FACULTY OF ENGINEERING

SCHOOL OF COMPUTING

SEMESTER 1/20212022

SECP1513 – TECHNOLOGY INFORMATION SYSTEM

SECTION 02

PROJECT – PHASE 1 (PROJECT PROPOSAL)

[FACIAL RECOGNITION ATTENDANCE SYSTEM]

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GROUP NO: 1

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1. INTRODUCTION

1.1 Overview of Project

The pandemic has brought about a major change in our daily life, including how we do trivial tasks in our life. From buying groceries to office work, most of them are now carried online and requires less physical interaction. This is certainly beneficial as it requires less energy and saves a lot of time. However, in many solutions offered, the best is always sought out.

In this project, we are going to indulge in the usage of AI in attendance recording systems, as a replacement to the traditional ways of recording attendance (through physical marking using paper and pens) or the currently digitized ways (Google form, QR scan) with the help of cloud storage or a cloud database.

1.2 Problem Statement

For this project, we are looking for the best solution to replace our traditional attendance system, where we mark the attendance using a logbook or using a punch card, which is now becoming less and less relevant since most things nowadays are conducted online, especially during this time of endemic. Other than that, we wanted to find a better solution than using Google form and QR code scan to record attendance because creating this item is time-consuming and requires constant renewal every time it is used. Therefore, based on the situation and condition above, the problem that appeared to us is what is the best system to implement to create a more versatile, simple, and user-friendly attendance system, which utilizes the features of cloud databases while using the latest technology?

1.3 Objectives

- To make attendance recording smoother, faster and easier to execute
- Reduce the risk of system malfunctioning since we use minimal hardware usage
- To achieve zero physical contact system
- To take attendance by requiring less actions to achieve the same goal,which is to take attendance

The objectives that our team is trying to achieve is to make attendance recording smoother, faster and easier to execute. By using AI-based facial recognition, we can save time to record attendance since we can reduce the time taken compared to our current system which requires our phone to scan QR codes, fill up attendance forms or even use a punch card to take attendance.

We can also reduce the risk of system malfunctioning since we only need a camera to access the facial recognition system.

Not only that, we also wanted to achieve zero physical contact system. Ever since we got hit by the pandemic waves, we have been reminded that micro-threats exist all around us and one of the ways to reduce the risk of catching the virus is to reduce contact with our surroundings as much as possible. By using facial recognition to take attendance, we can even avoid touching our smartphones. It may look like a petty reason but a lot of us didn't realize that our smartphone can become a medium for microorganisms to attach to and multiply (breed). This happens because most of the QR codes that we need to scan are located inside the store or mall. We need to touch the door handle first before we enter and after that, we touch our smartphone which can cause the microorganisms to transmit.

This is why we wanted to imply AI-based facial recognition to take attendance because it requires less action to achieve the same goal,which is to take attendance.

1.4 Scopes

The scope of our project is for School/University/College purposes where students can easily record their attendance without any hassle. We are also planning to implement the system for mall or outlet use to replace MySejahtera QR scanner to decrease the likelihood of the virus to spread via hand contact. This system can also be used at a workplace for the worker to clock in and clock out easily.

However, for this project, we limit its capability to university uses only.

2. SELECTION OF 4TH I.T TECHNOLOGY AND POSSIBLE CLIENT

2.1 Proposed solution

To create a more versatile, simple, and user-friendly attendance system, we proposed the use of AI in the facial recognition system to be implemented in the attendance recording system. We proposed this solution because it provides a much simpler form of user interaction in recording their attendance, as they simply need to open their camera and show their faces, without any need to fill in a tedious task or undergo trivial form filling. Theoretically, the system works by recognizing certain faces and registering them in a database, and every time the attendance is recorded, the system will take the data recorded in the databases to be sent in an excel form, while it also records the time and date. Using this method, we can prevent excessive time-consuming attendance recording, resulting in more hours of productive input such as class or work

2.2 Benefit

There are several benefits to applying face recognition based on attendance. The first advantage is the **automated time tracking system**. With a rapid and precise identification process, this system can reliably record attendance, absence, and overtime. Without the need for human intervention, facial recognition software can correctly manage time and attendance.

The second benefit is that it **saves time and money**. This method has the potential to save businesses a significant amount of time and money. Companies will not need to hire additional labour to conduct this task since the face recognition system automatically tracks employees' working hours and access to various areas on the site. The automatic technology also helps in the prevention of human mistakes and preserves correct time records.

The third benefit that will get by using this system is **contactless features**. The covid-19 endemic has forced everyone to be cautious and ensure that they are not infected. Because of the possibility of the Covid-19 virus, we should avoid touching or handling anything that has not been sanitised. As a result, this device may assist people in recording attendance without the necessity of touch. Thus, the indirect contactless feature has helped in reducing the spread of this Covid-19 virus.

Next is to be able to **avoid dishonesty and discipline employees or users**. For example, UTM students need to scan a QR code to record student attendance. This will allow students to share the QR code image with other students who are not attending class at the time. However, the use of this system will force students to scan their faces and immediately their names will be recorded. Each student has to use their own face. Here we can see, users are not able to cheat and need to discipline themselves to participate in meetings or so on.

The fifth is **simple to set up**. Facial recognition is easy to implement into artificial intelligence-based attendance systems. Companies may easily integrate this software into their existing systems, and the majority of apps will function effortlessly with it. The face recognition function allows for a hands-free approach while also improving hygiene and accuracy.

2.3 Summary of the proposed system

Basically, this AI Face Recognition system works by identifying faces and registering them within a database. Each time attendance is recorded, the system sends the data to an excel form which are the location of the data such as date, time in and names to be stored. If we are looking forward to this project, we will realize that this proposed system improves a lot of the attendance system before. This AI Face Recognition system will reduce efforts, eliminate human error and tackle proxy attendance. Not only that, but this system also will save time, saves resources and low cost to be implemented. As we move to Industrial Revolution 4.0, implementing AI in a system is a big yes for us because it will enhance the speed, precision and effectiveness of human efforts. On the other hand, AI implementation really helpful for certain specific tasks.

2.4 Client/user view

To further enhance our project credibility and worth, we have consulted ITTSB SDN. BHD. to give a little insight on our idea. First of all, Integrated Transportation Solutions Sdn. Bhd. (ITSSB) is a technology-based company that specializes in intelligent transportation system products and services. They started-off in 2009 focusing on transforming our own R&D output into highly commercial products for direct application in the transport sector. It has grown to be a leading local company in Malaysia specializing in homegrown state-of-the art commercial products in intelligent transport system applications. The outcome from our consultation from the company is :-

Overview of this project : It is inline with the most recent attendance recording technology

Lack in this project : Cost factor

Improvement in this project : Add more function aside taking attendance

According to Dr. Ahmad Saifizul Abdullah , managing director of ITTSB SDN. He states that our project is quite good as we are making use of the latest technology to enhance the regular attendance taking method to a face recognition attendance system.

Although it is good, the cost factor should be considered when developing a new system. In comparison to the QR code method, face recognition technology necessitates a significant investment on the hardware part by the end user. People will choose less superior technology or stick with their existing technology when a new approach or technology for the same function requires a significant investment.

Lastly, this system needs to add more functions aside from attendance taking. It will be easier to enter the market if you have more functions.

3. ARCHITECTURE PLANNING AND DESIGN

3.1 Gantt Chart

PROJECT TITLE	AI Face Recognition for Attendance System	GROUP NUMBER	GROUP 10
LECTURER	DR IZYAN IZZATI BINTI KAMSANI	DATE	14/12/2021

PART	TASK TITLE	TASK OWNER	DURATION (DAYS)	PCT OF TASK COMPLETE	PHASE ONE															PHASE TWO															
					WEEK 1					WEEK 2					WEEK 3					WEEK 4					WEEK 5					WEEK 6				
					M	T	W	R	F	M	T	W	R	F	M	T	W	R	F	M	T	W	R	F	M	T	W	R	F	M	T	W	R	F
1	Planning	Abdul Muhaimin	5	2%																														
2	Research	Abdul Muhaimin	5	4%																														
3	Collect user requirements	Izzat Haqeemi	5	6%																														
4	Write requirement specifications	Izzat Haqeemi	2	8%																														
5	Design data structure	Hafizulshah	8	28%																														
6	Design system functions	Hafizulshah	8	48%																														
7	Design user interface and menu	Hafizulshah	5	58%																														
8	Purchase hardware	Farhan	2	60%																														
9	Implement system	Farhan	3	75%																														
10	Perform system testing	Hazim	5	90%																														
11	Train system users	Hazim	5	100%																														

3.2 Task breakdown

1. **Planning**

   Taskmaster: Muhaimin

   -Providing the team with the details of the project,time-frame of work and discussing project task assignment to each member of the team.

2. **Research**

   Taskmaster: Muhaimin

   -Collect data and information from past invention/research/system prototype and share it with members of the development team to help with designing the system.

3. **Collect user requirements**

   Taskmaster: Izzat Haqeemi

   -discuss the specification for the system with client/user to further understand both parties' needs and wants,so that the project can deliver a satisfying result for the client.

4. **Write requirement specifications**

   Taskmaster: Izzat Haqeemi

   -Provide a detailed report regarding the specification given by the client/user for the development team to create a system that fulfills the necessary request brought forth by client.

5. **Design data structure**

   Taskmaster: Hafizulshah

   -design a cloud storage system using a Amazon web services,Amazon RDS,which is integrated with MySQL for better database structure.

6. **Design system function**

   Taskmaster: Hafizulshah

   -develope the source code for the system to synthesis input data

7. **Design menu interface**

   Taskmaster: Hafizulshah

   -design the end user interface to help ease user interaction with the system.

8. **Purchase hardware**

   Taskmaster: Farhan

   -purchase the hardware needed within the specified budget

9. **Implement system**

   Taskmaster: Farhan

   -install the system within the purchased hardware and prepare them for system testing.

10. **Perform system testing**

    Taskmaster: Hazim

    -perform system testing and provide a report to the development team if any correction or fix are required.

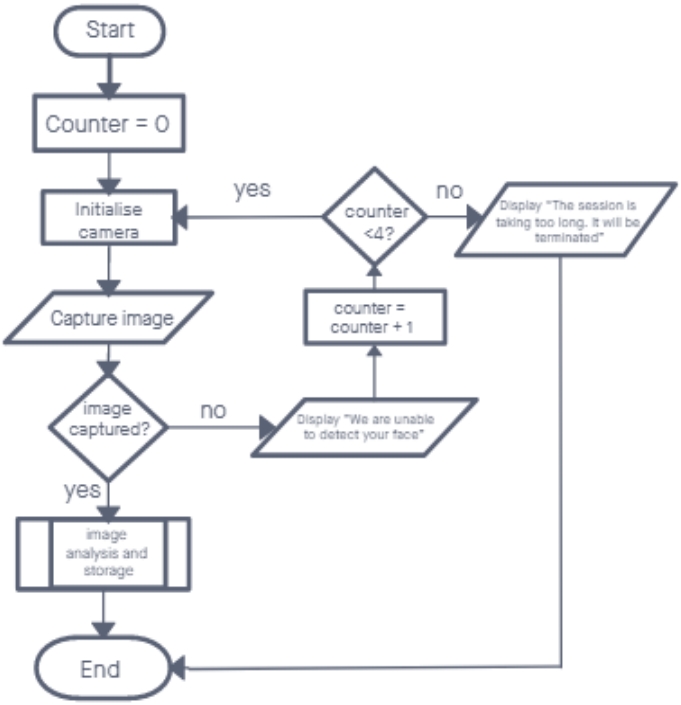
11. **Train system user**

    Taskmaster: Hazim

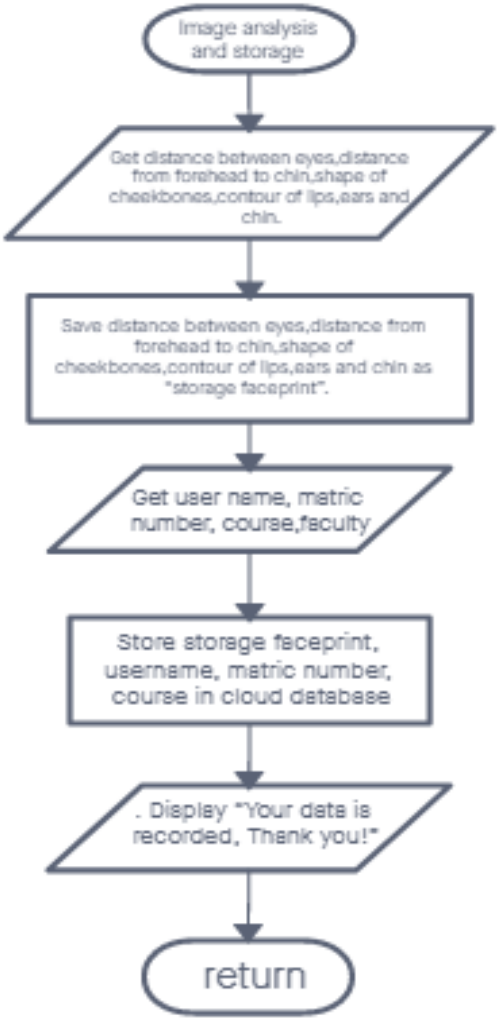
    -train the next system user for the respective client to give proper

3.3 System flowchart

Flowchart 1:database registration



Flowchart 1.1 : Image analysis and storage

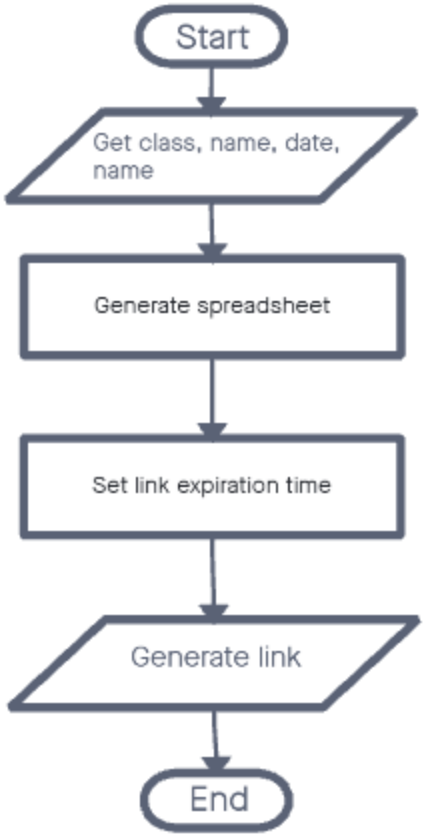


-The system starts by registering the student faceprint and id within the cloud database. The process can only be executed 4 times per session as a security measure and also to prevent any data loss during the registration.

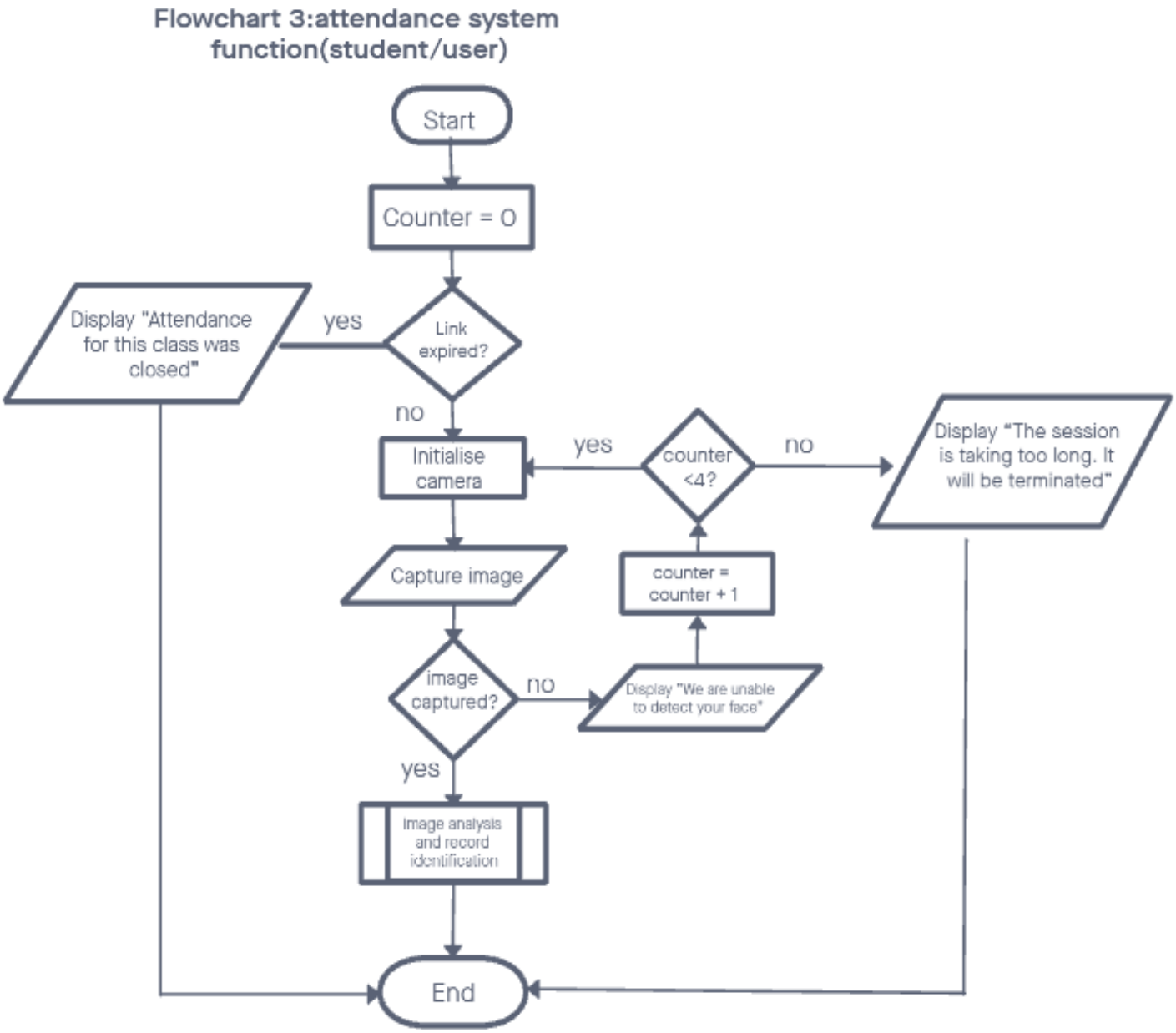
-during image analysis and storage, the system will scan for important feature within our faces,such as distance between eyes, distant from forehead to chin, shape of cheekbones and

contour of lips, ear and chin into numerical data,and save within the cloud storage as storage faceprint,including student name,matric number and course.

Flowchart 2: Attendance system function (Lecturer / Attendance taker)



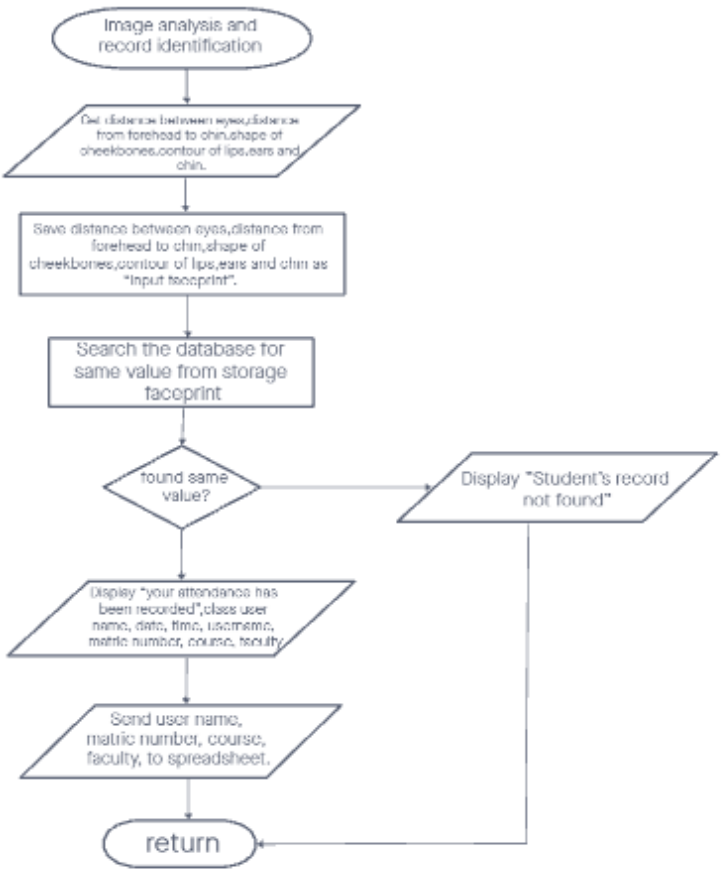
-For the lecturer end of the system,the system will required input of class name,date and lecturer name,before it automatically generates a spreadsheet and link expiration time,and create a link to be passed to the student as the output.



-for the student to use this system during the class attendance, they will just simply click the link provided and open their camera. The system will start by scanning for their facial features once

an image is captured, and then it will proceed to image analysis and record identification. the system will only execute this function 4 times to prevent any data loss and security breach.

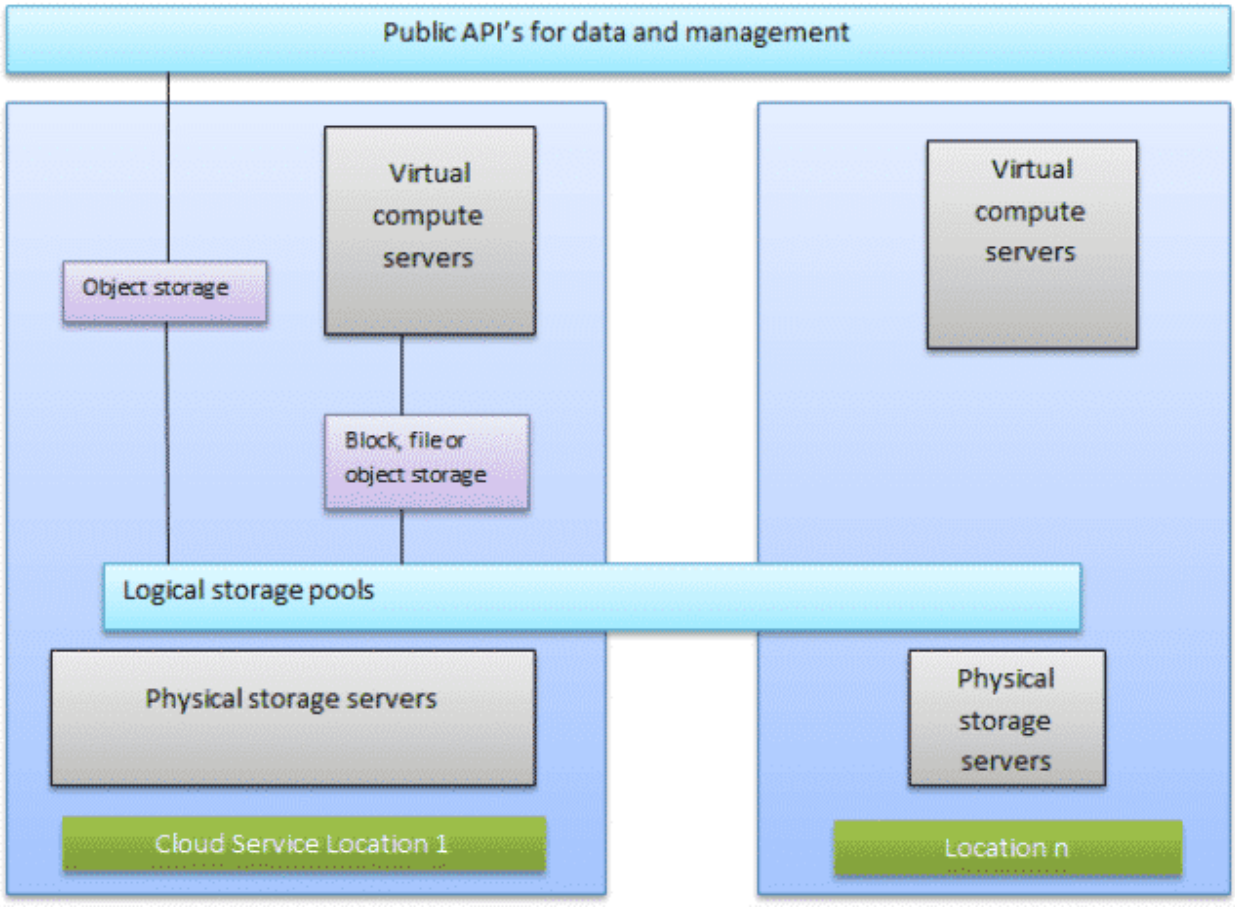
Flowchart 3.1 : Image analysis and record identification



-during image analysis and record identification,facial feature such as distance between eyes, distant from forehead to chin, shape of cheekbones and contour of lips, ear and chin will be converted into numerical data,and is saved as input faceprint,where the system will use this value

as reference for any similar storage faceprint within cloud database. if there is a similar value, the system will return the student data to the spreadsheet generated for the lecturer.

3.4 Cloud architecture



-for this project, we decided to use a cloud storage service as our main cloud architecture system because it is much more practical to store the data within a cloud as it requires less physical storage servers and is cheaper.

-with features such as Amazon RDS on Amazon web services,which is integrated with MySQL,the development team will have a much easier way to construct a system database that efficiently stores any data needed and for a cheaper price compared to other methods.

4. CONCLUSION

The purpose of this system is to use facial recognition algorithms to create an efficient attendance system. It can help minimize the errors and flaws seen in the traditional methods of taking attendance. Therefore, the system should be adopted to replace the old method. Using facial recognition, the proposed device would be able to track attendance. Using a camera, it will identify and recognise faces. After recognition, it will indicate the attendance of the acknowledged workers or students and update the attendance record. It can be constructed using a camera and computer.