University Putra Malaysia (UPM)

Future Class Room

(Facial recognition and finger print attendances system**)**

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ABSTRACT

There have never been increasingly precise advancements as accommodating to individuals looking for an approach to monitor bunch action as biometric time and participation innovation. In business and Educational conditions, participation is a major issue nowadays. How this framework can help in following participation of representatives, understudy all the more proficiently and precisely given us a chance to comprehend what Biometric investigation is: Biometrics takes unique physical characteristics and uses them for identification of your identity and verification that you are doing something you've been authorized to do. Your vascular patterns, hand print, finger print, iris patterns, and even your voice can be used to ensure that you are who you say you are, and to let people know that you've been given permission to do whatever it is you're attempting to do. Biometric scanning also improves security factor when used for applications where a person's identity need not to be disclosed. A biometric scanning device takes a user's biometric data, such as an iris pattern or fingerprint scan, and converts it into digital information a computer can interpret and verify. Since it is more difficult for a malicious hacker to gain access to a person's biometric data, and it is unlikely that a user will misplace or misuse his or her biometric data, this form of technology a greater level of assurance than other methods of identification Our project is a biometrics based comprehensive attendance management system for schools and colleges.

1.0 Introduction

Attendance system is been in the class science the beginning and science then there was always a lots of problem which seen in the system it could be any institute or also company, but what we focus here is the UPM which for improving the system and the class we decided to develop the system which can detect the face of the student and analysis the student face.

The main reason of using the facial recognition system as the attendance is that it will be benefit for the both side which student and the teacher which they will be able to boot up the process and do things much faster than the usual.

There are 3 reason we wanted to start the facial recognition system which is:

1. Boot up the process of the attendance.
2. Make it easier for the student and the teacher to attend and check the attendance.
3. Stop any third party to disturb like missing the attendance sheet or signing for others.

Which we explain everything on the objective.

Attendance are important which is the way so see if the student paying attention to the class or not that's why it can be found on the attendance which lecturer can see if the student attended all the class or not if not why? What happened? What was the reason? Is the class boring or its just student don't like the class or…?

That's when the attendance is come along but the old fashion way are getting to old and with a lots of problem that's when the smart class is come up and try to fix the time vesting and all other unnecessary which is appear in the system.

There is a many different type of the attendance which this days is available in the institute which has been used such as:

- On paper attendance
- QR code attendance
- Facial recognition attendance
- Finger print attendance

2.0 Objective of the system

The goal of the project is to be helpful in one hand for lecture so they don't have to key in the names and the ID to the system manually so once they can get the system up and running every time class start and the student came to the class they can find just get recognize by the system and once their face has been detected they consider it as a present in the class, and one thing which happened a lot is that the lecturers don't have to deal with the name one by one

to see if student only sign for them self or they sign for others as well. So by this why its actually improve the security of the system and class as well for the lecturers.

In the other hand it's much easier for student to get rid of the every time they came to class wait for the paper to sign basically all they have to do is face the camera and that's it. System will understand that the user is available in the in class and change the student status to the present.

What we basically try to achieve is:

- Gives an important participation benefit for both teachers and students.
- Reduce manual prepare mistakes by give computerized and a dependable participation framework employments confront acknowledgment technology.
- Increase protection and security which understudy cannot displaying himself or his companion whereas they are not.
- Produce month to month reports for lecturers.
- Flexibility, Addresses capability of altering participation records.
- Calculate non-appearance rate and send update messages to understudies

3.0 Literature Review

The real reason of using the project is to find the problem other group and organization faced and find the best solution for the problem that we face while we had the attendance which was on the sheet and then we try to develop the system which is called the facial recognition attendance system which also have the weaknesses and the bugs that has to be solved.

The way system work it may be different but mostly the problem that we face is same.

In 2005 Kawaguchi introduced a lecture attendance system with a new method called continuous monitoring, and the student's attendance marked automatically by the camera which captures the photo of a student in the class.

They use the simple architecture in the camera, which by using two camera they will decrease the error in the system one for the first part which student came in front of the camera and the other is a sensor camera which will capture the student once they sat on the class to make sure the system will work with no problem.

3.1 UPM Future Class Room Attendance System (FCRAS)-Problem Definition

There are several factor which we have to face with the new ways and old ways which can be a problem for taking the attendance for student.

1. The possibility of losing the attendance sheet
2. Process of taking the attendance and wasting the paper every time
3. Time

This are the problem which it will be solve by using the new smart system and avoid all of them but there is another factor which is the system even smart system has their weaknesses which can cause the problem for both parties which include:

1. System my not detect the face correctly
2. The camera goes off of won't work properly
3. People who does not want to show their faces for several reason

All this problem are the way than will cause the problem for student and lecturer to take the attendance from student.

3.2 UPM FCRAS - Solution

All this fact make us realis that we need something else as well because facial recognition attendance alone it's not going to be the prefect system for the attendance that why we came up with **Finger Print** we will use the finger print as a backup for the system once there is a problem in the system or student have problem using the facial recognition system they can use the finger print as a backup and easily get things done for their attendance.

Problem Definition for Biometrics Recognition Based Attendance System:

1. Enrollment is typically used for positive recognition, where the aim is to prevent multiple people from using the same identity.
2. Fingerprint verification is to verify the authenticity of one person by his fingerprint. There is one-to-one comparison in this case.
3. In the identification mode, the system recognizes an individual by searching the templates of all the users in the database for a match. Therefore, the system conducts a one to-many comparison to establish an individual's identity.

4.0 Methodology

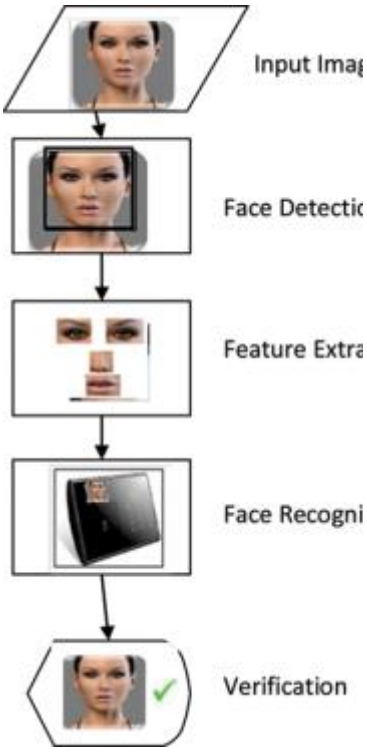
This project is develop using the Java swing and using JavaCV library for face recognition. Project develop using View and Controller architecture.

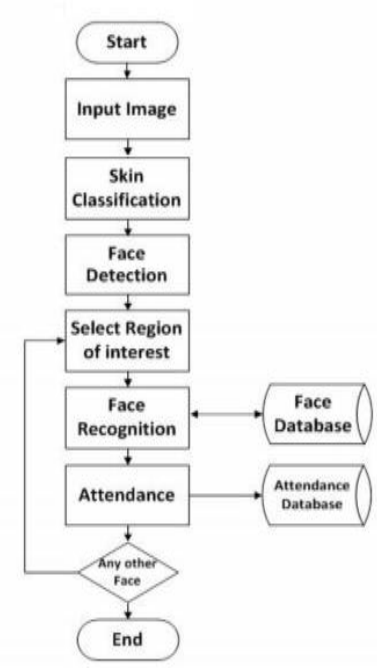
1. It have home java which have main method. When it's start it show two button. First button for Registration of new user and second button is for marking attendance of User. When registration is done it process the image and create the face data file and use it for image matching.
2. Image is matched based on score, which image have nearest score with image in repository it give it match with that image.

4.1 Face Recognition attendance method

" Numerous components impact the method of confront acknowledgment such as shape, measure, posture, impediment, and brightening.

Facial acknowledgment, have two diverse applications: fundamental and progressed ". Major confront acknowledgment recognizes faces or no faces such as balls and animals. If it could be a confront, at that point the framework looks for eyes, a nose, and a mouth. Progressed facial acknowledgment oversees the address on a particular confront. This contains special points of interest: "the width of nose, extensiveness of the eyes, the profundity and point of the jaw, the tallness of cheekbones, and the partition between the eyes,-





And makes a special numerical code."

4.2 Face recognition steps from interring date to take the attendance

Fig 4.2.1: Register as a new member (student)

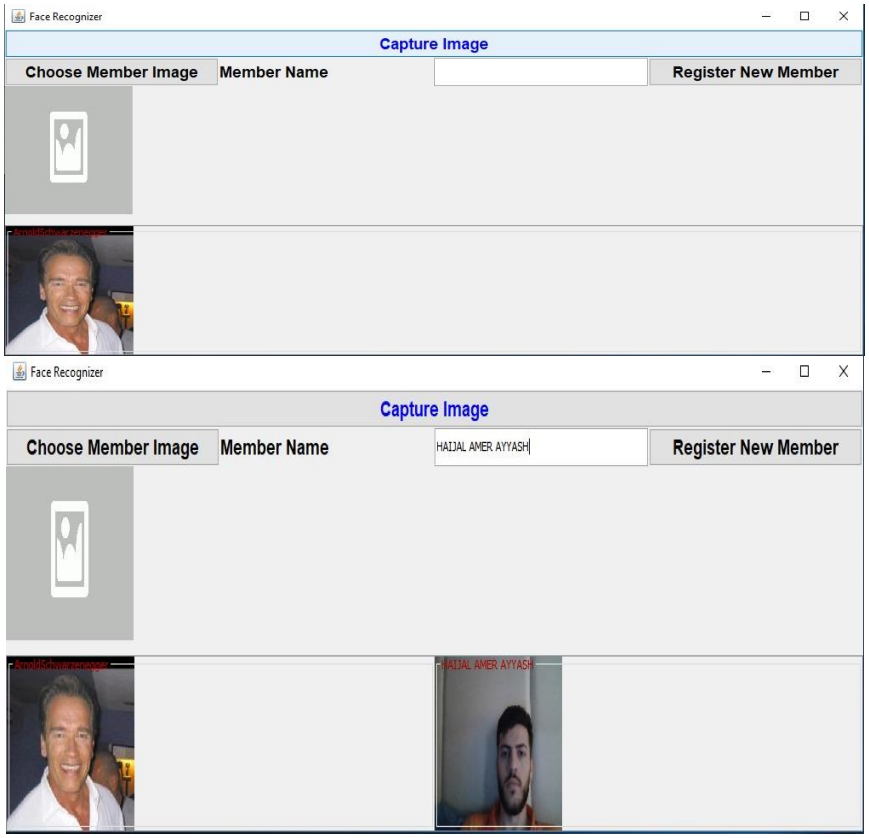


Fig 4.2.2: capturing the image of the member (student)

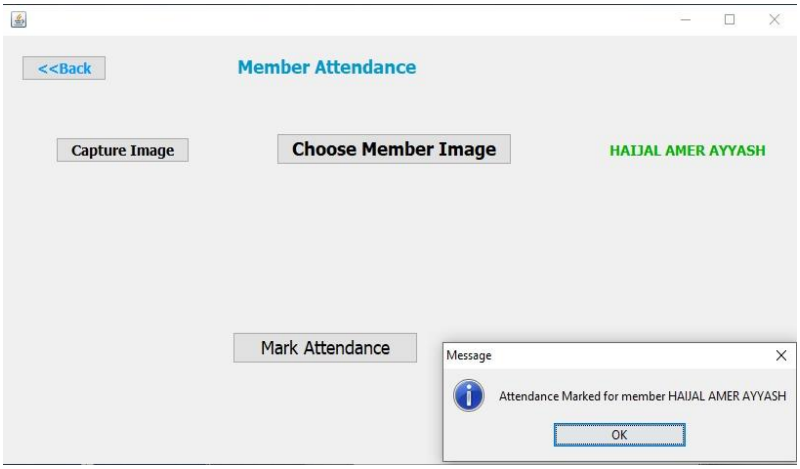


Fig 4.2.3: getting the result for member (student) present

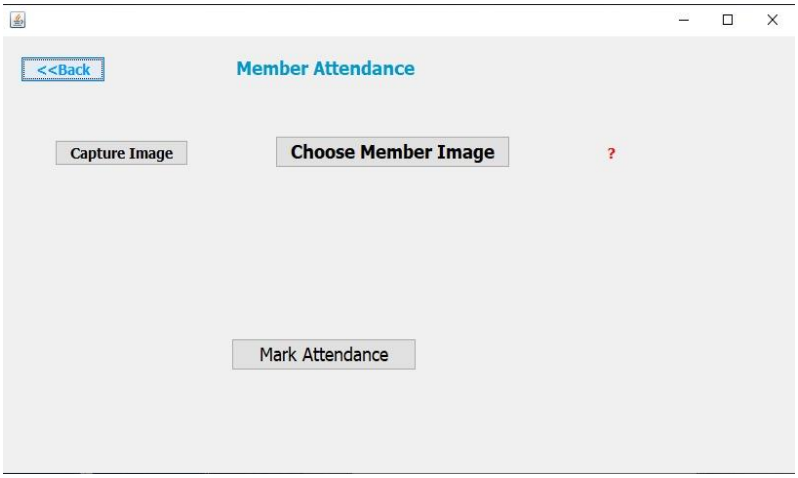


Fig 4.2.4: edit the data for the picture and check the attendance for member (student)

Biometric Technology	Accuracy	Price	Tools required
Facial recognition	Moderate	Moderate	Camera
Fingerprint	High	Moderate	Scanner

Table 1: technology needs

4.3 FINGER PRINT RECOGNIOTION BASED SYSTEM

The fingerprint recognition problem can be grouped into three sub-domains: fingerprint enrollment, verification and fingerprint identification. In Figure below shows a simple block diagram of a biometric system. The first block (Sensor, if any) is the interface between the real world and our system; it has to acquire all the necessary data. The second block performs all necessary pre-processing. In the third block, features needed are extracted and a template is generated. A template is a synthesis of all the characteristics extracted from the source, in the optimal size to allow for adequate identifiably. After creating a template, we have either an enrollment process or a recognition process. If enrollment is being performed, the template is simply stored somewhere within a database. If recognition is being performed, the obtained template is passed to a matcher that compares it with other exiting templates. The matching phase is usually done using software. The matching program will analyzes the template with the input. This will then output for any specified purpose.

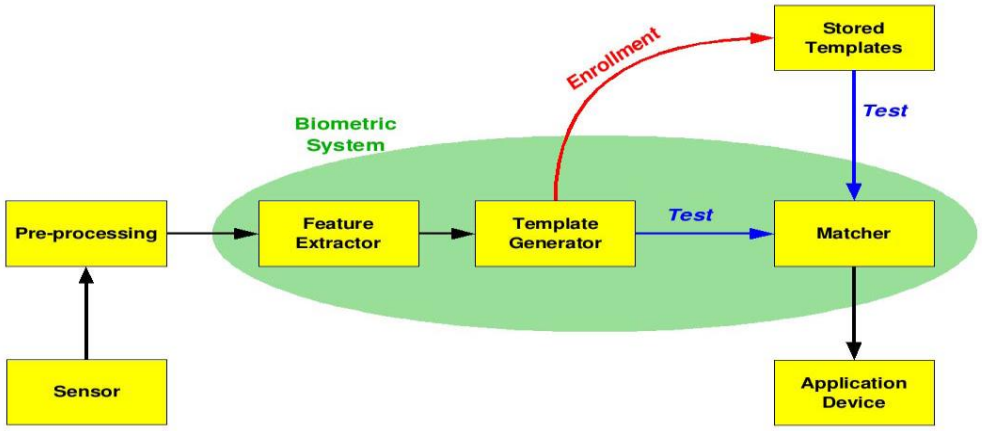


Fig 4.3.1; A chart1.0 Complete Biometric System

4.4 FINGER PRINT RECOGNIOTION BASED:

User Interface:

- Student registration form, filled by student itself under control of tutor guardian.
- Faculty registration filled by Head of the respective department.
- There is a single admin who can control all the activities related to attendance.

Some lesser manipulation authority will be given to management.

Functionality:

Administrator:

- Admin needs to login using specific id and password to perform activities.
- Can view the overall attendance of students of each department with distinction based on semester.
- Analyze individual attendance of any person.

Students:

- Student simply will select their details by selecting college then department then semester then enrollment number and submit the details.
- System will ask to put thumb impression on the device.
- Student will mark their attendance by putting thumb impression and its successful match.

4.5 INPUTS:

Inputs are all the details that are used at the time of registration of the person and person can be an employee or any student. Inputs are used at the time of thumb impression recognition for match and attendance marking.

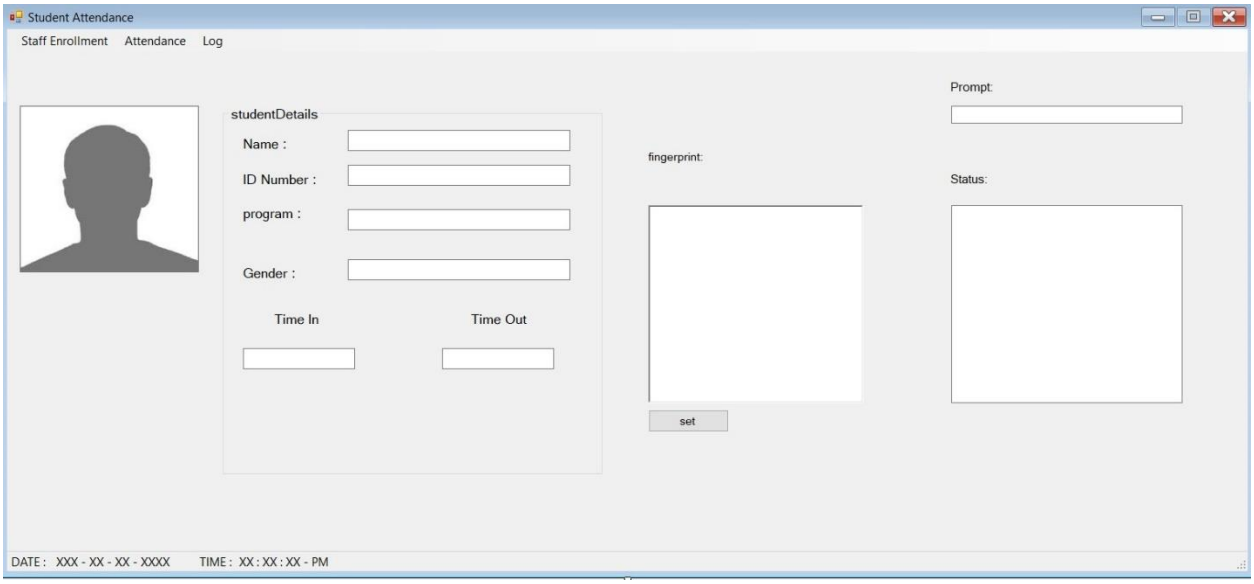


Fig 4.5.1 finger print interface for interring the date

4.6 OUTPUTS:

According to Fig 4.5.1 inputs we have following 3 outputs:

1. Marked Attendance.
2. Unmarked Attendance.

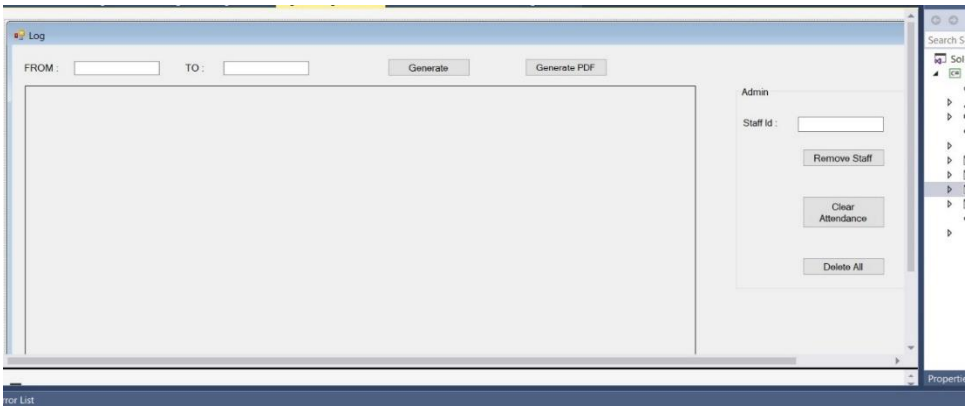


Fig 4.6.1 the output of the system

4.7 CI/CD and DevOps

The system core is develop by using the tools which can make the development process much easier for the group development here are the tools been used for both fingerprint and the facial recognition:

A. GitHub (used as a code repository) https://github.com/amiravinar/UPM-ADVANCED-SOFTWARE-ENGINEERING-Project-attandance
B. Jenkins (Building service)
C. AWS(EC2) (cloud for deployment)

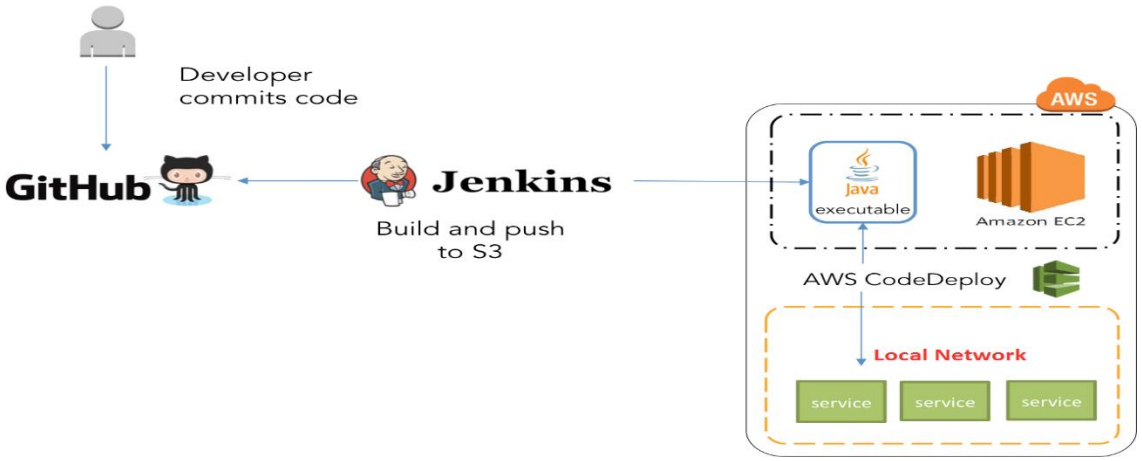


Fig 4.7.1: road map of the CI/CD from development to deployment

5.0 Result and Evaluation for Facial recognition attendances system

Here are the fact that we face as the result of the project which is explain the project from start to the end and its include how its work and how the system will detect, simply we try to explain the core of the system and result of the system after every time we used.

1. Face recognition takes few minutes to register the whole student in the class, that in turn makes the attendance registration more beneficial than the traditional way, all we need one image by webcam and write down the name of the student, in addition high level of security in which no one can manipulate or change the image or the name because it is already stored in the database the we created.

2. When a facial recognition system incorrectly identifies a person that can cause a number of potential problems, depending on what kind of error it is. A system restricting access to a specific location could wrongly admit an unauthorized person – if, say, she was wearing a disguise or even just looked similar enough to someone who should be allowed in. Or it could block the entry of an authorized person by failing to correctly identify her.

In law enforcement, surveillance cameras aren't always able to get very good images of a suspect's face. That could mean identifying an innocent person as a suspect – or even failing to recognize that a known criminal just ran afoul of the law again.

4. The newest technology helps in replacing the older paper register method efficiently. It also saves money that the organization used to spend behind manual security guards and then also it was lacking satisfaction. Face-recognition time attendance system gives better maintenance of data as, it supports the electronic medium of data storage.

5. The face images that are enrolled in the watch list database must be in .jpg file format, less than 4 MB and of sufficient quality. Ensure that the image contains a frontal view of the face, good lighting, and at least 80 pixels between the eyes.

6.0 Conclusion

The reality it will help to find the best way to collaborate with the system for make the process easier and faster, one thing that we all have to concentrate is system will always going to have the bug and the problem which by upgrading the system every time it will be a way to improve the system to make better system and much more user-friendly.

We try to by integrating fingerprint and facial recognition improve the system as much as we can for UPM so if one didn't work we always have the backup which is finger print.

The reliability of any automatic fingerprint system strongly relies on the precision obtained in the minutia extraction process. There is a scope of further improvement in terms of efficiency and accuracy which can be achieved by improving the hardware to capture the finger print or by improving the data enhancement techniques. So that the input finger print to the thinning stage could be made better which could improve the future stages and the final outcome.

And at the end all of this we try to do it using CI/CD tolls which we can monitor the work which has been done by all group members.

Reference

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UKEssays.com. (2019). *Face Recognition Attendance System*. [online] Available at: https://www.ukessays.com/essays/education/recognition-attendance-system-6424.php [Accessed 24 May 2019].

GitHub account:

https://github.com/hachelamer/java-appliaction.git

https://github.com/amiravinar/ADVANCED-SOFTWARE-ENGINEERING-Project-attandance

Jenkins account:

http://3.83.3.233:8080/

User:amir

Password: amirAMIR1@