STUDENT ATTENDANCE SYSTEM USING FACE RECOGNITION FOR HIGHER EDUCATIONAL INSTITUTION

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FAKULTI SENI, KOMPUTERAN & INDUSTRI KREATIF UNIVERSITI PENDIDIKAN SULTAN IDRIS

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I

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LAPORAN PROJEK TAHUN AKHIR DIKEMUKAKAN BAGI MEMENUHI
SYARAT UNTUK MEMPEROLEH IJAZAH SARJANA MUDA
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Dr. Suliana Bt Sulaiman

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ABSTRAK

Kertas kerja ini menjalankan penyelidikan dalam membangunkan sistem kehadiran pelajar menggunakan pengecaman muka untuk institusi pengajian tinggi. Sistem ini dibangunkan menggunakan kecerdasan buatan (a.i) iaitu pengecaman muka bagimewujudkan sistem kehadiran yang lebih cekap, mudah digunakan, cepat, dan tepat, sesi pengecaman wajah akan dilakukan dengan membandingkan wajah pengguna semasa sesi pengambilan kehadiran dengan wajah mereka yang berada di dalam pangkalan data. Semua sesi kehadiran akan direkodkan untuk pelajar dan pensyarah supaya mereka dapat mengaksesnya pada bila-bila masa. Model inkremental digunakan sebagai metodologi untuk menjalankan penyelidikan ini. Selain itu, sistem ini juga melalui dua fasa ujian iaitu ujian verifikasi dan validasi. Dalam ujian verifikasi, pengujian akan dilakukan oleh penyelidik sendiri, manakala dalam ujian validasi, ujian kebolehgunaan akan dijalankan dengan melibatkan 6 orang iaitu pelajar dan pensyarah dari jabatan komputeran. Keputusan yang diperoleh daripada ujian ini kemudian akan dianalisis dan digunakan untuk menambah baik sistem. Akhir sekali, kajian ini membuktikan bahawa sistem kehadiran pelajar menggunakan pengecaman muka boleh meningkatkan proses pengambilan kehadiran di institusi pengajian tinggi kerana ia dapat memudahkan tugas pelajar dan pensyarah, menjimatkan masa serta memastikan keselamatan data.

STUDENT ATTENDANCE SYSTEM USING FACE RECOGNITION FOR HIGHER EDUCATIONAL INSTITUTION

ABSTRACT

The aim of this study is to develop a student attendance system using face recognition for higher educational institution. All attendance sessions will be recorded for students and lecturers so that they can access it anytime. Incremental model was used as a methodology to conduct this study. Moreover, this system went through two testing phases which is a verification and validation test. In the verification test, the test was done by the researcher itself, while in the validation test, a usability testing was conducted involving 6 people which were students and lecturers from the computing department. The result from this test was analyzed and used to improve the system. Lastly, this study proves that the student attendance system using face recognition could improve the attendance taking process in the higher educational institution because it can ease student and lecturer tasks, save time as well as secure the data.

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LIST OF ABBREVIATION

SRS   Software Requirements Specification

SDD   Software Design Document

STD   Software Test Design

DNN   Deep Neural Network

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CHAPTER 1

INTRODUCTION

1.1　　Introduction

It can't be argued that information systems are now becoming a major thing in high educational institution. This can be seen through students and lecturers who are involved in a lot of information systems in their life. As an example, most of their tasks are directly involved with information systems such as doing assignments, doing some research and many more. However, with many information systems that have already applied, there seems to be a lack of information systems that collect data of students. Even these days, most of high educational institutions still use the old ways of collecting student attendance which have a lot of consequences.

Hence, a student attendance system with a face recognition approach

should be developed in order to improve the attendance taking system in high educational institutions. Face recognition system is to identify a person using his face image (Nithya D., 2015). In order to detect or train the image of a user, some method or algorithm will be used. According to Indra Evta et al., 2020, the face recognition algorithm of the human face contains of several steps which are feature extraction, training and database matching. This works by extracting details of a human face such as eyes, nose, mouth, chin and moreover to be compared with the one trained in the database.

Last but not least, it is to ensure that this system is efficient and to secure the data recorded and avoid a lot of common problems faced by manual attendance. The proposed system will also help to manage the attendance very well as well as reduce staff and lecturer tasks to compile all the data.

1.2   Research Background

According to Elias Shamsul et. al., (2019), attendance is important for university students. Sutabri Tata et. al., (2019) also stated that student attendance is essential in the learning process. It is because attendance would be counted as a part of a student's mark in most universities (Elias Shamsul et. al., 2019). Hence, the purpose of this research is to help record attendance using face recognition systems in an efficient way.

This is because face recognition seems to be the best way to help solve this problems. Based on the study conducted by Rusdi Jack et. al., (2020), the face recognition method can be applied to the attendance system and can be a

solution for universities to use the attendance system for their students. The face recognition process will take part by detecting human faces such as eyes, nose, mouth and even a small detail which involves some algorithm. With implementing face recognition in the attendance system, it can ensure that the attendance system can be done smoothly. This is because the system are able to record the attendance of the student in the classroom (Nithya D., 2015).

Hence, it proves that face recognition is one of the best tools that can be used and applied nowadays which requires an easy system with fast results because it is able to identify, verify and be applied to the attendance system in order to develop a system that can help the future of students and lecturers.

1.3   Problem Statement

There are two types of existing attendance system which are manual attendance system (MAS) and automated attendance system (AAS) (Lukas Samuel et al., 2016). These two types of attendance have a lot of consequences that are generally known which is time-consuming. Based on the study by Lukas Samuel et al., (2016), by practicing the manual attendance system, the faculty staff may face difficulty in both verifying and saving each student's record in a classroom, especially in classes attended by a large number of students. Attendance that has already been collected will be given to faculty staff and they need to update and keep the data. Imagine if an institution has a thousand data records in a day, they need to verify each one of the data which is difficult and time consuming. Lecturer's task also will be increased since they need to collect student's

attendance which might need to disturb the learning period since some of them may call up student's names one by one while some just hand out a piece of attendance paper.

Other than that, based on the study by Rusdi Jack et al., (2020), RFID, social media, barcodes, Bluetooth, fingerprints and Near Field are the examples of automated attendance systems (AAS) that are applied in some institutions. However, these types of attendance systems also have weaknesses , for example, if students forget to bring object identification, they can't take their attendance (Indra Evta et al., 2020). Moreover, since the students need to queue before carrying out the process, it proves that this method is also time-consuming. Other than that, in this pandemic era, some educational institutions only allowed some students to be in the hybrid class while the others may need to attend the online classes. As for online learning, this attendance system cannot be conducted and the institution needs to use the traditional way of collecting attendance such as through google form. Google form also has a lot of consequences just like a manual attendance system (MAS) since it requires the staff to verify the data manually.

Lastly, Sutabri Tata et al., (2019) also stated that students can easily falsify their friend's signatures. Falsifying a friend's signature occurs when a student who is absent asks for their friend's help to sign the attendance paper for them as if they are coming to the class. With a lot of students in a class, the lecturer may miss small details like this which perhaps increases the number of absences in a class. Automated attendance systems (AAS) such as RFID, barcodes and others also do not preventfrom falsifying attendance since they can

bring the identity of their friends who are absent and scan it for them. In order to prevent all of these things from occurring and to help students, lecturers, faculty staff and institutions, a face recognition attendance system can be developed which is very efficient, saves time, secured and private.

1.4   Research Objectives

The purpose of this research are:

a)   To analyze features related to collecting student attendance effectively.

b)   To develop Student Attendance System Using Face Recognition for Higher Educational Institution using Artificial Intelligence.

c)   To evaluate functionalities developed in Student Attendance System UsingFace Recognition for Higher Educational Institution.

1.5   Research Question

The research questions are:

a)   Does the Student Attendance System using Face Recognition for Higher Educational Institution are able to record student attendance using ArtificialIntelligence?

b)   Does the Student Attendance System using Face Recognition for Higher Educational Institution are able to store student information securely?

c)   Does the Student Attendance System using Face Recognition for Higher Educational Institution are able to record all the student attendance in a

database?

1.6   Research Significant

One way of presenting significant is discussion of benefits for the following

targeted users;

a)   Students

Easily update their attendance without queue or wait for their turn to sign

their attendance.

b)   Staff

Ease their job in collecting student's attendance which will be stored

automatically inthe database as well as prevent fake signatures and time wasting.

1.7   Research Scope

The Student Attendance System Using Face Recognition for Higher Educational

Institution's function will depends on the expertise of the researcher, hence it

will be on specific features in collecting student attendance data by develop

a prototype system of student attendance system using Artificial Intelligence (AI)

features that can stored student data which is their face and information in order

for lecturer to easily collect data of the attendance as well as easier the student to

submit their attendance without taking a lot of time. This prototype will include

simple text, images and moreover as easier interaction for users. The main

content of the system is student andlecturer information, student's face data and a

database. As for the target user of this system are all students and lecturer in

higher educational institution located in Malaysia.

1.8   Operational Definition

a) The Student Attendance System Using Face Recognition for Higher
Educational Institution

This system contains its own definition. Face detection is a biometric system that detects human faces specifically and saves it as a train image so that it can be used later for face recognition process

1.9   Conclusion

This chapter explains about a general overview of this study and why the proposed system wants and should be developed. It is a guarantee especially in this modern era, this proposed system will be one of the high demand system in the market since high educational institutions will continuously grow bigger from time to time and at the same moment, they will look for a way to improve their learning process, hence, with this system, they are able to help their students and lecturers in taking attendance process.