**Introduction**

Face recognition is one of the biometric used that identifies individuals by the features of their face. Face recognition has been conducted for more than 30 years, as a result, the current status of face recognition technology is well advanced.

Compared to the traditional password scheme, a biometrics based authentication technique presents a more robust alternative because it depends on physiological or behavioral traits which are unique.

**Aims and Objectives**

The aim of this project is to create a vision based biometric authentication system applied for the booking system. The authentication system can be divided into three parts: the face registration, face verification and the website for the booking system. In face registration, the user is allowed to register by capturing the frontal face. The website will be built for the booking system to allow the user booking the particular time slot. Finally, the development board is used to identify whether the user has booked in the particular time slot.

**System Block Diagrams**

- **Registration**
- **Face Detection**
- **Feature Extractor**
- **Login Website**
- **Time Slots Database**
- **Authentication on Mini2440**
- **Template Matcher**
- **Match or no Match?**

**Methodology**

A specific time slot to use a room can be booked by client through the booking website. Then, the booking system will send the booking information to the development board, such as name, time duration and date.

Qt and OpenCV will be used for designing user interface and processing images respectively. In addition, a webcam is used to capture images.

A real time image can be captured by webcam and send it to the development board through USB cable. Some face information are pre-stored in the development board. The incoming image will be processed and matched with the booking information. Finally, the board will unlock the door if face matched.

**Flow Chart**

1. The Booking System algorithm and functions
2. Face detection and recognition algorithms

**User Interface**

- **Face recognition in simulator**
- **Face detection in Mini2440**

**Result**

All the 400 images from the ORL database are used to evaluate the face recognition performance of the Eigenfaces method. Two images are randomly chosen from the ten images available for each subject for training, while the remaining eight images (unseen during training) are used for testing.

<table>
<thead>
<tr>
<th>Set</th>
<th>People in database</th>
<th>Number of training images</th>
<th>Number of testing samples</th>
<th>Recognition rate</th>
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<tr>
<td>1</td>
<td>10</td>
<td>20</td>
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</tr>
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<td>4</td>
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<td>80</td>
<td>320</td>
<td>82%</td>
</tr>
</tbody>
</table>

**Conclusion**

In this project, three major goals have been accomplished successfully, they are shown below:

- The face detection in real-time and consistent accuracy can be also performed in both PCs and the development board.
- The face recognition - Booking System is performed with user-friendly interface, and the communication between the website server and development board is established through server and client program.