

## Face Recognition Attendance System with Face Rolling Motion on Android

Nguai Seen Long<sup>1</sup>, Khairul Amin Mohamad Sukri<sup>1\*</sup>

<sup>1</sup>Fakulti Sains Komputer dan Teknologi Maklumat,  
Universiti Tun Hussein Onn Malaysia, Parit Raja, Batu Pahat, 86400, MALAYSIA

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**Abstract:** Face Recognition Attendance System with Face Rolling Motion on Android is a workspace attendance system for company's employee to use on their own devices to take their attendance in anywhere. The Face Recognition Attendance System with Face Rolling Motion on Android is aimed to resolve the manual attendance taking method's delayed and inefficient process. It is also capable to minimize the workload of the Human Resource Department. Since the Covid-19 pandemic outbreak, the industries are looking for a solution to eliminate the virus spreading until now and the project is suitable for this problem. The project is integrated with the machine learning technology which is Huawei ML Kit's Face Liveness Detection and Face Verification to achieve face recognition feature. The project is developed with Flutter framework and Dart language for targeted system which is Android. It also can achieve multiplatform development capabilities in the future. The result is expected to be used in anywhere and anytime. It also needs to let the employee to take attendance.

**Keywords:** Attendance system, Face Recognition, Android

### 1. Introduction

According to the Cambridge Dictionary [1], attendance refers to the presence of a person at a specific location or event. It is important to track attendance because it is a way to determine whether someone is present or not, and there is a correlation between attendance and performance [1][2]. In the working world, attendance is typically tracked and maintained by the company or factory, with the human resources department responsible for recording attendance. There are various methods for tracking attendance, including manual record-keeping, biometrics, and RFID, but manual record-keeping is time-consuming and inefficient [1][3]. Biometrics, such as fingerprints, can also increase the risk of disease transmission during the COVID-19 pandemic [4]. An alternative solution is face recognition, which uses machine learning to verify identity and eliminate close human-to-human contact. It can be paired with a Face Recognition Attendance System with Face Rolling Motion on Android to improve the efficiency of attendance tracking.

The use of a Face Recognition Attendance System with Face Rolling Motion on Android has the potential to improve the efficiency and accuracy of attendance tracking for companies, as well as providing a solution for reducing close human-to-human contact in the workplace, particularly during the COVID-19 pandemic. According to studies[1], manual attendance systems are inefficient and can be prone to errors and fraud, while biometric systems such as fingerprint recognition can pose a risk for close contact and disease transmission. A Face Recognition Attendance System with Face Rolling Motion on Android, on the other hand, can offer a more efficient and accurate method of attendance tracking while also providing a way to maintain social distancing in the workplace. This technology can be implemented on smartphones, which are increasingly favored by users as their primary computing devices [5]. Overall, the adoption of a Face Recognition Attendance System with Face Rolling Motion on Android has the potential to improve attendance tracking processes for companies and help protect the health of employees during the COVID-19 pandemic.

To solve these problems mentioned above, the project proposes an application called Face Recognition Attendance System with Face Rolling Motion on Android and the main objective of this project is:

- i. To design an application for Face Recognition Attendance System with Face Rolling Motion on Android.
- ii. To develop a face recognition feature for Face Recognition Attendance System with Face Rolling Motion on Android.
- iii. To evaluate the user acceptance and system functionality of Face Recognition Attendance System with Face Rolling Motion on Android.

The system uses facial recognition technology and machine learning to accurately record attendance and is intended to run on Android smartphones, which are widely available and affordable. The system includes a login module, facial recognition module, and attendance taking module, and is intended to make it easier for companies to track employee attendance and improve performance.

The Face Recognition Attendance System with Face Rolling Motion on Android is an application that aims to improve attendance tracking for employees. It uses face recognition technology to verify attendance and can be used remotely under certain conditions. The goal of the system is to make it easier for companies to track employee attendance without the need for manual processes.

This paper is divided into 5 parts. The first section discusses the background of the project. The second section provides an overview of related work. The third section outlines the methodology of the project. The fourth section is the result and discussion. The fifth section summarizes the conclusion.

## **2. Related Work**

This section discusses about the type of the system that have been still popular until today. Each of the system has their own pros and cons depend what kind of the system suits the users perfectly.

### **2.1.1 Attendance Manual**

Attendance systems that use manual methods, such as paper sign-in sheets, can be inefficient and waste resources. They also leave room for errors and manipulation, and can be time-consuming and prone to missing or destroyed files [1][6]. These issues can make it difficult for companies to accurately track and analyze their employees' attendance and performance[7]. In contrast, attendance systems using software are more precise and efficient, and can avoid the issues associated with manual methods.

### **2.1.2 Biometric Attendance System**

Biometric attendance systems, such as fingerprint attendance systems, are becoming increasingly common in organizations as a way to accurately track attendance and identify individuals. However,

the COVID-19 pandemic has raised concerns about the potential for close human-to-machine contact in these systems, as the virus is known to spread through close human contact [4]. In addition, fingerprints can change over time due to skin conditions or injuries, which can affect the accuracy of the system [8].

## 2.2 Attendance System

This section discusses about the published attendance system which used on the market nowadays.

### 2.2.1 Manual System

There are still have people using manual system until today's for low cost and simplicity for the people to start taking attendance. This is normally used when there is a temporary event for people to join so they would not want to invest much into a proper attendance system.

### 2.2.2 Zoho People Attendance System[9]

Zoho People is an attendance tracking system designed to streamline and simplify attendance management processes for organizations [9]. It allows users to record attendance using various methods such as clock-in/clock-out, geofencing, and facial recognition, and to request and track leave, set up shift schedules, and generate attendance reports.

## 2.3 Comparison Existing Application with the proposed Application

The systems above are chosen to be compared with the proposed application. The table will show all the difference between the systems. Table 1 shows the difference between the existing application with the proposed application.

**Table 1: Comparison Between Existing Applications with The Proposed Application**

Feature / Application	Manual Attendance System	Zoho People Attendance System	Proposed application
Technology	None	Web-based	Machine learning
Biometric	None	None	Face recognition
Analytic summary	Done by human	Automated	Automated
Location used	Specific place	Anywhere	Anywhere
GPS tracking	None	None	Yes
Software interface	None	Good	Good
Searching	On paper	Well recorded	Well recorded
Time consumed	Based on writing	Based on internet speed	Based on internet speed
Own profiles	No	Yes	Yes
Close-contact between humans	The contact still exists on the tools used.	The contact does not exist if using personal laptop.	The contact does not exist because people using their own phone

The existing and proposed attendance systems differ in several ways. The manual attendance system uses no technology, but the suggested system uses face recognition. The suggested method uses face recognition biometrics. Only the suggested system and Zoho People deliver automated analytic summaries. The manual requires a certain place, but the proposed technology and Zoho People can be utilized anywhere. The suggested system has GPS tracking, unlike the previous system. The suggested system and Zoho People have phone-friendly user interfaces, but the manual system does not. The suggested system and Zoho People save attendance records in a database, making them easier to access than the manual system, which uses paper records. The manual approach takes longer to take attendance when there are more people, while the proposed system and Zoho People use mobile devices and are faster based on internet speed. Finally, the suggested system and Zoho People offer user profiles to track attendance, while the manual solution does not. The proposed approach encourages attendance tracking with personal devices to minimize COVID-19 spread.

### 3. Methodology

The System Development Life Cycle is a process which include multiple phases to approach and develop a software such as application, system, and others. The System Development Life Cycle has various type like Waterfall, Scrum, Agile, and many more. The one chosen for the Face Recognition Attendance System with Face Rolling Motion on Android is Agile methodology.

#### 3.1 Agile Methodology

The chosen methodology for the Face Recognition Attendance System with Face Rolling Motion on Android is Agile methodology. The Agile methodology is a way of managing projects by breaking them down into smaller, more manageable phases. It involves frequent consultation with stakeholders and continuous improvement, with teams working in short sprints to complete tasks and make updates to the project. The Agile approach is known for its flexibility and adaptability, as well as its focus on customer input. In the Face Recognition Attendance System with Face Rolling Motion on Android project, the supervisor and company employees would be considered stakeholders, while the student would be considered a team member. The Agile method allows for quick changes to be made to the project as it progresses, ensuring that it is continuously improved. Figure 1 shows the Agile methodology model.



**Figure 1: Agile Methodology model [10]**

The planning phase of the Face Recognition Attendance System with Face Rolling Motion on Android project will begin once the vision of the project has been completed through analysis. The plan for the project is based on the identified problems, requirements, objectives, and scope of the project. These aspects must be addressed in order to create a successful plan. The identified problems with the current attendance system include inefficiency in the time taken to take attendance, potential for inaccurate data due to manual methods of attendance taking, and the need to maintain close human-to-human contact during the COVID-19 pandemic. The plan is based on the real-world situation which get from the pandemic to determine how the project is designed.

Once the planning phase is completed, the Face Recognition Attendance System with Face Rolling Motion on Android project has three main aspects: face recognition, liveness detection, and attendance system. These must be integrated into the Android application in order to achieve the final goal of the project, which is to create a functional attendance system for employees to use. These aspects are based on the research from online as reference to determine the function needs to be integrated.

The deployment phase puts the plans into action through the development of the project, including all necessary requirements in order to achieve the objectives of the project. The deployment process involves iterations to ensure that the items being included in the project are correct, through activities such as brainstorming sessions or daily scrums. Each outcome of runs will be recorded.

During the daily scrum, developers work together to incorporate all necessary product requirements and customer or supervisor feedback. The goal of the first sprint or iteration is to develop the basic functionality of the product, while later iterations can focus on adding additional features and refinements. This process, which is part of Agile software development, allows for the creation of working software in a timely manner and allows for ongoing improvements to meet the needs of stakeholders. All the updated targets will be included in the next run.

The review phase involves obtaining feedback from clients or customers on the current iteration of development. This review can be conducted within the team or by external clients. Internal team-based reviews can provide general feedback on the application or system, while external client-based reviews can provide valuable insights on how the system or application will be used by its intended users. The developers can use this feedback to improve the project and create a better version. The review is based on users' satisfaction and the security test of the test plan.

The retrospect phase involves reflecting on the project to identify areas for improvement. This includes identifying what worked well and what did not work, and documenting the results to be passed on to the next iteration. The goal is to take advantage of what worked well and find alternative solutions for any challenges encountered and prevent the repetition of issues and improve the overall project. This will be recorded in the future works of the project for further improvements.

Table 2 shows the system development workflow for the Face Recognition Attendance System with Face Rolling Motion on Android project. This workflow follows the Agile methodology and includes all relevant aspects of this approach. The table lists the tasks and outputs for each phase of the workflow.

**Table 2: The System Development Workflow**

Phases	Tasks	Deliverables
Planning	<ol style="list-style-type: none"> <li>Proposed the project.</li> <li>Determine the problem statements, objectives and scope of the project.</li> <li>Review on existing system.</li> <li>Decide the platform that is suitable for the project.</li> <li>Sketch the user interfaces/storyboards.</li> <li>Software/hardware requirements of the project.</li> <li>Sketch design of Unified Modelling Language (UML), use case, sequence, and class diagram.</li> </ol>	<ol style="list-style-type: none"> <li>Project proposal done.</li> <li>Gantt chart designed.</li> <li>Problem statements, objectives and scope of the project determined.</li> <li>Unified Modelling Language (UML), use case, sequence and class diagram sketched.</li> <li>Design of user interface sketched.</li> <li>Software/hardware requirements identified.</li> </ol>
Implementation	<ol style="list-style-type: none"> <li>Include the features of the project.</li> <li>Link database.</li> </ol>	<ol style="list-style-type: none"> <li>The modules of the project are coded into the application.</li> </ol>
Review	<ol style="list-style-type: none"> <li>The application will be asked for feedback.</li> </ol>	<ol style="list-style-type: none"> <li>The feedback is analyzed and the improvement are planned for the next iterations.</li> </ol>
Retrospect	<ol style="list-style-type: none"> <li>The result of the review will be taken to identify the next iteration requirements.</li> </ol>	<ol style="list-style-type: none"> <li>The iterations requirements will be plan and implement into next iteration.</li> </ol>

### 3.2 System Analysis and Design

This section is about the functional and non-functional requirements, the use of diagrams such as, Unified Modelling Language (UML) - including Sequence Diagram and Class Diagram for the development of a Face Recognition Attendance System with Face Rolling Motion on Android. It will outline the specific actions the system must perform, and the characteristics such as performance, security, and usability that the system needs to have. The UML diagrams are useful for designing the system and understanding how data is stored and flows within it. They will help identify potential issues and areas of improvement before implementation and allow organizations to gain a better understanding of the system's components and how they work together in order to make better decisions during the development process.

### 3.3 Functional Requirements Analysis

Functional requirement analysis is the process of identifying and documenting the specific actions that a system must be able to perform in order to meet the needs of an organization or its users. Table 3 shows the table of the functional requirement for the proposed system.

**Table 3: Table of Functional Requirement for proposed system**

Function	Description
Login	This function gives users' can login.
Sign up	This function gives the new users the ability to sign up a new account.
Forgot password	This function gives the users who forgot their password to retrieve back their account.
Update profile	This function gives the users to update their profile.
Scan face for attendance taking	This function lets the users to use the face recognition function to take the attendance.
View daily attendance	This function gives the users to check their attendance.
View attendance summary	This function gives the users to view the attendance summary.
Manage employee	This function let the admin to manage users.
View employee attendance	This function let the admin to view the employee attendance.

### 3.4 Non-Functional Requirements Analysis

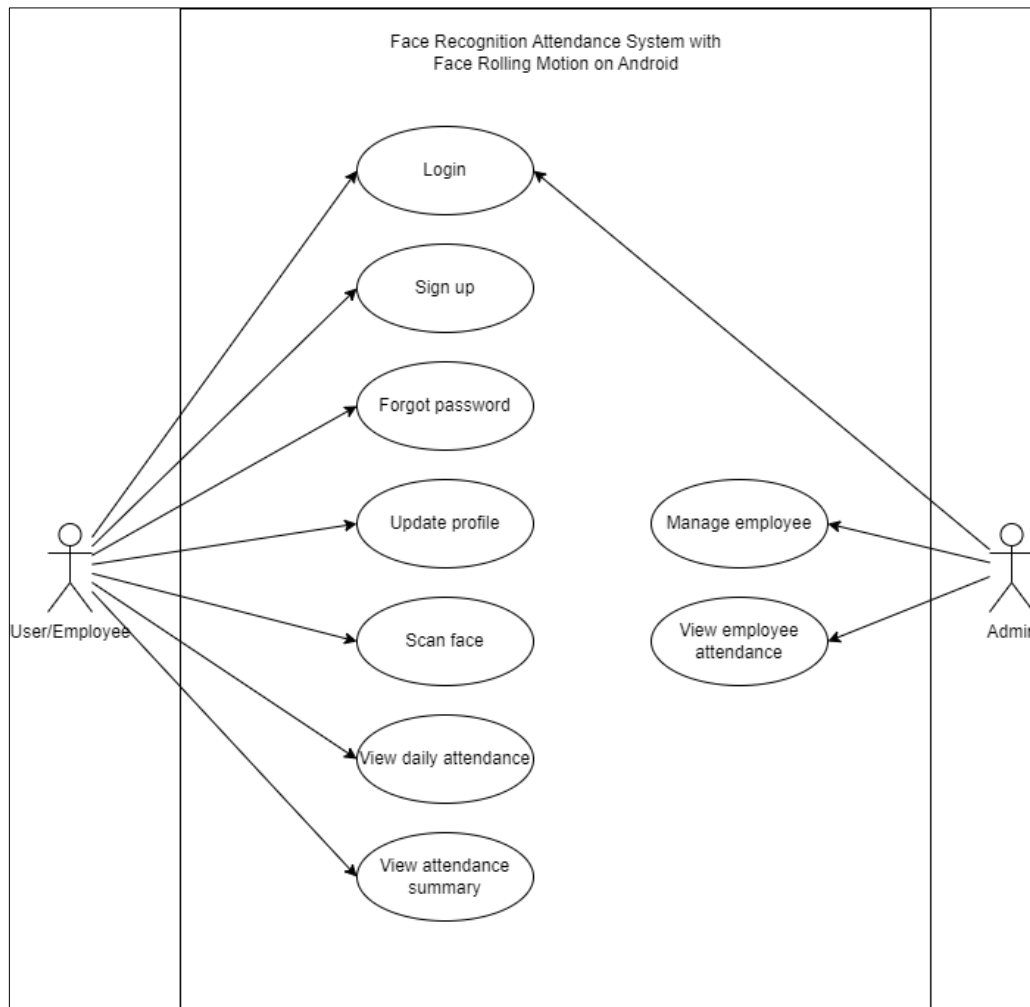
Non-functional requirement analysis is the process of identifying and documenting the overall characteristics of a system, such as performance, security, and usability, in order to ensure that it meets the needs of an organization or its users. Table 4 shows the table of the non-functional requirement for the proposed system.

**Table 4: Table of Non-Functional Requirement for proposed system**

Function	Description
Performance	The application should run smoothly, and the face recognition feature can be used normally.
Security	Only verified user can login into the application.
Operational	The application runs on Android. It operates in anytime.
Usability	The user-interface is easily and friendly for new user to learn to use the application.

### 3.5 Use Case Diagram

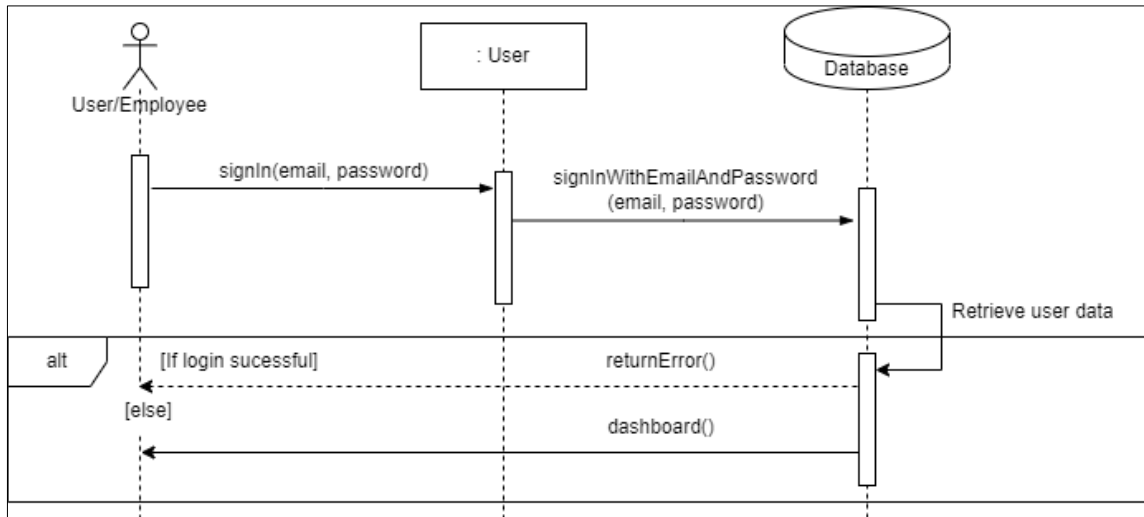
A use case diagram is a way to visually represent the interactions between a system and its users (actors) to achieve a specific goal. In the case of the Face Recognition Attendance System with Face Rolling Motion on Android project, the use case diagram includes nine use cases for both employees and admins which covers different processes such as logging in, taking attendance, and generating reports. Use case diagrams are useful in identifying the requirements and functionality of a system, as well as in spotting potential issues or conflicts. Figure 2 shows the use case diagram of the proposed system.



**Figure 2: Use Case Diagram of the proposed system**

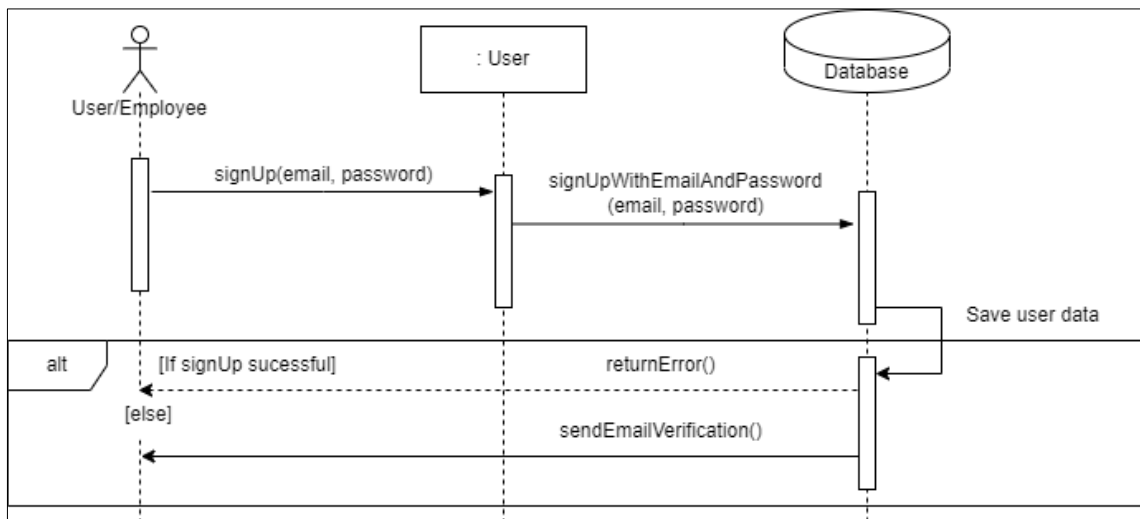
### 3.6 Sequence Diagram

Figure 3 in the report illustrates the sequence diagram for the user login process. The user initiates the process by using the `signIn(email, password)` method. The system then uses the `signInWithEmailAndPassword(email, password)` method to connect to the database and retrieve the user data to check the login credentials. If the login is successful, the system returns the `dashboard()` method to the application. On the other hand, if the login fails, the system returns the `Error()` method to the application to display an error message.



**Figure 3: Login Sequence Diagram for User/Employee**

Figure 4 illustrates the sequence diagram for the user registration process. The user starts the process by calling the `signUp(email,password)` method to the system. The application then uses the `signUpWithEmailAndPassword(email,password)` method to save the user data into the database. If the registration is successful, the system sends the user an email verification using `sendEmailVerification()` method. If the registration fails, the system sends the user an error message using the `returnError()` method.



**Figure 4: Sign-up Sequence Diagram for User/Employee**

### 3.7 Class Diagram

A class diagram is a type of diagram in Unified Modeling Language (UML) which presents the structure of a system by displaying classes, interfaces, objects and the relationship between them. It provides a detailed view of the classes, their attributes, and the methods they possess. It is a way to understand the static structure of the system, the relationships between the classes and objects and their properties. Class diagrams are widely used in object-oriented software development for conceptual modelling [11]. They are particularly useful for identifying the objects in a system, their attributes, and the methods that can be performed on them. The Figure 5 in the document presents the class diagram of the proposed system.

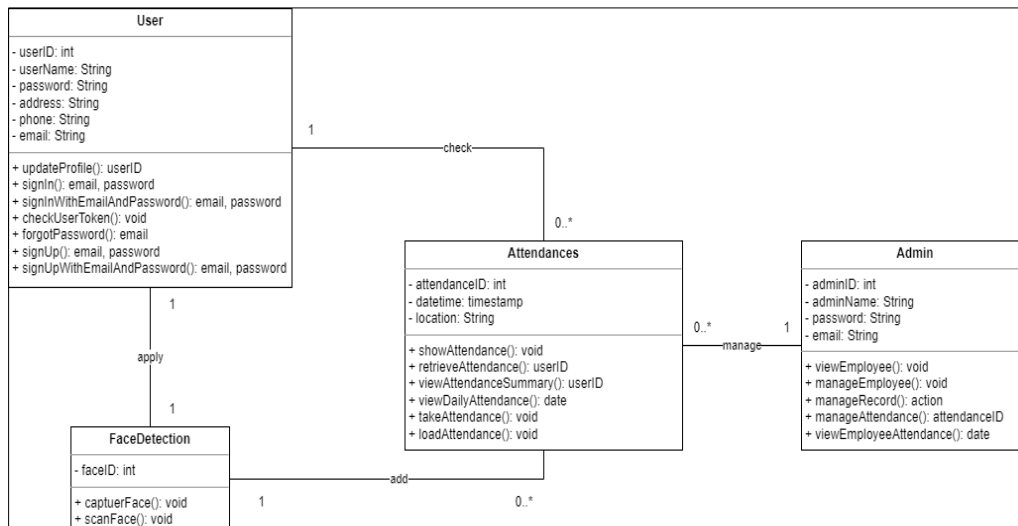


Figure 5: Class Diagram of proposed system

#### 4. Result and Discussion

The Flutter framework is used in the construction of the Face Recognition Attendance System with Face Rolling Motion for Android. The Dart language serves as the foundation for the Flutter framework. The application's architecture is handled by the Flutter framework, and its backend is handled by the Dart programming language. Flutter offers developers the ability to use packages to make the development process friendlier and simpler. A non-SQL cloud database known as Firebase is regarded as an API. In order to provide Firebase Authentication, Firestore, and Firebase Storage, it is integrated inside the application. A programme called Rowy is also used for the data export. For simple backup or validation, the Rowy is used to export the data into Microsoft Excel files.

##### 4.1 System Implementation

The login method is developed based on the Firebase Authentication. The method that the project using is the email and password Firebase Authentication only. This is better to keep track of the users in the company to use the application through the given email. Figure 6 shows the user interface of the login view.

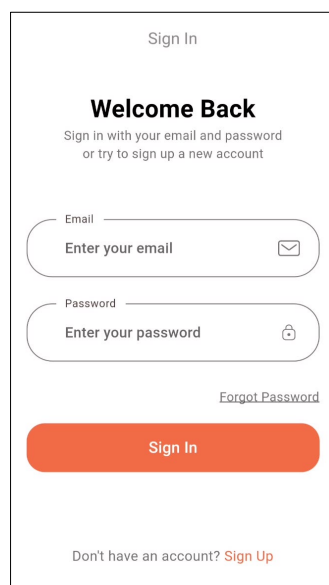
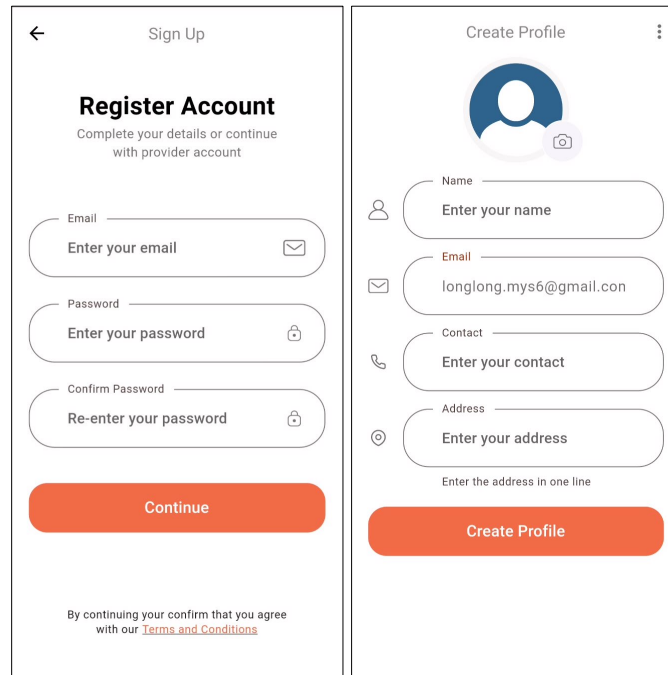


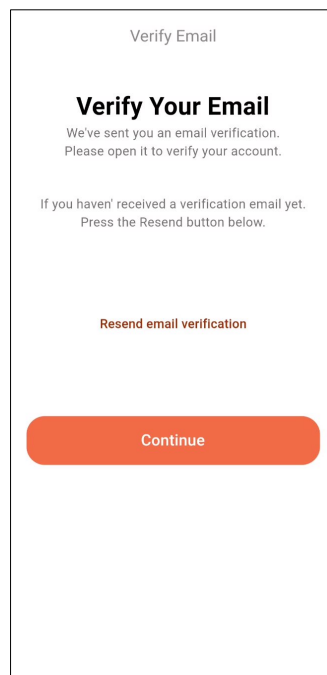
Figure 6: User Interface of the Login View

The sign-up method is also developed based on the Firebase Authentication. The sign-up is almost identical compared to the login for the users of the Face Recognition Attendance System with Face Rolling Motion on Android. Figure 7 shows the user interface of the sign-up view.



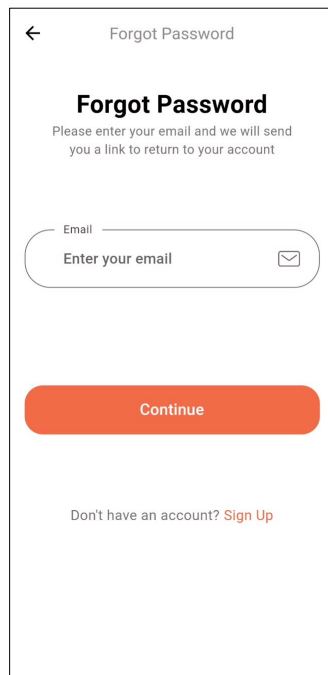
**Figure 7: User Interface of the Sign-up View**

The email verification method will be triggered after the new users created their account as multi factor authentication for provide more security towards attackers or bots. The system will send an email to the users' email provider with an activation link to them to activate their accounts. Figure 8 shows the user interface of the email verification view.



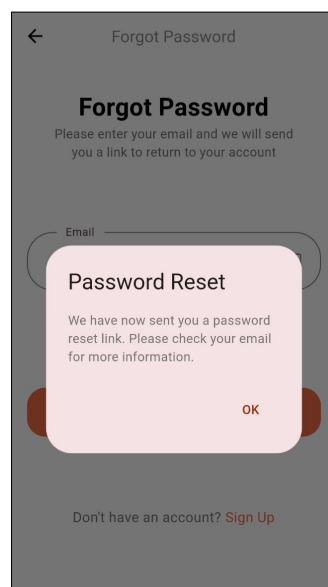
**Figure 8: User Interface of Email Verification View**

The forgot password view is made to the users who forgot their password. The forgot password method is usable and it is important for the users as a functionality which integrated to the application. Figure 9 shows the user interface of the forgot password view.



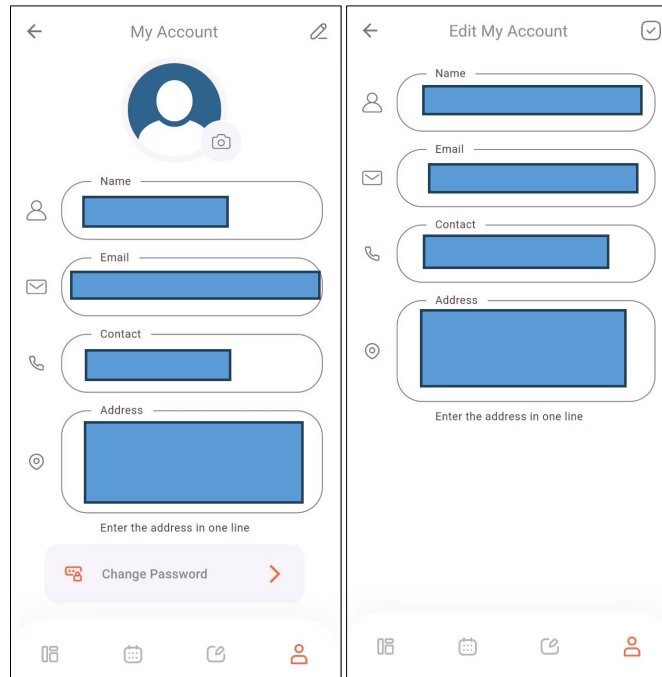
**Figure 9: User Interface of the Forgot Password View**

The password reset email is sent by the system for the users to change their password when they forgot their password. Figure 10 shows the password reset email.



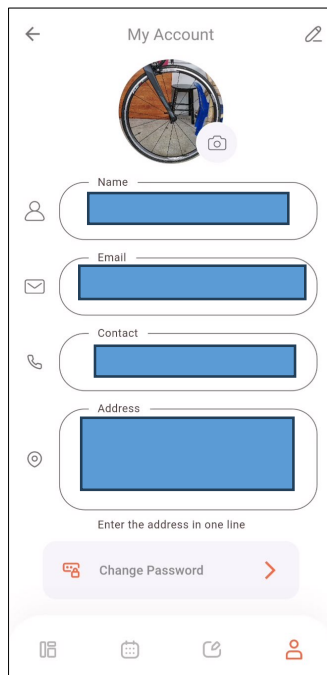
**Figure 10: Password Reset Email**

The Face Recognition Attendance System with Face Rolling Motion on Android provides the flexibility of update the profile of the users to personalize their profile based on their identities. The application can update the profile picture, name, contact, address and the face identity of the users to keep their personal details up-to-date. People appearance might change from time to time. So, it is crucial to let the users to update the personal details. Figure 11 shows the update profile view of the application.



**Figure 11: Update profile View**

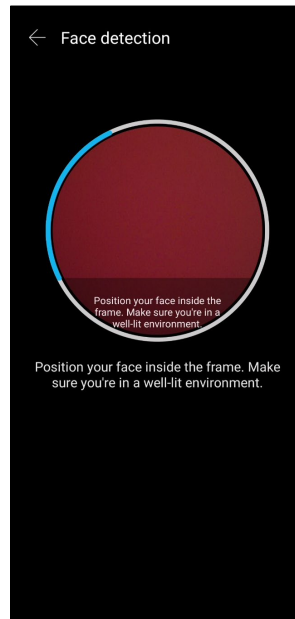
The Face Recognition Attendance System with Face Rolling Motion on Android will update the user’s personal details automatically due to the real-time database provided by the Firebase. Figure 12 shows the latest user profile view.



**Figure 12: Latest User Profile View**

The Face Recognition Attendance System with Face Rolling Motion on Android main functionality is the face scanning which means the face recognition feature. The face scanning is using the Huawei Liveness detection to scan and make the calculation of verifying the face with algorithm. The Huawei Liveness Detection is used to detect the face of the user is live or not. The verification is used to check the user is match with the face identity for face recognition. There is calculation behind the code which

make the verification accurate [12]. Figure 13 shows the user interface of the Huawei Liveness Detection and Verification.



**Figure 13: User Interface of the Huawei Liveness Detection and Verification**

The code for the Huawei Liveness Detection and Verification is based on the machine learning kit that provided by the Huawei. It is fast and accurate if the conditions of the environment are met. It can provide security for the application for taking the attendance for the users. Figure 14 shows the code of the Huawei Liveness Detection and Verification.

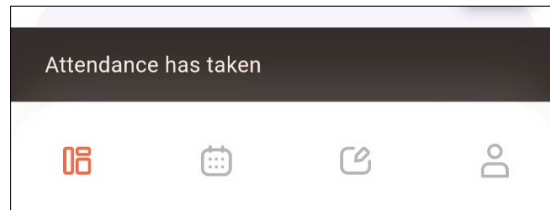
```

1 Future<File?> _startRecognition() async {
2   // Image? image;
3   bool? isLive;
4   try {
5     final MLlivenessCaptureResult result =
6       await MLlivenessCapture().startDetect(detectMask: true);
7     isLive = result.isLive;
8     // image = Image.memory(
9     //   result.bitmap!,
10    //   fit: BoxFit.cover,
11    // );
12    if (isLive ?? false) {
13      final tempDir = await getTemporaryDirectory();
14      final filePath = '${tempDir.path}/my_faceID.jpg';
15      final imageFile = File(filePath);
16      await imageFile.writeAsBytes(result.bitmap!);
17      return imageFile;
18      // return File('my_faceID.jpg').writeAsBytes(result.bitmap!);
19    } else {
20      return null;
21    }
22  } on Exception catch (e) {
23    // exceptionDialog(context, e.toString());
24    devtools.log(e.toString());
25  }
26  return null;
27 }

```

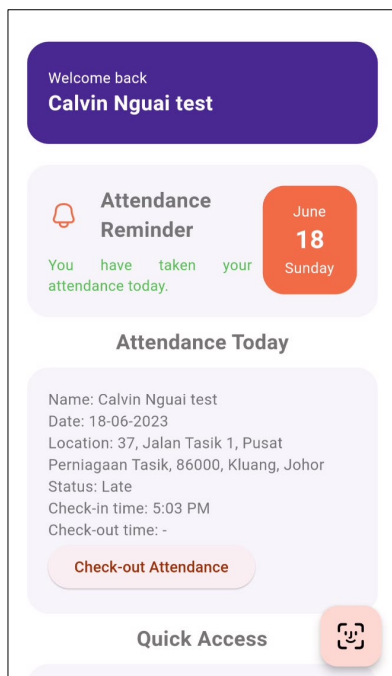
**Figure 14: Code of the Huawei Liveness Detection and Verification [12]**

The other main function of the Face Recognition Attendance System with Face Rolling Motion on Android is taking attendance of the users/employee to have a record of the present to work. Figure 15 shows the user interface of taking attendance.

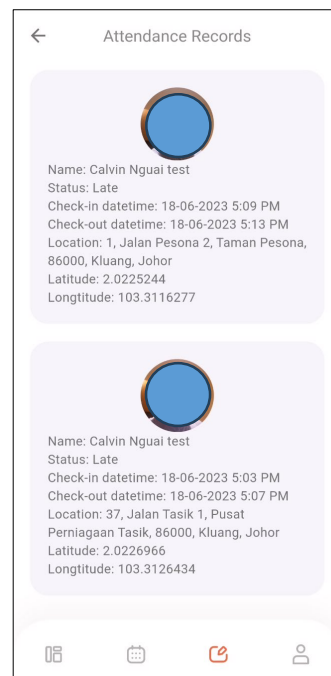


**Figure 15: User Interface of the Huawei Liveness Detection and Verification[12]**

The daily attendance will be shown in the application home view to let the users know they have taken the attendance or not. The quick information of the daily attendance is to ease the user to check their attendance record which can be very frustrating if you cannot memorize it. Figure 16 shows the user interface of daily attendance.



**Figure 16: User Interface of Daily Attendance**



**Figure 17: User Interface of the Attendance List**

The list of attendances can be tracked by the users when they open the attendance list view to check their previous attendances. Figure 17 shows the user interface of the attendance list.

## 4.2 System Testing

After the system development and implementation has been done, the system needs to be tested and debugged for safety concerns. The system needs to meet the defined requirements and proposed functions to keep the system on track with the proposal. The testing should consider all the vulnerabilities of the system to protect the users when they are using the application.

### 4.2.1 Test Plan

The test plan is test according to the define plan to see which functions are able to pass the test. The passed test will be recorded which is successful but the failed test will lead to the limitation of the project. Table 5 shows the test plan of the proposed system.

**Table 5: Test Plan of proposed system**

Description	Expected Results	Actual Results
<b>Login:</b> 1. User/employee login 2. Admin login	1. User/employee and admin login into the system.	Pass
<b>Sign up:</b> 1. Sign up new user account. 2. The email verification is sent.	1. User/employee able to sign up new account. 2. The user/employee able to verify their email to activate account.	Pass
<b>Forgot Password:</b> 1. The forgot password can work properly. 2. The email to reset password is sent.	1. The account can be found for reset the account's password. 2. The user/employee receive the reset password email to reset their password.	Pass
<b>Update profile:</b> 1. Personal details can be key in. 2. The personal details are updated.	1. The personal details update successfully.	Pass
<b>Scan face:</b> 1. The scan face function works properly. 2. The attendance is taken after scanning the face.	1. The scan face function matches the data stored. 2. The attendance data is recorded into the database.	Pass
<b>View daily attendance:</b> 1. The attendances are shown in the application.	1. The attendance is correct and accurate.	Pass
<b>View attendance list:</b> 1. The attendance summary shows in the application.	1. The attendance list is correct and accurate.	Pass
<b>Manage employee:</b> 1. Can view the employee list.	1. The employee list is all shown correct and accurate.	Pass
<b>View employee attendance:</b> 1. Can view the employee attendance.	1. The employee attendance shown in correct and accurate.	Pass

#### 4.2.2 User Acceptance Testing

The user acceptance testing form is tested by 10 users to give a score for the requirements of the Face Recognition Attendance System with Face Rolling Motion on Android. Table 6 shows the user acceptance testing form by users.

**Table 6: User Acceptance Testing Form by Users**

No	Acceptance Requirements	Test Score (1-5)				
		1	2	3	4	5
1.	User/employee and admin able to login into the system.	-	-	-	-	10
2.	User/employee able to sign up new account.	-	-	-	1	9
3.	User/employee able to use forgot password for their account.	-	-	-	-	10
4.	User/employee able to update their personal profile.	-	-	-	2	8
5.	User/employee able to scan face for attendance.	-	-	-	3	7
6.	User/employee able to view daily attendance.	-	-	2	1	7
7.	User/employee able to view attendance summary	-	-	-	3	7
8.	Admin able to manage employee.	-	-	1	1	8
9.	Admin able to view employee attendance.	-	-	1	2	7

#### 4.2.3 Security Analysis Testing

The security analysis testing is used to test the application's security based on the security aspects. The security aspects will include all the input validations, multi factor authentications, face recognition input, password re-authentication, and others. Table 7 shows the security analysis.

**Table 7: Security Analysis**

No	Security Analysis	Result
1.	Input validations	Pass
2.	Multi factor authentications	Pass
3.	Face recognition inputs	Pass
4.	Password re-authentication	Pass
5.	Time verification	Pass
6.	Locations (GPS)	Pass
7.	Block SQL injections	Pass

## 5. Conclusion

Through the use of Flutter, the Face Recognition Attendance System with Face Rolling Motion for Android is created to run natively on Android. It is a program that can be downloaded and utilized on all types of Android smartphones. The user may also use the facial recognition capability offered by the facial Rolling Motion Attendance System. Due of the application's versatility in terms of time and place, the user can also use or test it anywhere. The application has GPS address tracking as well for use in creating attendance records. Additionally, once the user established their face identity, their face was recognized and they could track their working attendance. Users must sign in via the application in order to access the attendance system feature, which offers logical security and safety for the application without user collision. The application is created to maximize potential and adhere to the design specifications in order to accommodate business working practices. They may feel more at ease as a result and may find it simpler to adjust to the new technique for taking attendance in the future.

Even if it has achieved the project's goals, the Face Recognition Attendance System with Face Rolling Motion on Android has satisfied its standards. It still has some restrictions on how the project will turn out. The user's surroundings, including lighting and cosmetics worn, come first. The face recognition technology used to identify users and take daily attendance will be impacted by lighting. The face recognition feature will take attendance more accurately in a well-lit area. The facial recognition feature cannot operate with constant precision if the user is in a dark room. This appears to be unavoidable at the moment because facial recognition algorithms are still in need of advancement. In addition, the information displayed for the admin to see the record is another restriction. For administrators to examine the attendance record, the system offers excel files, however they must utilize an external tool. It would be simpler for the administrator to export the data into excel files if Firebase offered a free export feature for users. Paid customers can easily address this issue, but owing to budgetary constraints, they cannot. The answer is to export the data using an external tool. The features of the application are the last restriction. The application currently only offers the user-friendly foundational features of the attendance system. It might aim to provide more features so that people can utilize the application more effectively.

The Face Recognition Attendance System with Face Rolling Motion for Android will likely change its coding structure in the future to make it more effective and use fewer lines. This can improve the steps the user takes to start the program and cut down on the number of executions. Additionally, a more sophisticated algorithm is required for the face recognition feature in order to confirm the user's identification in a dimly lit space. For the application to be improved, the computation needs to be upgraded to a better version with a faster and more accurate facial recognition feature. Additionally, the application can have extra features added to it for a better user experience and easier usability. To give consumers a better application experience, the application can incorporate features like meetings, chat, information sharing, and announcements. They would obtain all they need in the Face Recognition Attendance System with Face Rolling Motion on Android, eliminating the need to switch between applications for various uses.

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