

Face Recognition Approach in the Observance of Faculty Attendance System With Voice Command

Jamileyn Fernandez¹, Jefferson Fernandez², Carla Carmela Ramos³,
Francis Tucay⁴, Ferdinand Dalisay⁵

¹⁻⁵College of Computing Sciences, Pangasinan State University – Lingayen Campus,

Abstract- To respond to the pandemic, faculty attendance is made paperless through face recognition and voice command. This study aimed to develop an approach in the observance of faculty attendance of schools using face recognition scanners or web cameras. The study Face Recognition Approach in the Observance of Faculty Attendance System with Voice Command attained the following: (1) to identify the challenges encountered in the manual attendance system, (2) to determine the appropriate features of the developed system and (3) to establish the security measures of the developed system. In developing the system, the Rapid Application Development was applied. The developed system makes use of Python, Bootstrap, HTML, and CSS. The developed system offers easy to understand directions and user-friendly interface. It generates reports such as daily time records. It can perform in a minimal amount of time given that the system has a voice command feature. It also handles the records and information giving the users convenience and redirecting their time to a more productive work. In addition, the developed system provides easy and fast searching of information. The developed system proved to be efficient in monitoring faculty attendance.

Keywords – Face Recognition, Voice Command, Attendance Monitoring, Faculty Attendance.

INTRODUCTION

Organizations and other establishments rely on computer as the basis of their Database Management System. Computer technology brought significant and various effects in all forms of human life such as helping people do their job much easier and faster, accurate and efficient. But the fact is, in today's modern age where the computer has become a way of life, it is obvious that a bulk of country institutions still do not accommodate the high technology. Some of them prefer a manual because not all companies are computer literate in terms of programming software for the Time In and Time Out Records of their employees. What they did not know is that being manually operated leads inaccurate information.

Helping man to make his task much easier and with great precision. A study by the American Payroll Association reports that over

75% of companies lose money to time theft, whether done deliberately or not. Log in and log out monitoring solves the problem with time theft and overtime. In addition to that, computers are more useful when storing large quantity or vast amount of information or date in a long period of time. At this moment, other institutes still use the old-fashioned way. In a certain way, they are recording the attendance of their employees using logbook on a daily basis, in short it is paper-based. Others may take advantage by marking the attendance for others, therefore, it cannot really monitor employees who are frequently absent or late. And they have to respond to the call of technological advancement so that the institute will be able to serve the whole employees with utmost services. Thus, the researchers developed this study for a Log In and Log Out using face recognition with voice command because of its perceived importance. This is to monitor the attendance of the

employees easily, accurately and efficiently. Face recognition is the process of identifying and verifying the identity of the person/employee through his or her face. It detects, captures, and matches facial patterns based on details. Voice command on the other hand, allows the employees/persons to control the automation of the technology by simply using their voice. The researchers aimed to develop a fully customized Face Recognition Approach in the Observance of Faculty Attendance System with Voice Command for institutes to strictly monitor the attendance of employees as one way of improving the services of the campus. Moreover, this would help the government reduce the expenses by eliminating time theft and achieve good governance. Likewise, the system might influence the employees to become punctual and more responsive in performing tasks based on the prescribed number of working hours. Using the proposed system will help diminish the number of errors occurring when processing attendance data, raise the quality of employees' personal approach to work duties (increase in work morale), and prevent overtime being claimed unjustifiably.

OBJECTIVES OF THE STUDY

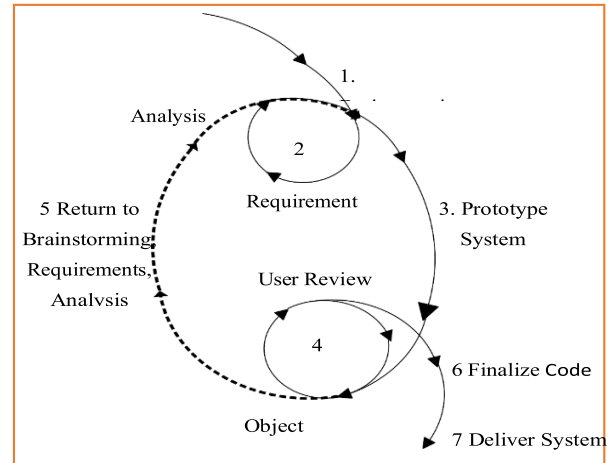
The main purpose of this study is to develop Face Recognition Approach in the Observance of Faculty Attendance System with Voice Command. The specific objectives of the study are as follows:

1. To identify the challenges encountered in the manual attendance system.
2. To determine the appropriate features of the developed system.
3. To establish the security measures of the developed system.

MATERIALS AND METHODS

The researchers used the Rapid Application Development (RAD). RAD is an agile project management strategy popular in software development and RAD approaches to

software development put less emphasis on planning and more emphasis on an adaptive process. It is driven by the user interface requirements. In Rapid Application



Development, structure techniques and prototyping were specially to design the final system. The development starts with the development of preliminary data models and business process models using structured techniques. In the next stage, requirements are verified using prototyping, eventually to refine the data and process models.

Figure 1. Rapid Application Development

RESULTS AND DISCUSSION

This chapter depicts findings of the study. It includes the challenges encountered in the manual attendance system, features of the developed system and its security measures. It also discusses the specifications for the proper implementation of the developed system.

Challenges encountered in the manual attendance system:

Login/Logout Issues. When using fingerprint, users should be in touch with the device, however, due to the global pandemic it is safer for the users to use the face recognition for their log in /log out as it is touch less. In addition, there are some people who are adermatoglyphic, or born without fingerprints.

Features of Face Recognition Approach in the Observance of Faculty Attendance System with Voice Command

This section discusses the features of the developed system. These features are the following:

Identity Registration. This focuses on authenticating the identities using devices such as facial characteristics scanners/web cameras and information sheets before consolidating these into a database as shown in Figure 2.

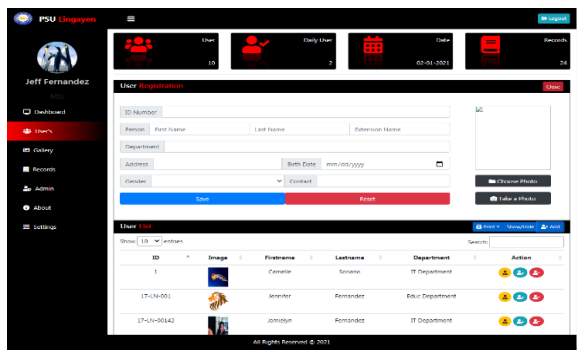


Figure 2. Identity Registration

Voice Command. This feature is the main vehicle of log in and out. The users will voice out a command “log in/log out” before the system automatically does the functions. Then, the system gives voice response on identity error and unrecognizable face and if the user successfully logs in/log out.

Face Detection. Face detection involve locating facial features. It typically starts by searching for human eyes, one of the easiest features to detect. Then it attempts to detect eyebrows, the mouth, nose, nostrils and the iris.

Face Recognition. Face recognition does more than just to detect a human face. It goes a step further to establish whose face it is. The face recognition system works by taking an image of user and making a prediction about whether the captured face matches the saved image in the database. The technology is designed to compare and predict potential matches of faces regardless of their expression, facial hair and age as shown in Figure 3.



Figure 3. Face Recognition

Log in and Log out. It allows users to log in and log out easily through face recognition approach with voice command and keep a record of their working hours.

Easy and Quick Report Generation. The DTR of the employee is recorded by the system reliably and accurately. The DTR of the employees can be printed in one click as shown in Figure 4.

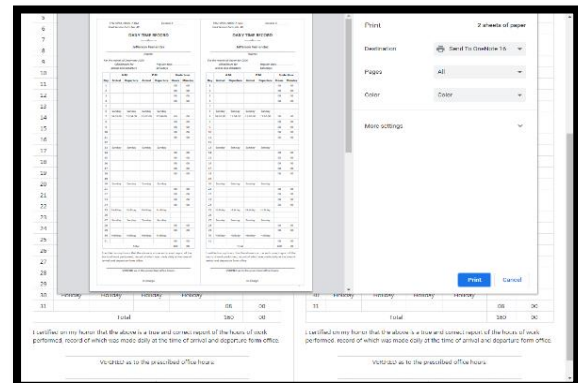


Figure 4. Easy and Quick Report Generation

Capturing the Unknown Faces. If the person is not recognized by the system, it means he/she is not registered in the system and he/she will be labeled as unknown. The system will capture the image of the unknown person/s and it will be saved in the library with date and time detected by the system as shown in Figure 5.

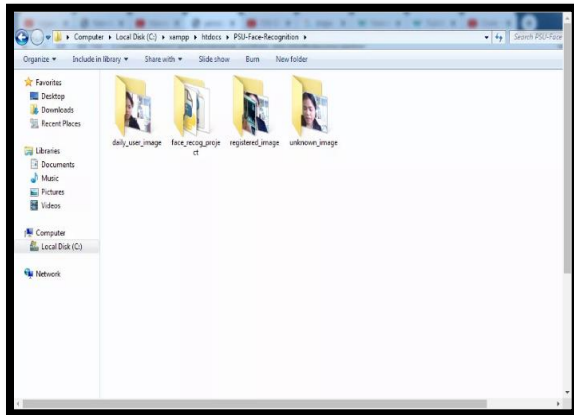


Figure 5. Capturing the Unknown Faces

User Portal Log in. The users can view their records through their devices only when connected to the Local Area Network. They will use their employee ID as their username and password to login, also, they can change their password in their portal as show in Figure 6.

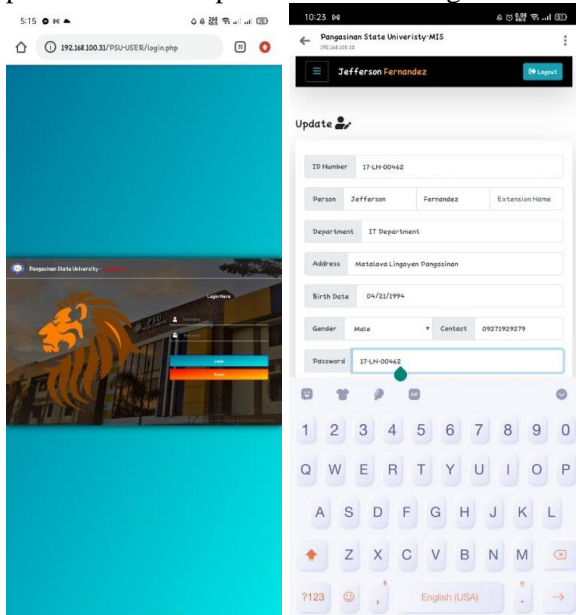


Figure 6. User Portal Login

User's Profile. The users will be able to edit or update his/her profile in their portal. Changing of password is also made available as shown in Figure 7.

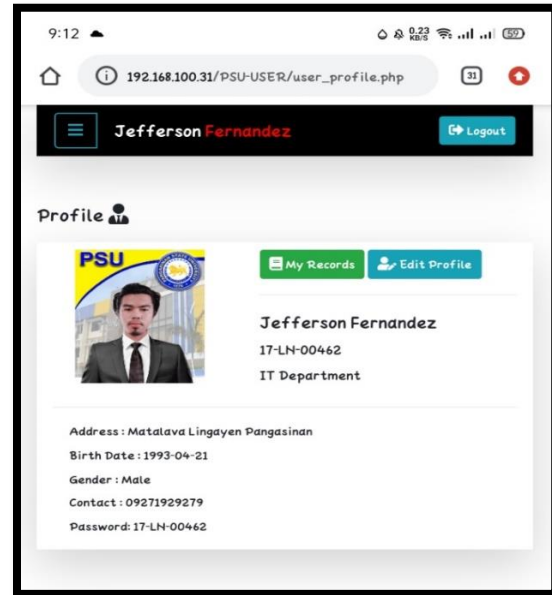


Figure 7. User's Profile

Record Viewing. The employees can view or check their records in their own devices, real time, while connected to the Local Area Network (LAN) as shown in Figure 8.

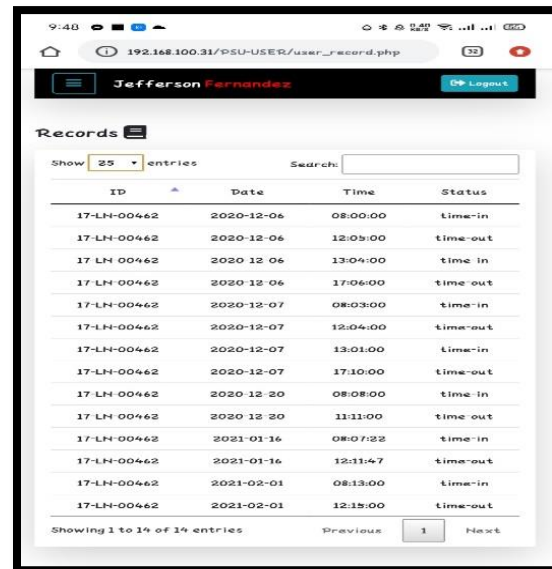


Figure 8. Record Viewing

Security measures of the developed Face Recognition Approach in the Observance of Faculty Attendance System with Voice Command.

The Face Recognition Approach in the Observance of Faculty Attendance System with Voice Command has the following Security Measures:

- MIS admin has the sole authority in making changes in the records of users as shown in Figure 9.

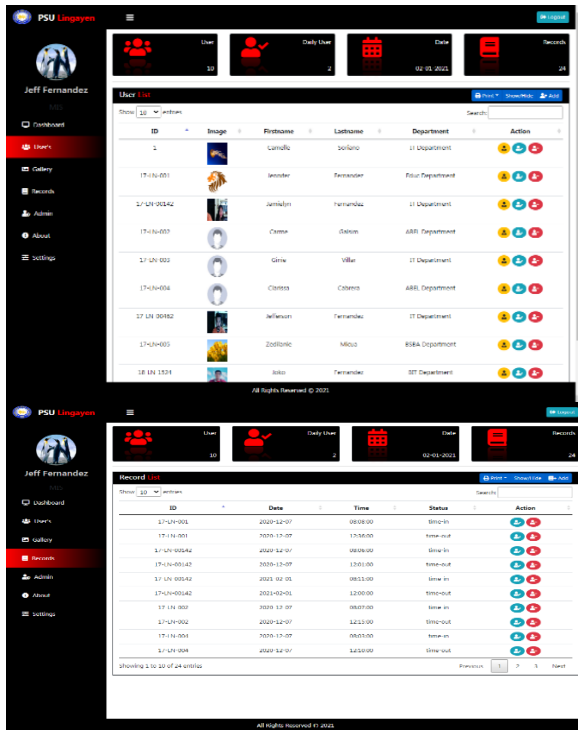


Figure 9. MIS - The Sole Authority

- Fraud attendance can be traceable. Since all images are saved upon login, user who attempts to buddy punch another user can be traced.

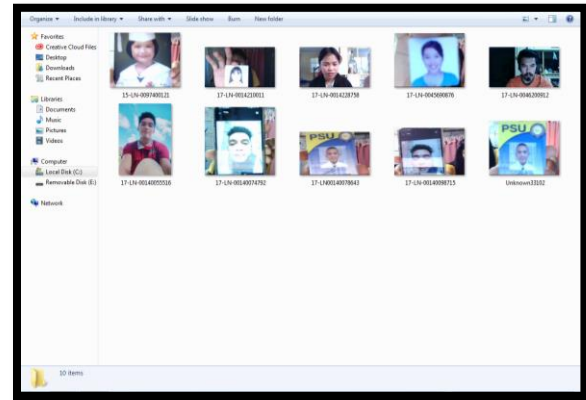
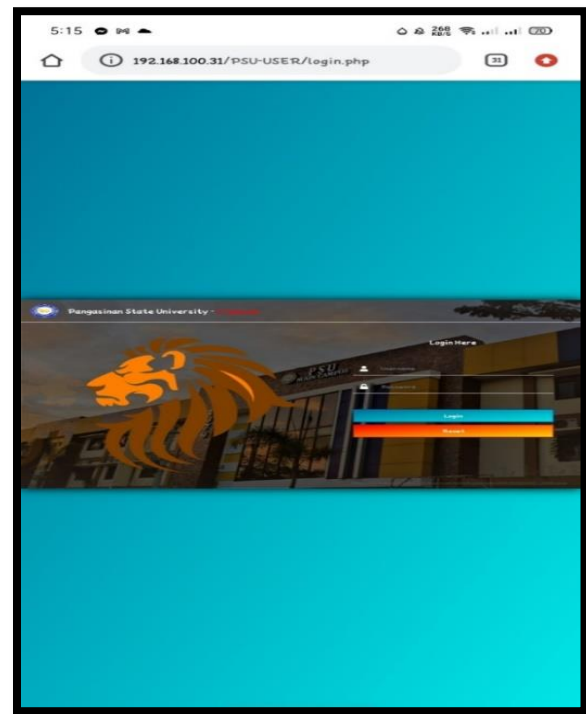


Figure 10. Traceable Fraud Attendance

- The users can only access the user login portal when connected to the Local Area Network using their ID number as their username and password.



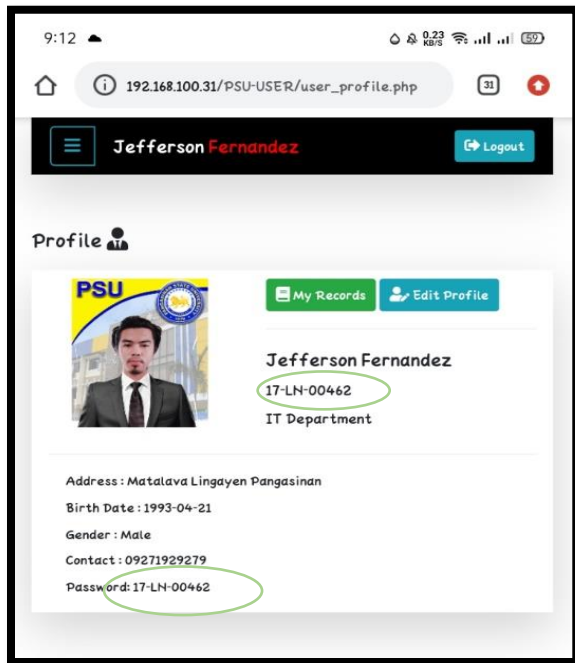


Figure 11. LAN Based User Login Portal

- Unrecognized faces automatically saves.

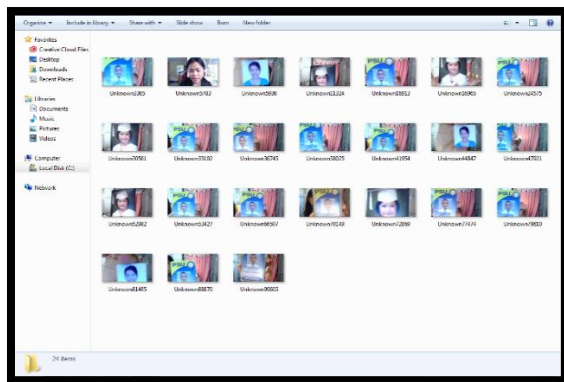


Figure 12. Automatic Saving of Unrecognized Faces

CONCLUSION AND RECOMMENDATIONS

Based on the findings of the study, the following conclusions were made:

1. The manual system is not automated, thus redirecting employees' time to a less productive work. Manual time sheets and punched cards do not prevent time theft or buddy punching. With manual time recording, an employee/user can use another punch card to login/logout for another

employee/user.

2. The developed system is efficient to use since it automates the attendance monitoring. It is a zero-time waste, zero paper waste, and zero effort waste because the employees can easily login/logout. In addition, the institution doesn't need to allot more time in record keeping since the employees' data is directly stored in the database, which makes the retrieval of information easy.
3. The developed system highly protects the identity of users/employee and it prevents time theft since images are saved upon login/logout.

On the basis of the findings and conclusions of this study, the recommendation is hereby presented:

1. The researchers recommend adding a new feature to the project which is thermal scanning. This feature will inform the employees of their current body temperature. With that, they can prevent themselves from having physical contact with others and take safety precautions, in case their temperature is beyond normal, in this time of pandemic.
2. System is recommended to be designed for both public and private institutions. With the implementation of developed system in both public and private institutions, the issues of the existing system will not be experienced. Everyone in the institution will be keen with the time they render their services. In addition, this will ensure lesser/no contacts in commonly used objects, especially in this time of pandemic.

REFERENCES

- Thales (2021). *Facial recognition: top 7 trends (tech, vendors, markets, use cases & latest news)*. Retrieved on June 07, 2021 from <https://www.thalesgroup.com/en/markets/digital-identity-and-security/government/biometrics/facial-recognition>



- Agarwal, S. (2014). *The importance of face recognition system as Security solution*. Retrieved on June 07, 2021 from <https://en.calameo.com/books/003014942376bd07d979c>
- Dev, S., Patnik, T. (2020). *Student Attendance System using Face Recognition*. Retrieved on June 4, 2021 from <https://ieeexplore.ieee.org/document/9215441>
- Bhatti K. L., Mughal, L., Khuhawar, Y. R., Memon S. A. (2018). *Smart Attendance Management System Using Face Recognition*. Retrieved on June 07, 2021 from <https://eudl.eu/pdf/10.4108/eai.13-7-2018.159713>
- Espinoza, S. K., Paray, M., Tanquiamco, D., Jandayan, C., Denilla, P. G. (2020). *Analysis and Design of Employee Attendance Monitoring Using Face Recognition System for Archempres Fruit Corporation*. Retrieved on June 07, 2021 from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3636604.
- Dela Cruz, J. C., Paglinawan, A. C., Bonifacio, M. I. R., Flores, A. J. D., Hurna, E. V. B., (2015). *Biometrics based attendance checking using Principal Component Analysis*. Retrieved on June 07, 2021 from <https://ieeexplore.ieee.org/document/7391860>
- ELID Technology International Inc. (1998).** *Attendance Monitoring in the Philippines: Significant Improvement of Punctuality and Performance of Employees*. Retrieved on June 07, 2021 from <https://elid.com.ph/attendance-monitoring-system-philippines>
- Tantak, A., Sudrik, A. & Pophale, S. (2017). *Face Recognition for E- Attendance for Students and Staff*. Retrieved on June 2, 2021 from <https://www.semanticscholar.org/paper/Face-Recognition-for-E-Attendance-for-Student-and-Tantak-Sudrik/64f58b2840d19901160080eac97517d1c29e085e>
- Motajo, M. (2015). *Face Recognition –based Employee Attendance System (E-Attendance)*. Retrieved on June 2, 2021 from <https://www.academia.edu/14755533/Face-Recognition-based-Employee-Attendance-System-E-Attendance>
- Claro, M., Laure, J.K., Ogdod, B., & Gupit, D. (2019). *Class Attendace Using Face Recognition*. Retrieved on June 7, 2021 from <https://sherj.smccnasipit.edu.ph/articles/computing2/Claro>
- IceHrm (2020). *Difficulties in Manual Attendance*. Retrieved on June 7, 2021 from <https://icehrm.com/blog/difficulties-in-manual-attendance-tracking/>
- Gomez, A.J., Grepon, B. G., Liwanen, N., & Ranido, C. J. (2015). *Faculty Attendance Monitoring System: An improved feature with Barcode Scanner*. Retrieved on June 7, 2021 from <https://ejournals.ph/article.php?id=12937>
- GreyTHR (2021). *A safe entry to workplace with Facial Recognition Attendance System*. - <https://blog.greythr.com/importance-of-facial-recognition-attendance-system-in-post-covid-world>

PLEASE INCLUDE CONTACT INFORMATION:

- Name: **Jamielyn R. Fernandez (presenter)**
Contact No: +639153594144
Email Address: jamiefernandez9716@gmail.com
- Name: **Jefferson R. Fernandez (presenter)**
Contact No: +639052497883
Email Address: jefferson0211993@gmail.com
- Name: Carla Carmela P. Perez (Adviser)
Contact No: +639127336461
Email Address: carlacarmelaperez@yahoo.com
- Name: Francis P. Tucay (Thesis Adviser)
Contact No: 09056649939
Email Address: ftucay@psu.edu.ph
- Name: Ferdinand Dalisay (Chairperson)
Contact No: +639171399757
Email Address: fvdalisay@psu.edu.ph