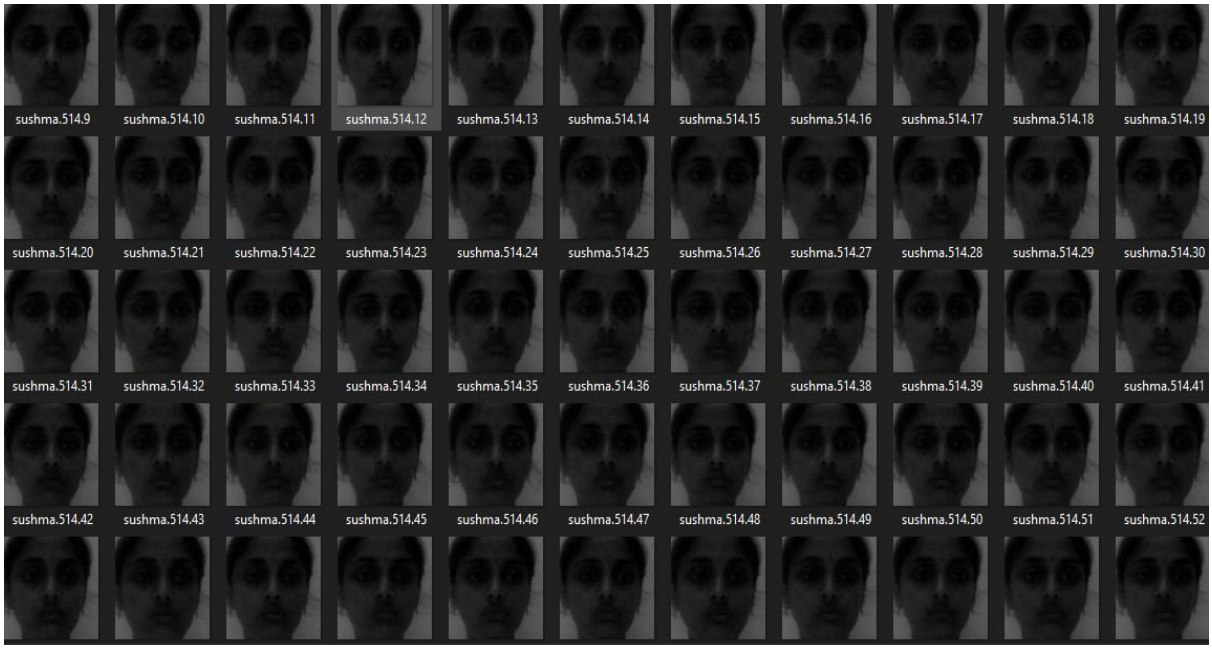
Dataset:

Face features of 71 samples of each face are captured and stored in the database.



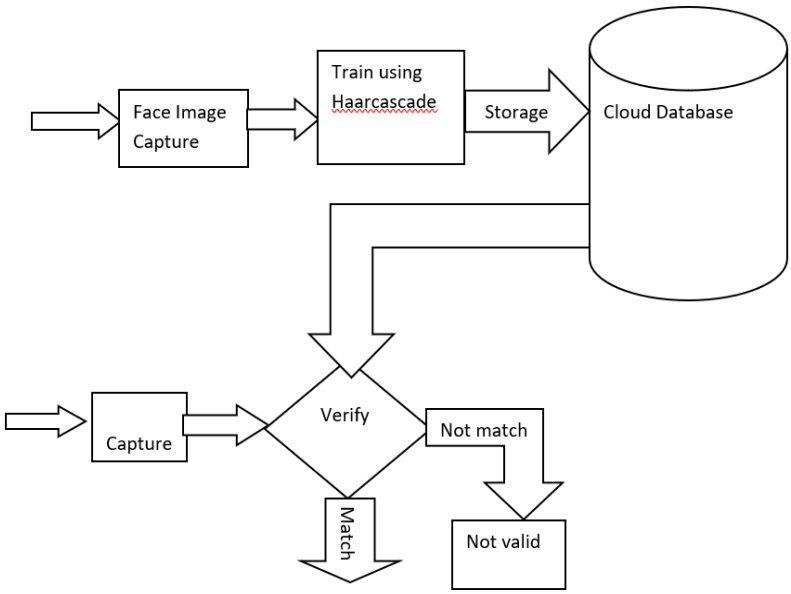
IV. FACE RECOGNITION PROCESS

Face Detection: See the picture and find a face in it.

Data Gathering: Extract unique characteristics of the face that it can be used to differentiate that face from other faces stored in the database.

Data Comparision: Despite variations in light or expression, it will compare those unique features to all the features of all the faces stored in the database.

The proposed application provides the GUI for the hostelers to give feedback about the food quality on a day-day basis. The feedback report will be monitored by the chief warden, admin, and the management of the college. The visualization and analytics of the feedback are performed by Hive.



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Execution Process:

Step 1: Admin can register hostelers details by log in to the application and their faces of 71 samples are stored in the database by using registration form. Admin stores their faces with their roll numbers. Directly we can log in with their faces only no need of the log in credentials.

Step 2: Chief warden can log in to the application and adds breakfast, lunch and dinner items daily by clicking add items option in the application and he/she also has right edit those items.

Step 3: Student and Faculty can log in to the application with their face or with their log in credentials and view the menu items posted by the chief warden by clicking view items option in the application.

Step 4: Student and Faculty can give their attendance for breakfast, lunch and dinner daily by clicking attendance option in the application. They can select any of breakfast, lunch and dinner or all.

Step 5: Admin, Chief warden and Manager can check the attendance details of hostelers after log in to the application. Attendance details can include member count for breakfast, lunch and dinner.

Step 6: Student and Faculty can give their feedback on each item for breakfast, lunch and dinner daily by clicking feedback option daily.

Step 7: Admin, Chief warden and Manager can view the feedback given by the hostelers to know the quality of the food after log in to the application. Feedback table include the no.of students who given the feedback as good, average and bad.

Step 8: Admin and Manager can also view the feedback report of previous days in the application by selecting from date and to date.

Step 9: Admin and Manager can view the hostelers data registered by the admin. Admin has the right to delete the hostelers data.

Step 10: Chief warden can post requirement issues by clicking requirement issues option in the application. These can be viewed by admin and manager in the check issues option.

Step 11: Student and Faculty can give suggestions daily in this application and this can be viewed by Admin and Manager.

Step 12: Student, Faculty, Admin, Chief warden and Manager can update his/her profile by clicking update profile in the application. In this he/she can change his/her password.

V. EXPERIMENTAL RESULTS

Hardware setup:

- Processor: Minimum 1GHz. Recommended 2GHz or more.
- Ethernet connection(LAN) or Wi-Fi
- Hard Drive: Minimum 32GB. Recommended 64GB or more, 2GB free disk space
- Memory(RAM): Minimum 4GB
- Operating system: Windows 7 or newer.

Software setup:

- Platform: Windows
- Front End: Bootstrap, CSS, HTML, JavaScript
- Back End: MySQL, OpenCV-Python, Flask

Results and Comparison

	Authentication	Food quality	Feedback
Hostel food management system	Yes	No	No
Mess management system	Yes	No	No
Our web application	Yes	Yes	Yes

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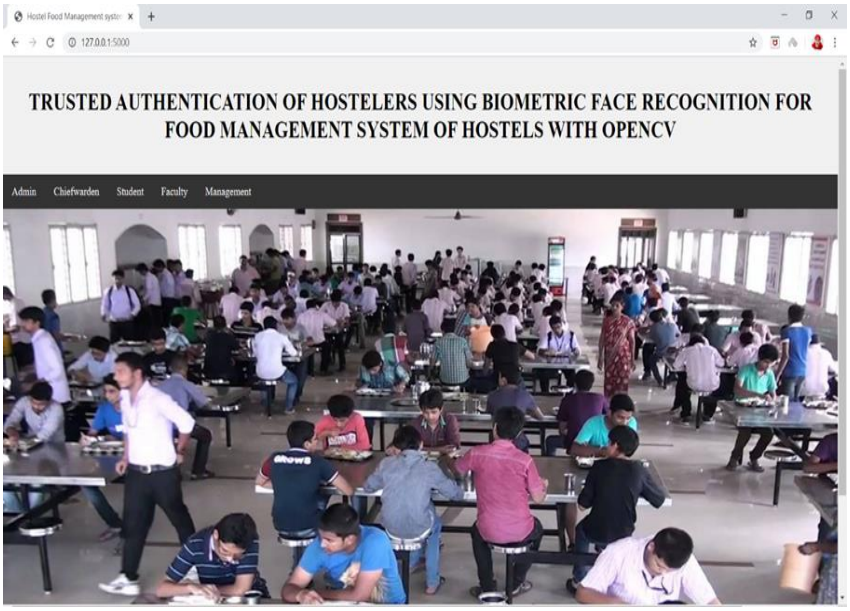
VI. ADVANTAGES

- Authentication can be performed using OpenCV-Python.
- Based on the attendance the food will be prepared so the wastage of food is less.
- A Web application is computerized so there is no strain to the person.
- Daily the attendance report and feedback report will be generated to the management.

VII. RESULTS

Home Page

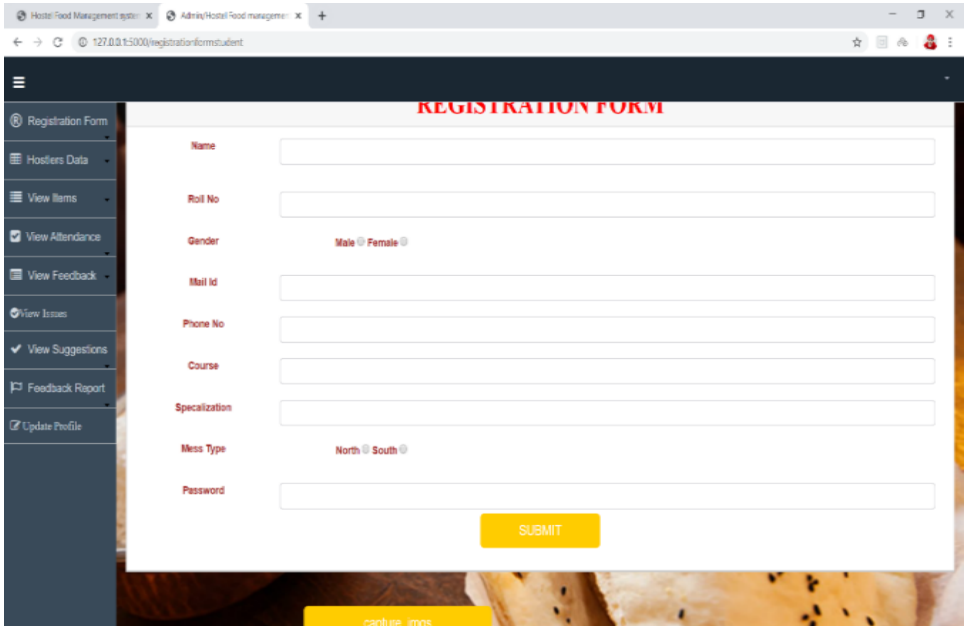
This is the home page of our web application.



Admin:

Registration form

- Admin registers the details of hostelers and their faces are captured and stored in the database.



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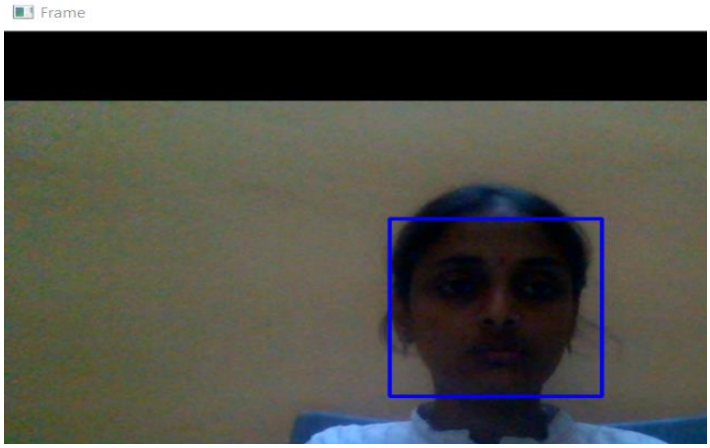
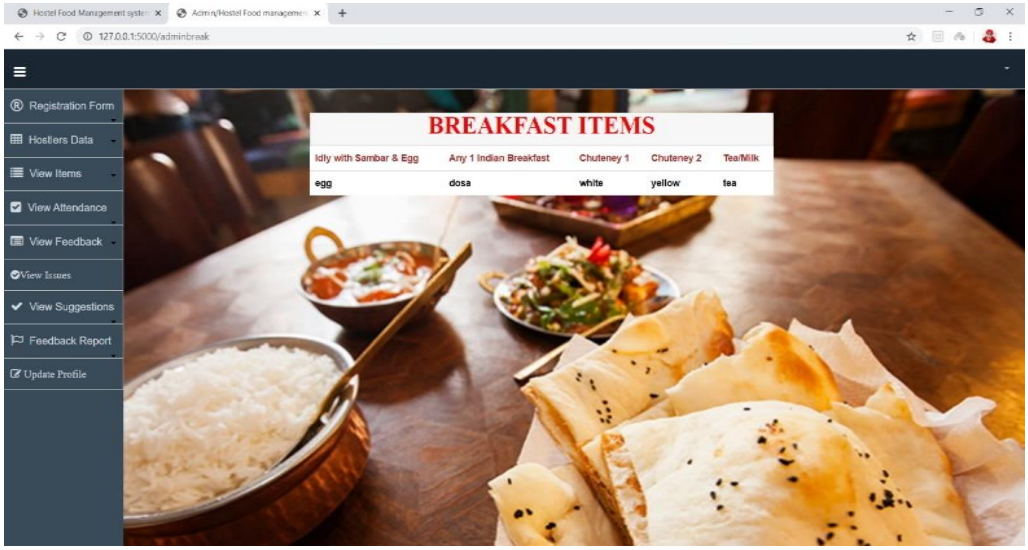
Capturing faces of hostelers



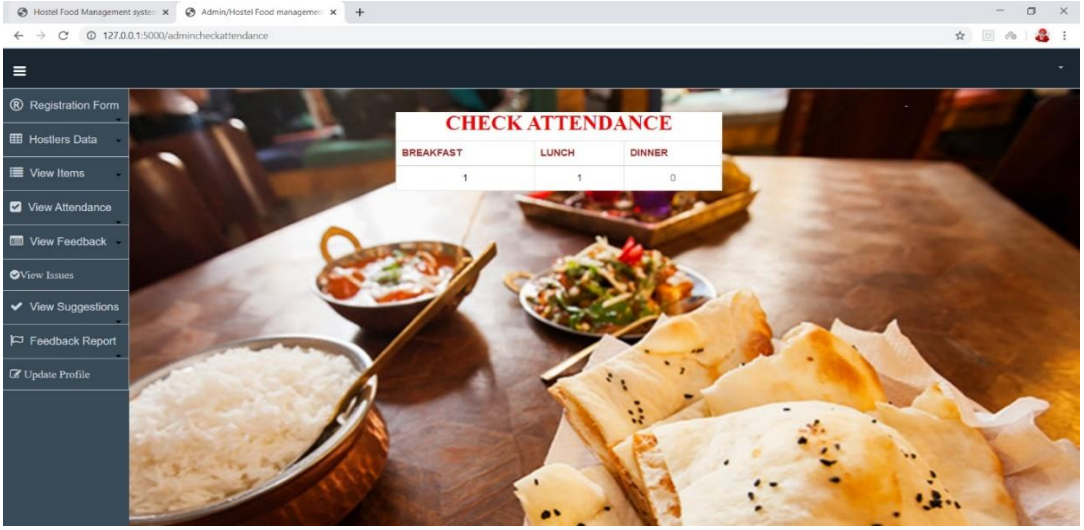
View Breakfast items

- Admin can view the list of breakfast items posted by chief warden.



View Attendance

- Admin can view the attendance for breakfast, lunch, and dinner.



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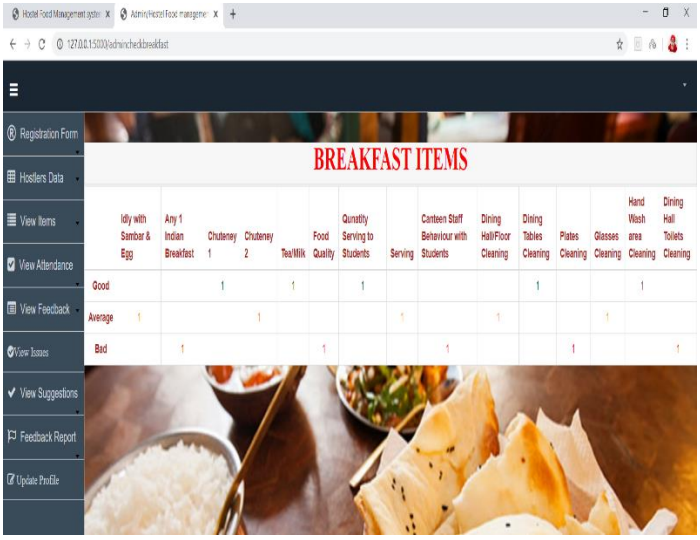
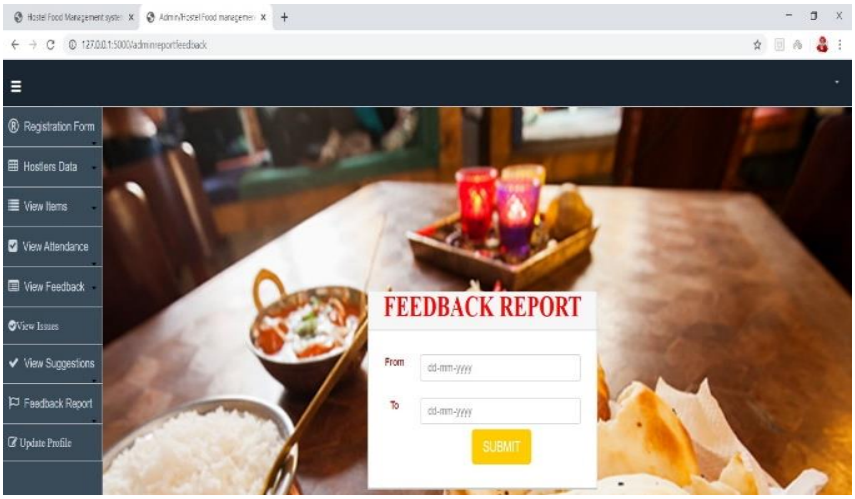
View Feedback

- Admin can view the feedback given by the hostelers.



Feedback Report

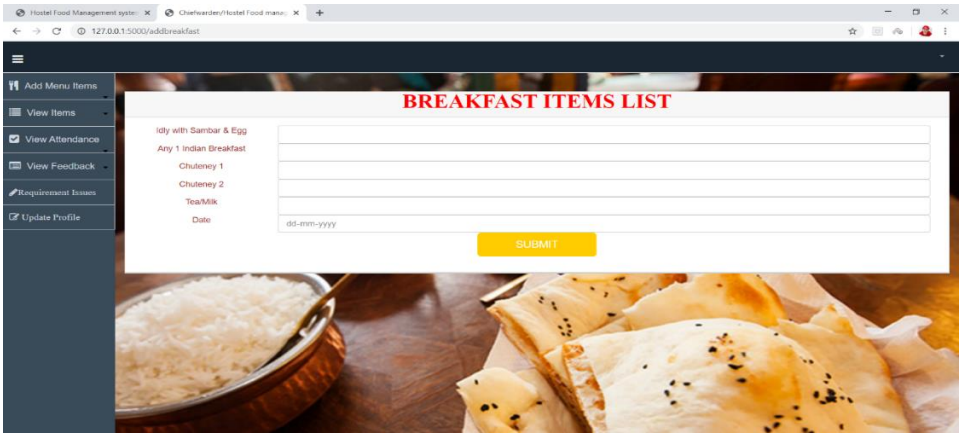
- Admin can view the feedback report of previous days by selecting from date and to date.



Chief warden:

Add Menu items

- The Chief warden can add the menu items for breakfast, lunch, and dinner.



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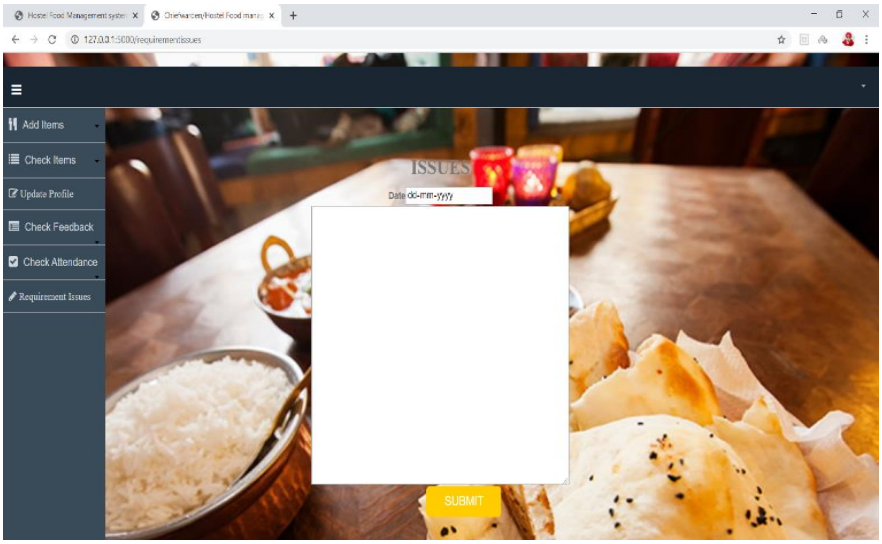
Add Requirement issues

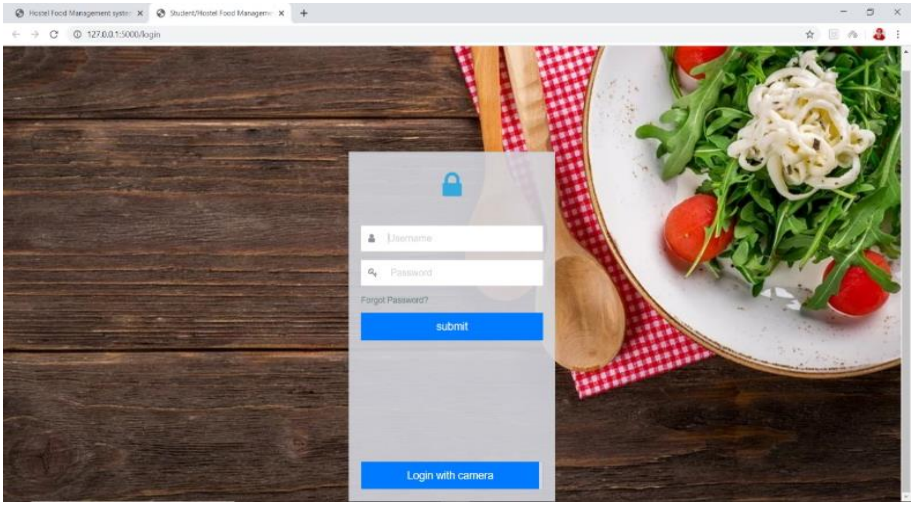
- The Chief warden can post requirement issues in this application.



Student and faculty:

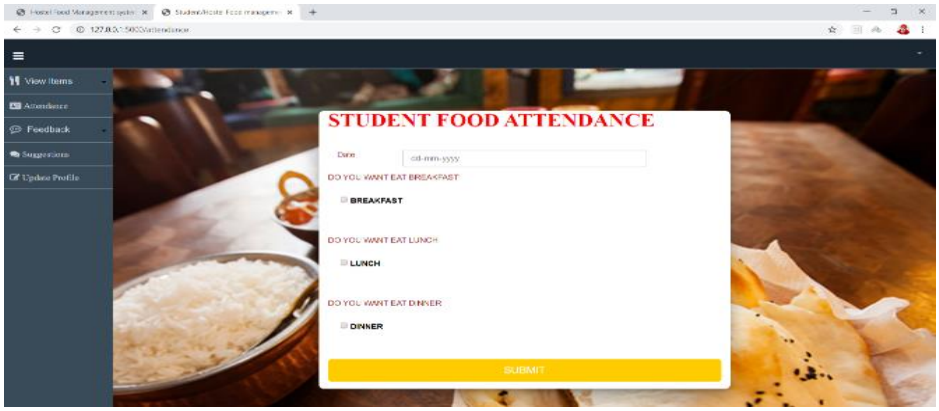
Login Page

- Student and faculty can log in to the application with their credentials or with their face.



Give Attendance

- Hostelers can give attendance for breakfast, lunch, and dinner.



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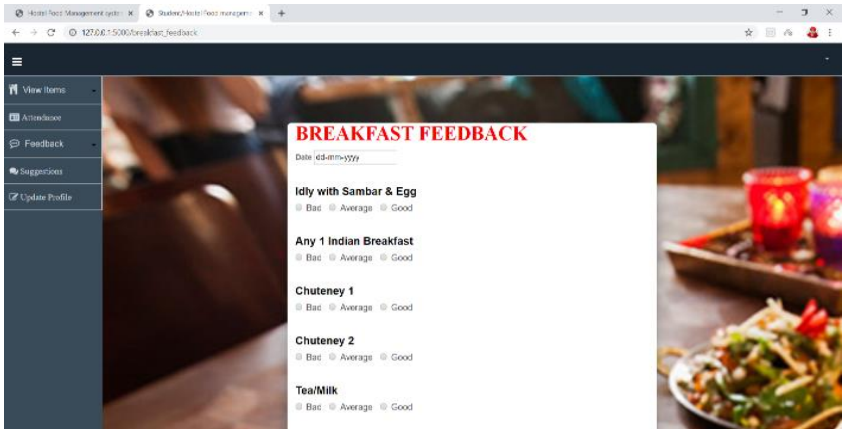
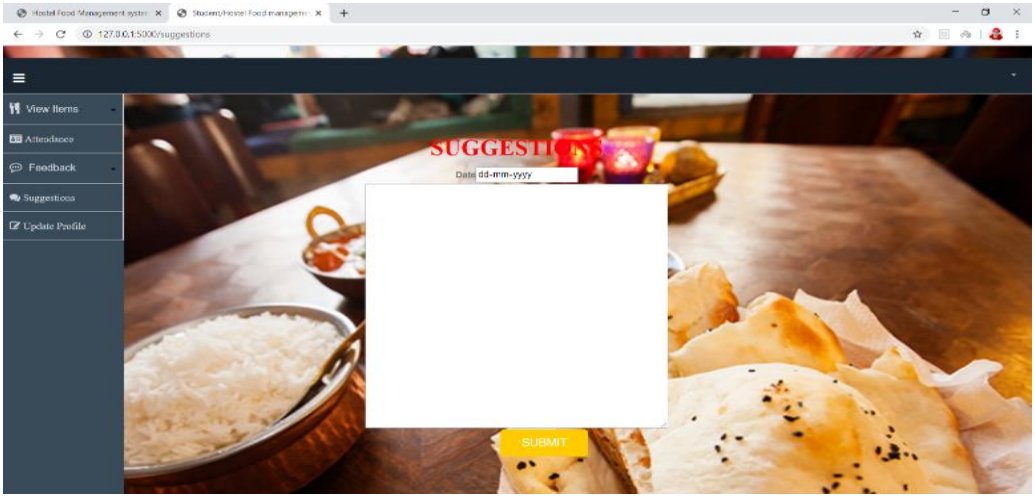
Give Feedback

- Hostelers can give feedback on each item.



Give Suggestions

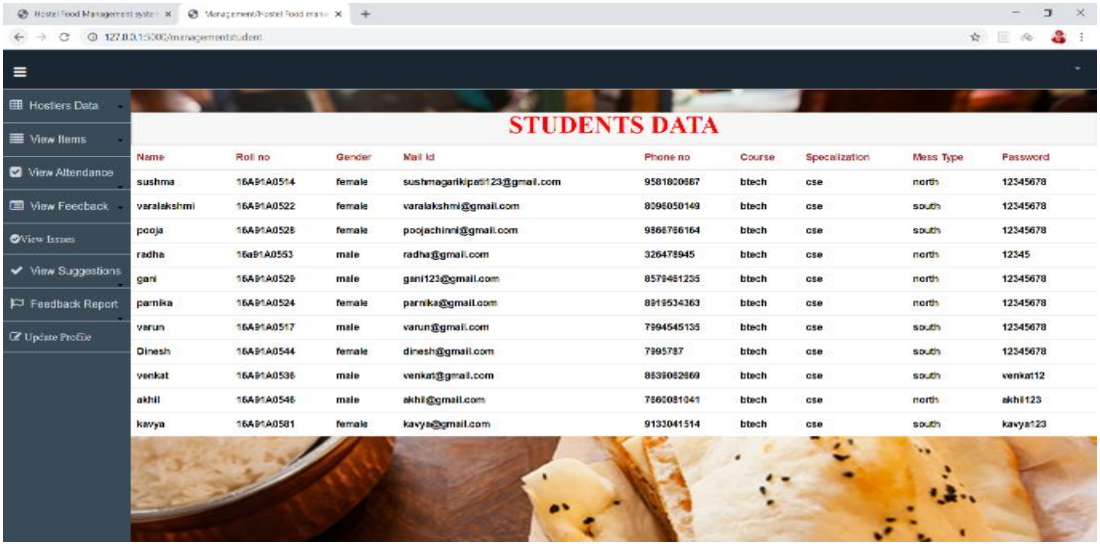
- Hostelers can post suggestions to the management.



Management:

View Hostelers data

- Manager can view the details of hostelers.



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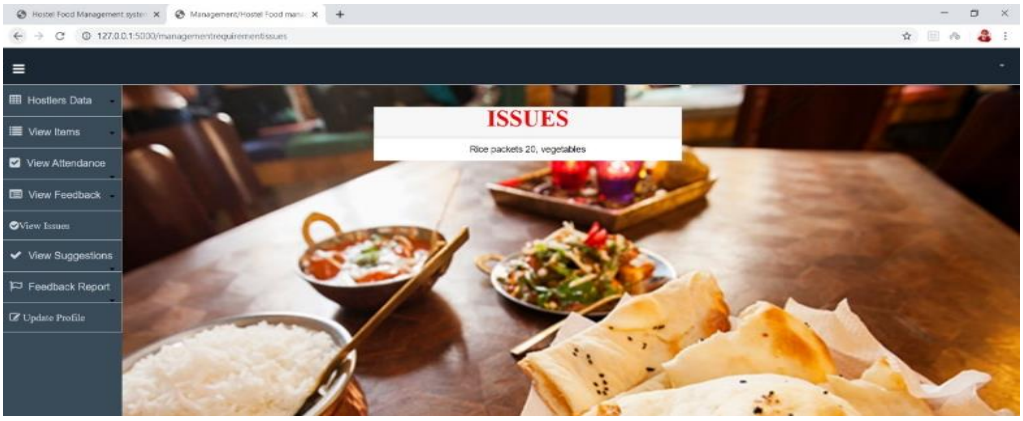
View Requirement issues

- Manager can view the issues posted by the chief warden.



VIII. CONCLUSION

- This application automates all the activities which are currently manual.
- By using this application, the system can able to automatically verify the identity of hostelers.
- This application offers hostelers to enter the data through a simple and interactive manner.
- By using this application hostelers can provide their attendance. Based on this attendance count the food will be prepared so the wastage of food is less.
- By using this application hostelers can give their feedback. Based on their feedback we know the quality of the food.
- This application helps to perform paperless work and manage all the data.

IX. FUTURE SCOPE

- At present we have done the web application. In the future, we need to develop the android application that will save admin as well as student time.
- In the future, we need to develop a face recognition based attendance system using OpenCV.
- Another thing is to add the account section in the application so the hostelers can check their fee details and also make money transactions in that application

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