

CHAPTER III. RESEARCH METHODOLOGY

3.1. Research Time and Place

The research was conducted at the Politeknik Negeri Malang campus. The research was carried out for 7 months starting in December 2021 until June 2022.

3.2. Target Market Analysis

In this undergraduate thesis, an attendance system will be created by applying a face recognition system that can provide greater security and efficiency in conducting attendance at an event held. The use of paper or manual attendance can be reduced by using this attendance system so there is no need to hold paper attendance which can reduce security or existing fraud.

An attendance system will be created to add security and efficiency when attending an event, this attendance system can also detect the user's location in taking attendance to reduce fraud in taking attendance that must be done at the event place. The process of making events can be done in this application with some terms and conditions that have been made, the registration process into events can be done in this application and the face registration process for recognition will also be carried out in this application.

After the user registration process is complete, the user can choose the event they want to participate in and can also make attendance if the selected event has entered the time for attendance.

3.3. Data Collection

Gathering data will be done by obtaining data when the user event organizer add the csv data in application, at the time event organizer upload the participant data with csv data, participant face registration can be done by adding the face image column in csv data with URL link of image (link can be added with google drive link).

Event organizer can fill the participant data in the form of csv, the data will be taken directly from the relevant CSV (Comma Separated Value) data, the data can be in the form of name, phone number, email, photo to be used as an identifier, and the category related to the event. CSV data will be given a template format to reduce errors in entering data using CSV data.

3.3.1. Dataset

The dataset used as an example of the csv file is 9 data obtained from respondents filling out google forms <https://forms.gle/KLvxBKGEtUUxa3h8>. The dataset contains biodata from respondents which will be used as personal data in the CSV data and data on diploma photos

and selfie photos (optional). Respondent data will be used as guest list data or event participants for which facial representation trials will be carried out, and the accuracy of the use of facial recognition to the total dataset added.

the following is a template from csv data, which will later be used to fill in participants in an event.

A	B	C	D	E	F	G	H	I	J
participant_id	name	email	phone_number	category_1	category_1_value	category_2	category_2_value	face_image	
1841720001	person 1	person1@gmail.com	+628214563312	Seat Number	1A	Jurusan	Teknologi Informasi	https://drive.google.com/file/d/1Gj	
1841720002	person 2	person2@gmail.com	+628214563312	Seat Number	2A	Jurusan	Teknik Mesin	https://drive.google.com/file/d/1Gj	
1841720003	person 3	person3@gmail.com	+628214563313	Seat Number	3A	Jurusan	Teknik Elektro	https://drive.google.com/file/d/1Gj	
1841720004	person 4	person4@gmail.com	+628214563314	Seat Number	4A	Jurusan	Teknik Kimia	https://drive.google.com/file/d/1Gj	
1841720005	person 5	person5@gmail.com	+628214563315	Seat Number	5A	Jurusan	Akutansi	https://drive.google.com/file/d/1Gj	

Figures 3.1 Guest List File Template

For face image data it is recommended to display the face clearly and face forward with clear lighting with the following example:



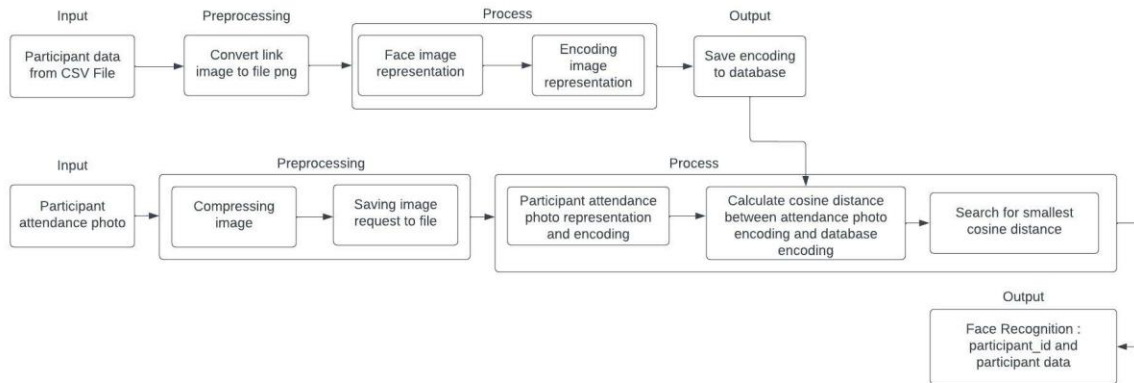
Figures 3.2 Recommended Dataset for Guest List

For collection the participant attending location data, our application used Google Maps API to provide the latitude, longitude, and landmark name and address to fill the database data when attending. Latitude and longitude will be used for calculating the range of participant when attending and venue location.

For collecting the event organizer data, user will be ask to do some registration in application, the registration form will contain email, password, and username of the event organizer.

3.4. Data processing techniques

3.4.1. Block Diagram



Figures 3.3 Block Diagram System

Processing data based on the picture above, first starts with inputting participant data into a particular event by the event organizer using a CSV file, after uploading the CSV file, the system will do preprocessing in the form of saving csv data into the database and converting the face image link into a png file, after that the system will process the face representation with the image that has been converted into a file, after the face representation is complete the system will encode the data from the face representation, after that the system will store encoding data with additional information such as participant id and the event id concerned.

After encoding or facial representation is complete, the event organizer can perform attendance using face recognition, attendance begins by taking photos of the faces of participants who come and upload photos, the system will compress the photo size to speed up the upload process, after that the system will save request upload file for face representation, facial representation is done after the file is finished saving and after that encoding the data from the face representation, after that encoding the attendance data the cosine distance will be calculated by encoding the data already stored in the database, after doing the calculations, the system will look for the smallest cosine distance data and determine the participant id that has been recognized, and the system will send information about who has been recognized at this time.

3.5. System Testing

This research of face recognition will be tested using data from Kaggle and from volunteers to test the accuracy of the facial recognition that will be carried out, facial recognition testing will be carried out into an application that has been made and perform 15 poses of data to volunteers and then record the accuracy results for each volunteer. Here are examples of 15 poses that will be tested:



Figures 3.4 Example Image of Various Poses

This development of attendance system application will be tested using black-box testing, to ensure that the entire system design has been carried out on the attendance system with a face recognition prototype. The prototype is made to resemble the real attendance system in a real situation. Users will be used the attendance system to register and attend some events with face recognition in this application. After doing some attending, data will be updated based on system purposes. Testing this system is based on the suitability of the function flow to the design that has been proposed.