

1.INTRODUCTION

1.1Problem Statement :

This section is the introduction of report for the developed system. It will equip the basic overview of the whole system. This chapter present about the project background, problem statement, objectives, scope and limitation of works. The general information regarding the system will be stated in background section of the report. The objectives state the main goal of the system meanwhile the scope reveals who the user of the system and what the users can do. Lastly, the limitation of works state the limit of the system and what is not covered in this system.

Nowadays, technology is really influential and it is the core elements in almost educational institutions. They started to initiate the organization with technology. Usually, the institutions used manual process for recording the attendance by using paper and pen. It was one approach that has been used in almost institutions even the process seems slow and unproductive. This thesis is about QR Code Attendance System which will streamline the process of taking the attendance. Despite the use of QR code in educational institutions is not something new, but it is intended to reveal the use of technology that can solve the daily problems. This system will help facilitate attendance information of a particular student in a particular class and it is under the supervision of teachers to generate the QR Code and to collect data of the attendance. Besides helping the educators, the system may also notify the parents regarding the student attendance and it is an alternative solutions to avoid the students from play truant and trying to cheat on their attendance by asking friends to put initial on the attendance sheet.

1.2 Motivation:

There are some automatic attendances making system which are currently used by much institution. One of such system is biometric technique. Although it is automatic and a step ahead of traditional method it fails to meet the time constraint. The student has to wait in queue for giving attendance, which is time taking.

This project introduces an involuntary attendance marking system, devoid of any kind of interference with the normal teaching procedure. The system can be also implemented during exam sessions or in other teaching activities where attendance is highly essential. This system eliminates classical student identification such as calling name of the student, or checking respective identification cards of the student, which can not only interfere with the ongoing teaching process, but also can be stressful for students during examination sessions.

1.3 Objective:

This project introduces an involuntary attendance marking system, devoid of any kind of interference with the normal teaching procedure. The system can be also implemented during exam sessions or in other teaching activities where attendance is highly essential. This system eliminates classical student identification such as calling name of the student, or checking respective identification cards of the student, which can not only interfere with the ongoing teaching process, but also can be stressful for students during examination sessions.

1.4 Proposed System:

In this project , we are designing QR code based employee attendance system

The proposed system admin can ADD New Employee Details and then application will generate QR CODE on EMPLOYEE ID and then admin can download that image and give to employee and employee can show that image to QR CODE scanner to mark attendance. Admin can view all employee details and then can view employee attendance by using start and end date

employee has to show his QR CODE image from his mobile to webcam and then webcam will read QR CODE and mark attendance. Only one attendance for each employee for each day will be marked

ADVANTAGES OF PROPOSED SYSTEM:

- ☐ Provide better security.
- ☐ Maintenance of the system is easy and cost effective.
- ☐ Generate the result quickly.
- ☐ Provide accurate and efficient data.
- ☐ User friendly.

2.LITERATURE SURVEY

2.1 Technologies Learnt

In order to understand more about this system, readings involving related literature was done. The source of references were important to classify the problems and to gain possible solutions to the problems. The aims are to find, understand and master the related approaches to the project and therefore article, journal and existing system are referenced. The technology that will be used will be discussed briefly in this chapter.

What is Python :-

Below are some facts about Python.

Python is currently the most widely used multi-purpose, high-level programming language.

Python allows programming in Object-Oriented and Procedural paradigms. Python programs generally are smaller than other programming languages like Java.

Programmers have to type relatively less and indentation requirement of the language, makes them readable all the time.

Python language is being used by almost all tech-giant companies like – Google, Amazon, Facebook, Instagram, Dropbox, Uber... etc.

The biggest strength of Python is huge collection of standard library which can be used for the following –

- Machine Learning
- GUI Applications (like Kivy, Tkinter, PyQt etc.)
- Web frameworks like Django (used by YouTube, Instagram, Dropbox)
- Image processing (like Opencv, Pillow)
- Web scraping (like Scrapy, BeautifulSoup, Selenium)

- Test frameworks
- Multimedia

Advantages of Python :-

Let's see how Python dominates over other languages.

1. Extensive Libraries

Python downloads with an extensive library and it contains code for various purposes like regular expressions, documentation-generation, unit-testing, web browsers, threading, databases, CGI, email, image manipulation, and more. So, we don't have to write the complete code for that manually.

2. Extensible

As we have seen earlier, Python can be **extended to other languages**. You can write some of your code in languages like C++ or C. This comes in handy, especially in projects.

3. Embeddable

Complimentary to extensibility, Python is embeddable as well. You can put your Python code in your source code of a different language, like C++. This lets us add **scripting capabilities** to our code in the other language.

4. Improved Productivity

The language's simplicity and extensive libraries render programmers **more productive** than languages like Java and C++ do. Also, the fact that you need to write less and get more things done.

5. IOT Opportunities

Since Python forms the basis of new platforms like Raspberry Pi, it finds the future bright for the Internet Of Things. This is a way to connect the language with the real world.

6. Simple and Easy

When working with Java, you may have to create a class to print **'Hello World'**. But in Python, just a print statement will do. It is also quite **easy to learn, understand, and code**. This is why when people pick up Python, they have a hard time adjusting to other more verbose languages like Java.

7. Readable

Because it is not such a verbose language, reading Python is much like reading English. This is the reason why it is so easy to learn, understand, and code. It also does not need curly braces to define blocks, and **indentation is mandatory**. This further aids the readability of the code.

8. Object-Oriented

This language supports both the **procedural and object-oriented** programming paradigms. While functions help us with code reusability, classes and objects let us model the real world. A class allows the **encapsulation of data** and functions into one.

9. Free and Open-Source

Like we said earlier, Python is **freely available**. But not only can you **download Python** for free, but you can also download its source code, make changes to it, and even distribute it. It downloads with an extensive collection of libraries to help you with your tasks.

10. Portable

When you code your project in a language like C++, you may need to make some changes to it if you want to run it on another platform. But it isn't the same with

Python. Here, you need to **code only once**, and you can run it anywhere. This is called **Write Once Run Anywhere (WORA)**. However, you need to be careful enough not to include any system-dependent features.

11. Interpreted

Lastly, we will say that it is an interpreted language. Since statements are executed one by one, **debugging is easier** than in compiled languages.

Any doubts till now in the advantages of Python? Mention in the comment section.

Advantages of Python Over Other Languages

1. Less Coding

Almost all of the tasks done in Python requires less coding when the same task is done in other languages. Python also has an awesome standard library support, so you don't have to search for any third-party libraries to get your job done. This is the reason that many people suggest learning Python to beginners.

2. Affordable

Python is free therefore individuals, small companies or big organizations can leverage the free available resources to build applications. Python is popular and widely used so it gives you better community support.

The 2019 Github annual survey showed us that Python has overtaken Java in the most popular programming language category.

3. Python is for Everyone

Python code can run on any machine whether it is Linux, Mac or Windows. Programmers need to learn different languages for different jobs but with Python, you can professionally build web apps, perform data analysis and **machine learning**,

automate things, do web scraping and also build games and powerful visualizations. It is an all-rounder programming language.

Disadvantages of Python

So far, we've seen why Python is a great choice for your project. But if you choose it, you should be aware of its consequences as well. Let's now see the downsides of choosing Python over another language.

1. Speed Limitations

We have seen that Python code is executed line by line. But since Python is interpreted, it often results in **slow execution**. This, however, isn't a problem unless speed is a focal point for the project. In other words, unless high speed is a requirement, the benefits offered by Python are enough to distract us from its speed limitations.

2. Weak in Mobile Computing and Browsers

While it serves as an excellent server-side language, Python is much rarely seen on the **client-side**. Besides that, it is rarely ever used to implement smartphone-based applications. One such application is called **Carbonnelle**.

The reason it is not so famous despite the existence of Brython is that it isn't that secure.

3. Design Restrictions

As you know, Python is **dynamically-typed**. This means that you don't need to declare the type of variable while writing the code. It uses **duck-typing**. But wait, what's that? Well, it just means that if it looks like a duck, it must be a duck. While this is easy on the programmers during coding, it can **raise run-time errors**.

4. Underdeveloped Database Access Layers

Compared to more widely used technologies like **JDBC (Java DataBase Connectivity)** and **ODBC (Open DataBase Connectivity)**, Python's database access

layers are a bit underdeveloped. Consequently, it is less often applied in huge enterprises.

5. Simple

No, we're not kidding. Python's simplicity can indeed be a problem. Take my example. I don't do Java, I'm more of a Python person. To me, its syntax is so simple that the verbosity of Java code seems unnecessary.

This was all about the Advantages and Disadvantages of Python Programming Language.

History of Python : -

What do the alphabet and the programming language Python have in common? Right, both start with ABC. If we are talking about ABC in the Python context, it's clear that the programming language ABC is meant. ABC is a general-purpose programming language and programming environment, which had been developed in the Netherlands, Amsterdam, at the CWI (Centrum Wiskunde & Informatica). The greatest achievement of ABC was to influence the design of Python. Python was conceptualized in the late 1980s. Guido van Rossum worked that time in a project at the CWI, called Amoeba, a distributed operating system. In an interview with Bill Venners¹, Guido van Rossum said: "In the early 1980s, I worked as an implementer on a team building a language called ABC at Centrum voor Wiskunde en Informatica (CWI). I don't know how well people know ABC's influence on Python. I try to mention ABC's influence because I'm indebted to everything I learned during that project and to the people who worked on it." Later on in the same Interview, Guido van Rossum continued: "I remembered all my experience and some of my frustration with ABC. I decided to try to design a simple scripting language that possessed some of ABC's better properties, but without its problems. So I started typing. I created a simple virtual machine, a simple parser, and a simple runtime. I made my own version of the various ABC parts that I liked. I created a basic syntax, used indentation for statement grouping instead of

curly braces or begin-end blocks, and developed a small number of powerful data types: a hash table (or dictionary, as we call it), a list, strings, and numbers."

What is Machine Learning : -

Before we take a look at the details of various machine learning methods, let's start by looking at what machine learning is, and what it isn't. Machine learning is often categorized as a subfield of artificial intelligence, but I find that categorization can often be misleading at first brush. The study of machine learning certainly arose from research in this context, but in the data science application of machine learning methods, it's more helpful to think of machine learning as a means of *building models of data*.

Fundamentally, machine learning involves building mathematical models to help understand data. "Learning" enters the fray when we give these models *tunable parameters* that can be adapted to observed data; in this way the program can be considered to be "learning" from the data. Once these models have been fit to previously seen data, they can be used to predict and understand aspects of newly observed data. I'll leave to the reader the more philosophical digression regarding the extent to which this type of mathematical, model-based "learning" is similar to the "learning" exhibited by the human brain. Understanding the problem setting in machine learning is essential to using these tools effectively, and so we will start with some broad categorizations of the types of approaches we'll discuss here.

Categories Of Machine Learning :-

At the most fundamental level, machine learning can be categorized into two main types: supervised learning and unsupervised learning.

Supervised learning involves somehow modeling the relationship between measured features of data and some label associated with the data; once this model is determined, it can be used to apply labels to new, unknown data. This is further subdivided into *classification* tasks and *regression* tasks: in classification, the labels are discrete categories, while in regression, the labels are continuous quantities. We will see examples of both types of supervised learning in the following section.

Unsupervised *learning* involves modeling the features of a dataset without reference to any label, and is often described as "letting the dataset speak for itself." These models include tasks such as *clustering* and *dimensionality reduction*. Clustering algorithms identify distinct groups of data, while dimensionality reduction algorithms search for more succinct representations of the data. We will see examples of both types of unsupervised learning in the following section.

Need for Machine Learning

Human beings, at this moment, are the most intelligent and advanced species on earth because they can think, evaluate and solve complex problems. On the other side, AI is still in its initial stage and haven't surpassed human intelligence in many aspects. Then the question is that what is the need to make machine learn? The most suitable reason for doing this is, "to make decisions, based on data, with efficiency and scale".

Lately, organizations are investing heavily in newer technologies like Artificial Intelligence, Machine Learning and Deep Learning to get the key information from data to perform several real-world tasks and solve problems. We can call it data-driven decisions taken by machines, particularly to automate the process. These data-driven decisions can be used, instead of using programming logic, in the problems that cannot be programmed inherently. The fact is that we can't do without human intelligence, but other aspect is that we all need to solve real-world problems with efficiency at a huge scale. That is why the need for machine learning arises.

Challenges in Machines Learning :-

While Machine Learning is rapidly evolving, making significant strides with cybersecurity and autonomous cars, this segment of AI as whole still has a long way to go. The reason behind is that ML has not been able to overcome number of challenges. The challenges that ML is facing currently are –

Quality of data – Having good-quality data for ML algorithms is one of the biggest challenges. Use of low-quality data leads to the problems related to data preprocessing and feature extraction.

Time-Consuming task – Another challenge faced by ML models is the consumption of time especially for data acquisition, feature extraction and retrieval.

Lack of specialist persons – As ML technology is still in its infancy stage, availability of expert resources is a tough job.

No clear objective for formulating business problems – Having no clear objective and well-defined goal for business problems is another key challenge for ML because this technology is not that mature yet.

Issue of overfitting & underfitting – If the model is overfitting or underfitting, it cannot be represented well for the problem.

Curse of dimensionality – Another challenge ML model faces is too many features of data points. This can be a real hindrance.

Difficulty in deployment – Complexity of the ML model makes it quite difficult to be deployed in real life.

Applications of Machines Learning :-

Machine Learning is the most rapidly growing technology and according to researchers we are in the golden year of AI and ML. It is used to solve many real-world complex

problems which cannot be solved with traditional approach. Following are some real-world applications of ML –

- Emotion analysis
- Sentiment analysis
- Error detection and prevention
- Weather forecasting and prediction
- Stock market analysis and forecasting
- Speech synthesis
- Speech recognition
- Customer segmentation
- Object recognition
- Fraud detection
- Fraud prevention
- Recommendation of products to customer in online shopping

How to Start Learning Machine Learning?

Arthur Samuel coined the term “**Machine Learning**” in 1959 and defined it as a “**Field of study that gives computers the capability to learn without being explicitly programmed**”.

And that was the beginning of Machine Learning! In modern times, Machine Learning is one of the most popular (if not the most!) career choices. According to Indeed, Machine Learning Engineer Is The Best Job of 2019 with a 344% growth and an average base salary of **\$146,085** per year.

But there is still a lot of doubt about what exactly is Machine Learning and how to start learning it? So this article deals with the Basics of Machine Learning and also the path you can follow to eventually become a full-fledged Machine Learning Engineer. Now let's get started!!!

How to start learning ML?

This is a rough roadmap you can follow on your way to becoming an insanely talented Machine Learning Engineer. Of course, you can always modify the steps according to your needs to reach your desired end-goal!

Step 1 – Understand the Prerequisites

In case you are a genius, you could start ML directly but normally, there are some prerequisites that you need to know which include Linear Algebra, Multivariate Calculus, Statistics, and Python. And if you don't know these, never fear! You don't need a Ph.D. degree in these topics to get started but you do need a basic understanding.

(a) Learn Linear Algebra and Multivariate Calculus

Both Linear Algebra and Multivariate Calculus are important in Machine Learning. However, the extent to which you need them depends on your role as a data scientist. If you are more focused on application heavy machine learning, then you will not be that heavily focused on maths as there are many common libraries available. But if you want to focus on R&D in Machine Learning, then mastery of Linear Algebra and Multivariate Calculus is very important as you will have to implement many ML algorithms from scratch.

(b) Learn Statistics

Data plays a huge role in Machine Learning. In fact, around 80% of your time as an ML expert will be spent collecting and cleaning data. And statistics is a field that handles the collection, analysis, and presentation of data. So it is no surprise that you need to learn it!!! Some of the key concepts in statistics that are important are Statistical Significance, Probability Distributions, Hypothesis Testing, Regression, etc. Also, Bayesian

Thinking is also a very important part of ML which deals with various concepts like Conditional Probability, Priors, and Posteriors, Maximum Likelihood, etc.

(c) Learn Python

Some people prefer to skip Linear Algebra, Multivariate Calculus and Statistics and learn them as they go along with trial and error. But the one thing that you absolutely cannot skip is Python! While there are other languages you can use for Machine Learning like R, Scala, etc. Python is currently the most popular language for ML. In fact, there are many Python libraries that are specifically useful for Artificial Intelligence and Machine Learning such as Keras, TensorFlow, Scikit-learn, etc.

So if you want to learn ML, it's best if you learn Python! You can do that using various online resources and courses such as **Fork Python** available Free on GeeksforGeeks.

Step 2 – Learn Various ML Concepts

Now that you are done with the prerequisites, you can move on to actually learning ML (Which is the fun part!!!) It's best to start with the basics and then move on to the more complicated stuff. Some of the basic concepts in ML are:

(a) Terminologies of Machine Learning

- **Model** – A model is a specific representation learned from data by applying some machine learning algorithm. A model is also called a hypothesis.
- **Feature** – A feature is an individual measurable property of the data. A set of numeric features can be conveniently described by a feature vector. Feature vectors are fed as input to the model. For example, in order to predict a fruit, there may be features like color, smell, taste, etc.
- **Target (Label)** – A target variable or label is the value to be predicted by our model. For the fruit example discussed in the feature section, the label with each set of input would be the name of the fruit like apple, orange, banana, etc.

- **Training** – The idea is to give a set of inputs(features) and it's expected outputs(labels), so after training, we will have a model (hypothesis) that will then map new data to one of the categories trained on.
- **Prediction** – Once our model is ready, it can be fed a set of inputs to which it will provide a predicted output(label).

(b) Types of Machine Learning

- **Supervised Learning** – This involves learning from a training dataset with labeled data using classification and regression models. This learning process continues until the required level of performance is achieved.
- **Unsupervised Learning** – This involves using unlabelled data and then finding the underlying structure in the data in order to learn more and more about the data itself using factor and cluster analysis models.
- **Semi-supervised Learning** – This involves using unlabelled data like Unsupervised Learning with a small amount of labeled data. Using labeled data vastly increases the learning accuracy and is also more cost-effective than Supervised Learning.
- **Reinforcement Learning** – This involves learning optimal actions through trial and error. So the next action is decided by learning behaviors that are based on the current state and that will maximize the reward in the future.

Advantages of Machine learning :-

1. Easily identifies trends and patterns -

Machine Learning can review large volumes of data and discover specific trends and patterns that would not be apparent to humans. For instance, for an e-commerce website like Amazon, it serves to understand the browsing behaviors and purchase histories of its users to help cater to the right products, deals, and reminders relevant to them. It uses the results to reveal relevant advertisements to them.

2. No human intervention needed (automation)

With ML, you don't need to babysit your project every step of the way. Since it means giving machines the ability to learn, it lets them make predictions and also improve the algorithms on their own. A common example of this is anti-virus softwares; they learn to filter new threats as they are recognized. ML is also good at recognizing spam.

3. Continuous Improvement

As **ML algorithms** gain experience, they keep improving in accuracy and efficiency. This lets them make better decisions. Say you need to make a weather forecast model. As the amount of data you have keeps growing, your algorithms learn to make more accurate predictions faster.

4. Handling multi-dimensional and multi-variety data

Machine Learning algorithms are good at handling data that are multi-dimensional and multi-variety, and they can do this in dynamic or uncertain environments.

5. Wide Applications

You could be an e-tailer or a healthcare provider and make ML work for you. Where it does apply, it holds the capability to help deliver a much more personal experience to customers while also targeting the right customers.

Disadvantages of Machine Learning :-

1. Data Acquisition

Machine Learning requires massive data sets to train on, and these should be inclusive/unbiased, and of good quality. There can also be times where they must wait for new data to be generated.

2. Time and Resources

ML needs enough time to let the algorithms learn and develop enough to fulfill their purpose with a considerable amount of accuracy and relevancy. It also needs massive resources to function. This can mean additional requirements of computer power for you.

3. Interpretation of Results

Another major challenge is the ability to accurately interpret results generated by the algorithms. You must also carefully choose the algorithms for your purpose.

4. High error-susceptibility

Machine Learning is autonomous but highly susceptible to errors. Suppose you train an algorithm with data sets small enough to not be inclusive. You end up with biased predictions coming from a biased training set. This leads to irrelevant advertisements being displayed to customers. In the case of ML, such blunders can set off a chain of errors that can go undetected for long periods of time. And when they do get noticed, it takes quite some time to recognize the source of the issue, and even longer to correct it.

Python Development Steps : -

Guido Van Rossum published the first version of Python code (version 0.9.0) at alt.sources in February 1991. This release included already exception handling, functions, and the core data types of list, dict, str and others. It was also object oriented and had a module system. Python version 1.0 was released in January 1994. The major new features included in this release were the functional programming tools lambda, map, filter and reduce, which Guido Van Rossum never liked. Six and a half years later in October 2000, Python 2.0 was introduced. This release included list comprehensions, a full garbage collector and it was supporting unicode. Python flourished for another 8 years in the versions 2.x

before the next major release as Python 3.0 (also known as "Python 3000" and "Py3K") was released. Python 3 is not backwards compatible with Python 2.x. The emphasis in Python 3 had been on the removal of duplicate programming constructs and modules, thus fulfilling or coming close to fulfilling the 13th law of the Zen of Python: "There should be one -- and preferably only one -- obvious way to do it." Some changes in Python 3:

- Print is now a function
- Views and iterators instead of lists
- The rules for ordering comparisons have been simplified. E.g. a heterogeneous list cannot be sorted, because all the elements of a list must be comparable to each other.
- There is only one integer type left, i.e. int. long is int as well.
- The division of two integers returns a float instead of an integer. "/" can be used to have the "old" behaviour.
- Text Vs. Data Instead Of Unicode Vs. 8-bit

Purpose :-

We demonstrated that our approach enables successful segmentation of intra-retinal layers—even with low-quality images containing speckle noise, low contrast, and different intensity ranges throughout—with the assistance of the ANIS feature.

Python

Python is an interpreted high-level programming language for general-purpose programming. Created by Guido van Rossum and first released in 1991, Python has a design philosophy that emphasizes code readability, notably using significant whitespace.

Python features a dynamic type system and automatic memory management. It supports multiple programming paradigms, including object-oriented, imperative, functional and procedural, and has a large and comprehensive standard library.

- Python is Interpreted – Python is processed at runtime by the interpreter. You do not need to compile your program before executing it. This is similar to PERL and PHP.

- Python is Interactive – you can actually sit at a Python prompt and interact with the interpreter directly to write your programs.

Python also acknowledges that speed of development is important. Readable and terse code is part of this, and so is access to powerful constructs that avoid tedious repetition of code. Maintainability also ties into this may be an all but useless metric, but it does say something about how much code you have to scan, read and/or understand to troubleshoot problems or tweak behaviors. This speed of development, the ease with which a programmer of other languages can pick up basic Python skills and the huge standard library is key to another area where Python excels. All its tools have been quick to implement, saved a lot of time, and several of them have later been patched and updated by people with no Python background - without breaking.

Modules Used in Project :-

Tensorflow

TensorFlow is a free and open-source software library for dataflow and differentiable programming across a range of tasks. It is a symbolic math library, and is also used for machine learning applications such as neural networks. It is used for both research and production at Google.

TensorFlow was developed by the Google Brain team for internal Google use. It was released under the Apache 2.0 open-source license on November 9, 2015.

Numpy

Numpy is a general-purpose array-processing package. It provides a high-performance multidimensional array object, and tools for working with these arrays.

It is the fundamental package for scientific computing with Python. It contains various features including these important ones:

- A powerful N-dimensional array object
- Sophisticated (broadcasting) functions
- Tools for integrating C/C++ and Fortran code

- Useful linear algebra, Fourier transform, and random number capabilities

Besides its obvious scientific uses, Numpy can also be used as an efficient multi-dimensional container of generic data. Arbitrary data-types can be defined using Numpy which allows Numpy to seamlessly and speedily integrate with a wide variety of databases.

Pandas

Pandas is an open-source Python Library providing high-performance data manipulation and analysis tool using its powerful data structures. Python was majorly used for data munging and preparation. It had very little contribution towards data analysis. Pandas solved this problem. Using Pandas, we can accomplish five typical steps in the processing and analysis of data, regardless of the origin of data load, prepare, manipulate, model, and analyze. Python with Pandas is used in a wide range of fields including academic and commercial domains including finance, economics, Statistics, analytics, etc.

Matplotlib

Matplotlib is a Python 2D plotting library which produces publication quality figures in a variety of hardcopy formats and interactive environments across platforms. Matplotlib can be used in Python scripts, the Python and IPython shells, the Jupyter Notebook, web application servers, and four graphical user interface toolkits. Matplotlib tries to make easy things easy and hard things possible. You can generate plots, histograms, power spectra, bar charts, error charts, scatter plots, etc., with just a few lines of code. For examples, see the sample plots and thumbnail gallery.

For simple plotting the pyplot module provides a MATLAB-like interface, particularly when combined with IPython. For the power user, you have full control of line styles, font properties, axes properties, etc, via an object oriented interface or via a set of functions familiar to MATLAB users.

Scikit – learn

Scikit-learn provides a range of supervised and unsupervised learning algorithms via a consistent interface in Python. It is licensed under a permissive simplified BSD license and is distributed under many Linux distributions, encouraging academic and commercial use. **Python**

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Install Python Step-by-Step in Windows and Mac :

Python a versatile programming language doesn't come pre-installed on your computer devices. Python was first released in the year 1991 and until today it is a very popular high-level programming language. Its style philosophy emphasizes code readability with its notable use of great whitespace.

The object-oriented approach and language construct provided by Python enables programmers to write both clear and logical code for projects. This software does not come pre-packaged with Windows.

How to Install Python on Windows and Mac :

There have been several updates in the Python version over the years. The question is how to install Python? It might be confusing for the beginner who is willing to start learning Python but this tutorial will solve your query. The latest or the newest version of Python is version 3.7.4 or in other words, it is Python 3.

Note: The python version 3.7.4 cannot be used on Windows XP or earlier devices.

Before you start with the installation process of Python. First, you need to know about your **System Requirements**. Based on your system type i.e. operating system and based processor, you must download the python version. My system type is a **Windows 64-bit operating system**. So the steps below are to install python version 3.7.4 on Windows 7 device or to install Python 3. Download the Python Cheatsheet here. The steps on how to install Python on Windows 10, 8 and 7 are **divided into 4 parts** to help understand better.

Download the Correct version into the system

Step 1: Go to the official site to download and install python using Google Chrome or any other web browser. OR Click on the following link: [**https://www.python.org**](https://www.python.org)



Fig 2.1.1: Installation of Python Using Browser

Now, check for the latest and the correct version for your operating system.

Step 2: Click on the Download Tab.



Fig 2.1.2: Select Python 3.7.4

Step 3: You can either select the Download Python for windows 3.7.4 button in Yellow Color or you can scroll further down and click on download with respective to their version. Here, we are downloading the most recent python version for windows 3.7.4

Looking for a specific release?

Python releases by version number:








Release version	Release date		Click for more
Python 3.7.4	July 8, 2019	 Download	Release Notes
Python 3.6.9	July 2, 2019	 Download	Release Notes
Python 3.7.3	March 25, 2019	 Download	Release Notes
Python 3.4.10	March 18, 2019	 Download	Release Notes
Python 3.5.7	March 18, 2019	 Download	Release Notes
Python 2.7.16	March 4, 2019	 Download	Release Notes
Python 3.7.2	Dec. 24, 2018	 Download	Release Notes

Fig 2.1.3: Select File According To Requirements

Step 4: Scroll down the page until you find the Files option.

Step 5: Here you see a different version of python along with the operating system.

Files					
Version	Operating System	Description	MD5 Sum	File Size	GPG
Gzipped source tarball	Source release		68111671e5b2db4ae77b9ab01b0f09be	23017663	SG
XZ compressed source tarball	Source release		d33e4aae66097051c2eca45ee3604803	17131432	SG
macOS 64-bit/32-bit installer	Mac OS X	for Mac OS X 10.6 and later	6428b4fa7583da01a440c8a1cee08e6	34898416	SG
macOS 64-bit installer	Mac OS X	for OS X 10.9 and later	5dd605c382179457738f5e4a936b243f	20882845	SG
Windows help file	Windows		d63999573a2c96b2ac56cade6b477cd2	8131761	SG
Windows x86-64 embeddable zip file	Windows	for AMD64/EM64T/x64	9b0b3cfd9ec0b0abef3184a0728a2	7504391	SG
Windows x86-64 executable installer	Windows	for AMD64/EM64T/x64	a702b4b0ad76dbdb3543a383e543400	26882368	SG
Windows x86-64 web-based installer	Windows	for AMD64/EM64T/x64	28cb1c608b6d73aebef3a3bd351b4bd2	1382904	SG
Windows x86 embeddable zip file	Windows		9fab3b818b41879fda94113574139d8	6741626	SG
Windows x86 executable installer	Windows		33cc002942a5446a3d9451478394789	25663848	SG
Windows x86 web-based installer	Windows		1b470cfa5d317df82c30983ea371d87c	1324608	SG

Fig 2.1.4: Download Windows 32-bit Python Version

- To download Windows 32-bit python, you can select any one from the three options: Windows x86 embeddable zip file, Windows x86 executable installer or Windows x86 web-based installer.

- To download Windows 64-bit python, you can select any one from the three options: Windows x86-64 embeddable zip file, Windows x86-64 executable installer or Windows x86-64 web-based installer.

Here we will install Windows x86-64 web-based installer. Here your first part regarding which version of python is to be downloaded is completed. Now we move ahead with the second part in installing python i.e. Installation

Note: To know the changes or updates that are made in the version you can click on the Release Note Option.

Installation of Python

Step 1: Go to Download and Open the downloaded python version to carry out the installation process.

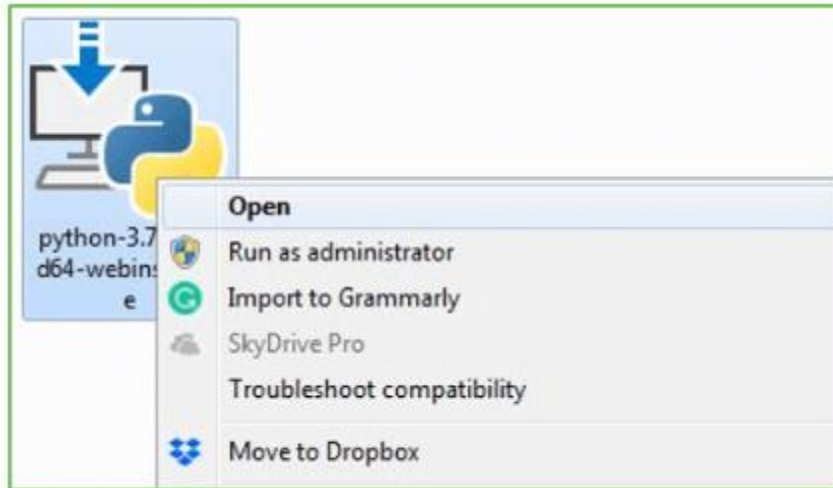


Fig 2.1.5 Click Open

Step 2: Before you click on Install Now, Make sure to put a tick on Add Python 3.7 to PATH

Step 3: Click on Install NOW After the installation is successful. Click on Close.



Fig 2.1.6: Setup Installation

With these above three steps on python installation, you have successfully and correctly installed Python. Now is the time to verify the installation.

Note: The installation process might take a couple of minutes.

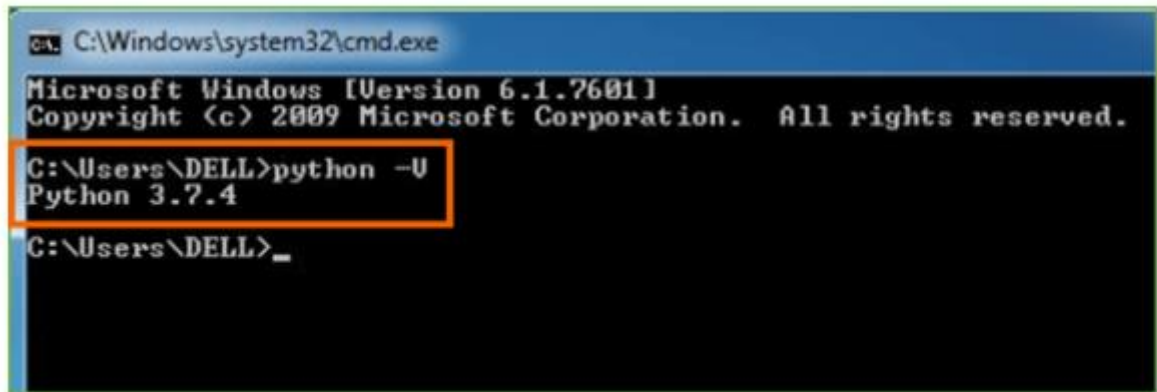
Verify the Python Installation

Step 1: Click on Start

Step 2: In the Windows Run Command, type “cmd”.

Step 3: Open the Command prompt option.

Step 4: Let us test whether the python is correctly installed. Type **python -V** and press Enter.



```
C:\Windows\system32\cmd.exe
Microsoft Windows [Version 6.1.7601]
Copyright (c) 2009 Microsoft Corporation. All rights reserved.

C:\Users\DELL>python -U
Python 3.7.4

C:\Users\DELL>_
```

Fig 2.1.7: Enter Python-V to check version

Step 5: You will get the answer as 3.7.4

Note: If you have any of the earlier versions of Python already installed. You must first uninstall the earlier version and then install the new one.

Check how the Python IDLE works

Step 1: Click on Start

Step 2: In the Windows Run command, type “python idle”.

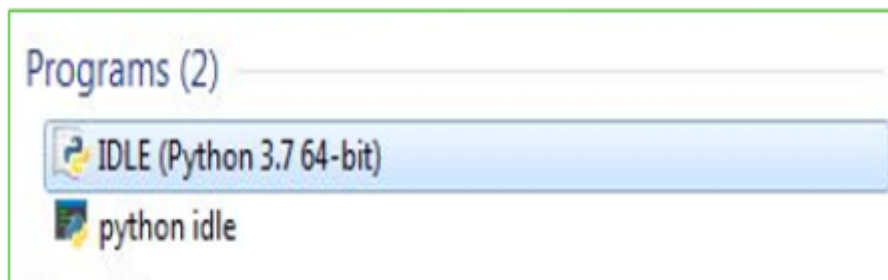


Fig 2.1.8: Click on Python IDLE

Step 3: Click on IDLE (Python 3.7 64-bit) and launch the program

Step 4: To go ahead with working in IDLE you must first save the file. **Click on File > Click on Save**

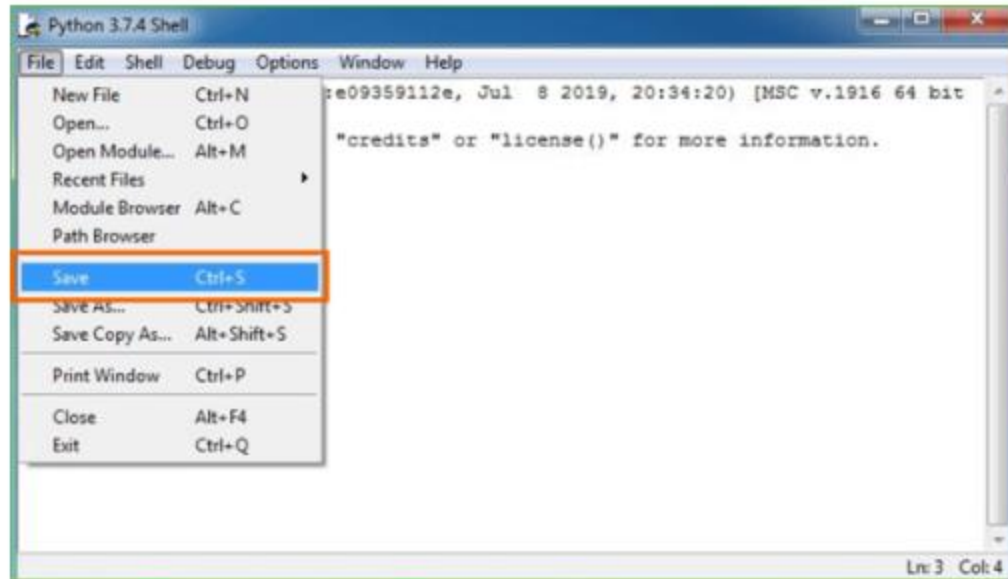


Fig 2.1.9: Save the file before use

Step 5: Name the file and save as type should be Python files. Click on SAVE. Here I have named the files as Hey World.

Step 6: Now for e.g. **enter print**

2.2 LITERATURE SURVEY

This section reviews the research works carried out by different researchers that are related to the proposed work. In general, the mobile application is developed using any one of the languages such as Java using software development kit (SDK). The data used for the application or processed by the application are stored in the data bases. The following mobile application developers succeed in developing the student attendance management system with the structured query language (SQL) data base

V. Somasundaram et al presented a mobile-based attendance system using visual basic .Net (VB.NET) and SQL server. This system is used to store, organize, find and manage the

information of the students and helps to generate the reports of the student information [1].

K. Akhila et al proposed an android-based mobile application for student attendance tracking system. It offers reliability, time saving, and it is easy to control and to take the attendance using android mobile phones. It can reduce the efforts of the staff members towards attendance maintenance. It is an efficient and user friendly android mobile application for attendance monitoring [3]. Rakhi Joshi et al developed an android-based attendance management with smart learning system. The web-based mobile application is developed with a SQL server. This system is used to mark attendance through smart phone and gives a prior intimation to student as soon as their attendance goes below the specified level through SMS [2]. Moreover, Amita Dhale et al. presented a survey on “smart connect”, android and web based application for college management system. It is developed using SQL server. It is mainly used to store the details required for the institutions [8].

The mobile operating system (MOS) place a key role in the development of mobile application since the application for one MOS is not compatible with other MOS. Therefore, before developing the mobile application for a particular application the MOS must be considered and the application must be developed for the same. Thus, the student attendance management and monitoring systems are developed for the Android MOS. Akshay A. Kumbhar et al presented an automated attendance monitoring system using android platform. It is then used to maintain the attendance of the student regularly [9]. Jessenth Ebenezer et al presented an android-based student activity register system. It is used to mark the attendance and to store the details of the students so that the professors or higher officials can view the attendance of the students and regulate them if they are not regular to the classes [7].

The mobile application-based attendance management system is also employed in the organisations to mark the attendance of the employees. S.P. Avinaash Ram and J. Albert

Mayan presented a mobile application for employee registration and mobile attendance. It is used to update the employee attendance regularly and track their attendance. Moreover, it is helpful to the staff and the authorities to take the attendance. This system is also used to know the number of employees easily and to monitor whether they are regular to the organisation. This system also provides the details of every employee

3.SYSTEM DESIGN

3.1 SYSTEM ARCHITECTURE:

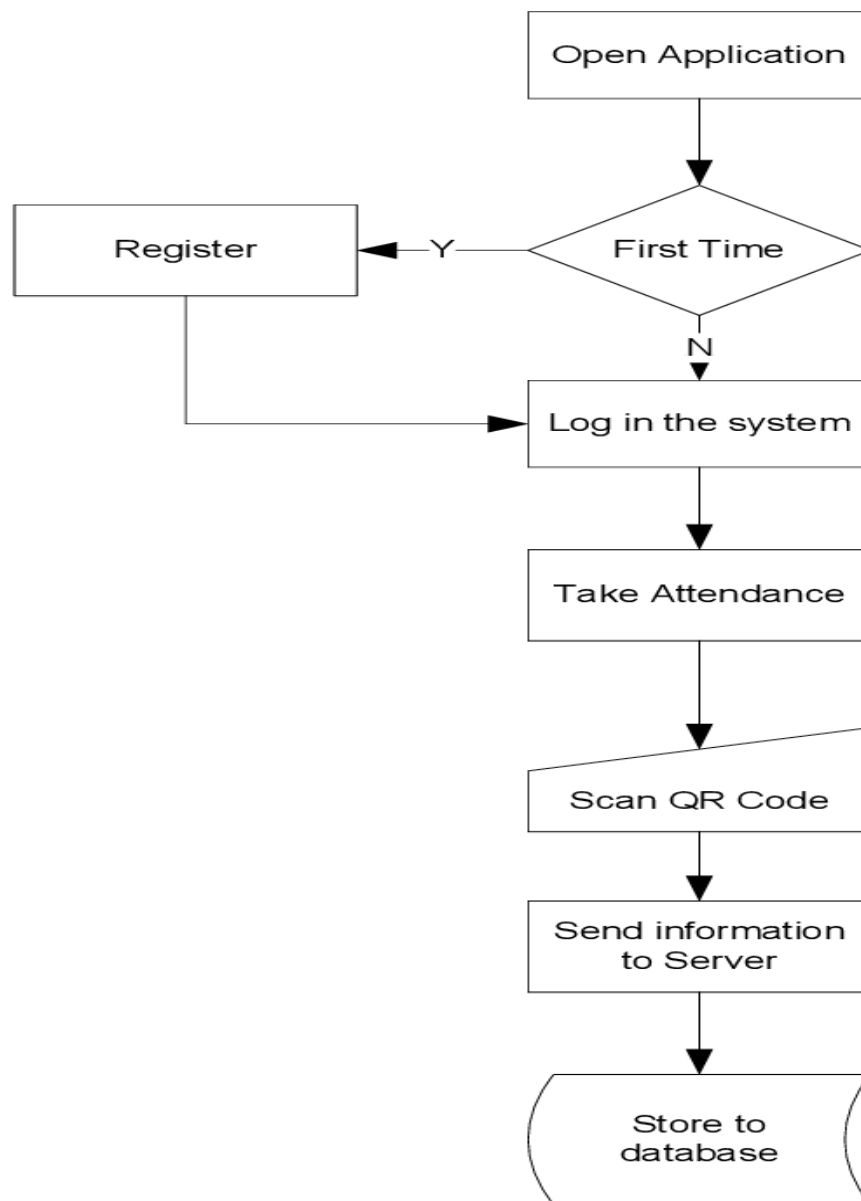


Fig 3.1.1: System Architecture for QR Based Attendance System

3.2SYSTEM ANALYSIS

EXISTING SYSTEM:

There are some automatic attendances making system which are currently used by much institution. One of such system is biometric technique. Although it is automatic and a step ahead of traditional method it fails to meet the time constraint. The student has to wait in queue for giving attendance, which is time taking.

3.3SYSTEM REQUIREMENTS:

SOFTWARE REQUIREMENTS

The functional requirements or the overall description documents include the product perspective and features, operating system and operating environment, graphics requirements, design constraints and user documentation.

The appropriation of requirements and implementation constraints gives the general overview of the project in regards to what the areas of strength and deficit are and how to tackle them.

- **Python idel 3.7 version (or)**
- **Anaconda 3.7 (or)**
- **Jupyter (or)**
- **Google colab**

HARDWARE REQUIREMENTS

Minimum hardware requirements are very dependent on the particular software being developed by a given Enthought Python / Canopy / VS Code user. Applications that need to store large arrays/objects in memory will require more RAM, whereas applications that need to perform numerous calculations or tasks more quickly will require a faster processor.

- **Operating system : windows, linux**

- **Processor** : minimum intel i3
- **Ram** : minimum 4 gb
- **Hard disk** : minimum 250gb

FUNCTIONAL REQUIREMENTS

- 1.Data Collection
- 2.Data Preprocessing
- 3.Training And Testing
- 4.Modiling
- 5.Predicting

NON FUNCTIONAL REQUIREMENTS

NON-FUNCTIONAL REQUIREMENT (NFR) specifies the quality attribute of a software system. They judge the software system based on Responsiveness, Usability, Security, Portability and other non-functional standards that are critical to the success of the software system. Example of nonfunctional requirement, *“how fast does the website load?”* Failing to meet non-functional requirements can result in systems that fail to satisfy user needs. Non- functional Requirements allows you to impose constraints or restrictions on the design of the system across the various agile backlogs. Example, the site should load in 3 seconds when the number of simultaneous users are > 10000. Description of non-functional requirements is just as critical as a functional requirement.

- Usability requirement
- Serviceability requirement
- Manageability requirement
- Recoverability requirement
- Security requirement
- Data Integrity requirement
- Capacity requirement
- Availability requirement
- Scalability requirement
- Interoperability requirement

- Reliability requirement
- Maintainability requirement
- Regulatory requirement
- Environmental requirement

3.4 SYSTEM STUDY

FEASIBILITY STUDY

The feasibility of the project is analyzed in this phase and business proposal is put forth with a very general plan for the project and some cost estimates. During system analysis the feasibility study of the proposed system is to be carried out. This is to ensure that the proposed system is not a burden to the company. For feasibility analysis, some understanding of the major requirements for the system is essential.

Three key considerations involved in the feasibility analysis are

◆ **ECONOMICAL FEASIBILITY**

◆ **TECHNICAL FEASIBILITY**

◆ **SOCIAL FEASIBILITY**

ECONOMICAL FEASIBILITY

This study is carried out to check the economic impact that the system will have on the organization. The amount of fund that the company can pour into the research and development of the system is limited. The expenditures must be justified. Thus the developed system as well within the

budget and this was achieved because most of the technologies used are freely available. Only the customized products had to be purchased.

TECHNICAL FEASIBILITY

This study is carried out to check the technical feasibility, that is, the technical requirements of the system. Any system developed must not have a high demand on the available technical resources. This will lead to high demands on the available technical resources. This will lead to high demands being placed on the client. The developed system must have a modest requirement, as only minimal or null changes are required for implementing this system.

SOCIAL FEASIBILITY

The aspect of study is to check the level of acceptance of the system by the user. This includes the process of training the user to use the system efficiently. The user must not feel threatened by the system, instead must accept it as a necessity. The level of acceptance by the users solely depends on the methods that are employed to educate the user about the system and to make him familiar with it. His level of confidence must be raised so that he is also able to make some constructive criticism, which is welcomed, as he is the final user of the system.

3.5UML DIAGRAMS

UML stands for Unified Modeling Language. UML is a standardized general-purpose modeling language in the field of object-oriented software engineering. The standard is managed, and was created by, the Object Management Group.

The goal is for UML to become a common language for creating models of object oriented computer software. In its current form UML is comprised of two major components: a Meta-model and a notation. In the future, some form of method or process may also be added to; or associated with, UML.

The Unified Modeling Language is a standard language for specifying, Visualization, Constructing and documenting the artifacts of software system, as well as for business modeling and other non-software systems.

The UML represents a collection of best engineering practices that have proven successful in the modeling of large and complex systems.

The UML is a very important part of developing objects oriented software and the software development process. The UML uses mostly graphical notations to express the design of software projects.

GOALS:

The Primary goals in the design of the UML are as follows:

1. Provide users a ready-to-use, expressive visual modeling Language so that they can develop and exchange meaningful models.
2. Provide extendibility and specialization mechanisms to extend the core concepts.

3. Be independent of particular programming languages and development process.
4. Provide a formal basis for understanding the modeling language.
5. Encourage the growth of OO tools market.
6. Support higher level development concepts such as collaborations, frameworks, patterns and components.
7. Integrate best practices.

USE CASE DIAGRAM:

A use case diagram in the Unified Modeling Language (UML) is a type of behavioral diagram defined by and created from a Use-case analysis. Its purpose is to present a graphical overview of the functionality provided by a system in terms of actors, their goals (represented as use cases), and any dependencies between those use cases. The main purpose of a use case diagram is to show what system functions are performed for which actor. Roles of the actors in the system can be depicted.



Fig 3.5.1: Use case Diagram for QR Based Attendance System

Class diagram:

The class diagram is used to refine the use case diagram and define a detailed design of the system. The class diagram classifies the actors defined in the use case diagram into a set of interrelated classes. The relationship or association between the classes can be either an "is-a" or "has-a" relationship. Each class in the class diagram may be capable of providing certain functionalities. These functionalities provided by the class are termed "methods" of the class. Apart from this, each class may have certain "attributes" that uniquely identify the class.

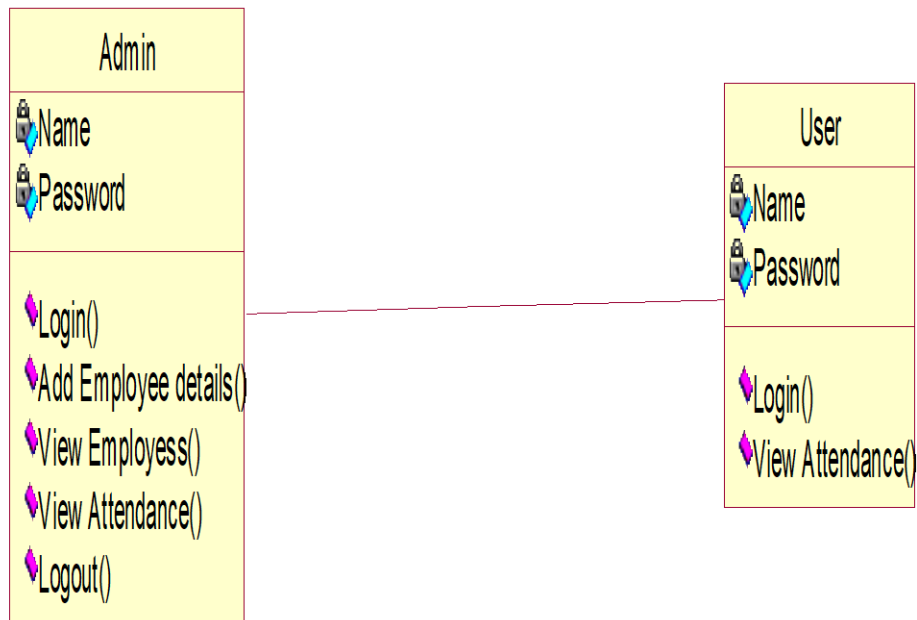


Fig 3.5.2 Class Diagram For QR Based Attendance System

Sequence diagram:

A sequence diagram represents the interaction between different objects in the system. The important aspect of a sequence diagram is that it is time-ordered. This means that the exact sequence of the interactions between the objects is represented step by step. Different objects in the sequence diagram interact with each other by passing "messages".

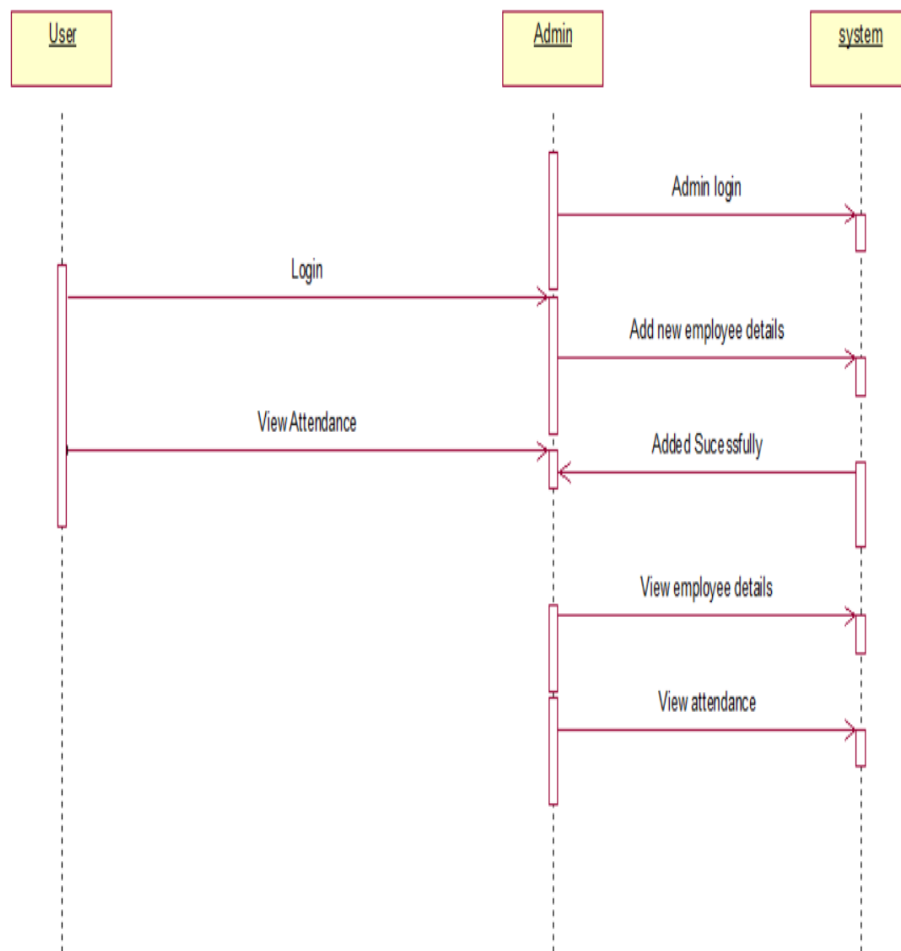


Fig 3.5.3: Sequence Diagram for QR Based Attendance System

4.IMPLEMENTATION

4.1 Sample Code

```
from tkinter import messagebox

from tkinter import *

from tkinter import simpledialog

import tkinter

import numpy as np

from tkinter import simpledialog

from tkinter import filedialog

import os

import cv2

import pymysql

import time


main = tkinter.Tk()

main.title("Webcam application to scan QR Code for Employee Attendance")

#designing main screen

main.geometry("1300x1200")

global emp_id, present_date

emp_id = "none"
```

```

def addAttendance(eid):

    output = "Error in marking attendance"

    status = 0

    dd = str(time.strftime('%Y-%m-%d'))

    con = pymysql.connect(host='127.0.0.1',port = 3306,user = 'root', password = 'root',
database = 'qrattendance',charset='utf8')

    with con:

        cur = con.cursor()

        cur.execute("select * FROM attendance where emp_id='"+eid+"' and
presence_days='"+dd+"'")

        rows = cur.fetchall()

        for row in rows:

            status = 1

            output = "Attendance already marked for Employee ID : "+eid+" for todays date
"+dd

            break

        if status == 0:

            db_connection = pymysql.connect(host='127.0.0.1',port = 3306,user = 'root',
password = 'root', database = 'qrattendance',charset='utf8')

            db_cursor = db_connection.cursor()

            student_sql_query = "INSERT INTO attendance(emp_id,presence_days)
VALUES('"+eid+"','"+dd+"')"

            db_cursor.execute(student_sql_query)

```

```

        db_connection.commit()

        output = "Attendance saved in database"

    return output

def runWebCam():

    global emp_id, present_date

    cap = cv2.VideoCapture(0)

    detector = cv2.QRCodeDetector()

    while True:

        _, img = cap.read()

        data, bbox, _ = detector.detectAndDecode(img)

        if bbox is not None:

            for i in range(len(bbox)):

                cv2.line(img, tuple(bbox[i][0]), tuple(bbox[(i+1) % len(bbox)][0]),
color=(255, 0, 0), thickness=2)

            if data and data != emp_id:

                output = addAttendance(data)

                emp_id = data

                messagebox.showinfo(output, output)

            cv2.imshow("QR Code Scanner", img)

            if cv2.waitKey(1) == ord("q"):

                break

```

```
cap.release()

cv2.destroyAllWindows()

def exit():

    main.destroy()

font = ('times', 13, 'bold')

title = Label(main, text='Webcam application to scan QR Code for Employee
Attendance')

title.config(bg='LightGoldenrod1', fg='medium orchid')

title.config(font=font)

title.config(height=3, width=120)

title.place(x=0,y=5)

font1 = ('times', 12, 'bold')

text=Text(main,height=20,width=100)

scroll=Scrollbar(text)

text.configure(yscrollcommand=scroll.set)

text.place(x=480,y=100)

text.config(font=font1)
```

```
font1 = ('times', 12, 'bold')
```

```
uploadButton = Button(main, text="Start Webcam", command=runWebCam)
```

```
uploadButton.place(x=50,y=100)
```

```
uploadButton.config(font=font1)
```

```
exitButton = Button(main, text="Exit", command=exit)
```

```
exitButton.place(x=50,y=150)
```

```
exitButton.config(font=font1)
```

```
main.config(bg='OliveDrab2')
```

```
main.mainloop()
```

5.SYSTEM TESTING

5.1 Introduction

The purpose of testing is to discover errors. Testing is the process of trying to discover every conceivable fault or weakness in a work product. It provides a way to check the functionality of components, subassemblies, assemblies and/or a finished product. It is the process of exercising software with the intent of ensuring that the

Software system meets its requirements and user expectations and does not fail in an unacceptable manner. There are various types of test. Each test type addresses a specific testing requirement.

5.2UNIT TESTING

Unit testing, a testing technique using which individual modules are tested to determine if there are issues by the developer himself.. it is concerned with functional correctness of the standalone modules. The main aim is to isolate each unit of the system to identify, analyze and fix the defects.

Unit Testing Techniques:

Black Box Testing - Using which the user interface, input and output are tested.

White Box Testing –Used to test each one of those functions behavior is tested.

5.3 DATA FLOW TESTING

Data flow testing is a family of testing strategies based on selecting paths through the program's control flow in order to explore sequence of events related to the status of Variables or data object. Dataflow Testing focuses on the points at which variables receive and the points at which these values are used.

5.4INTEGRATION TESTING

Integration Testing done upon completion of unit testing, the units or modules are to be integrated which gives raise too integration testing. The purpose of integration testing is to verify the functional, performance, and reliability between the modules that are integrated.

5.5BIG BANG INTEGRATION TESTING

Big Bang Integration Testing is an integration testing Strategy wherein all units are linked at once, resulting in a complete system. When this type of testing strategy is adopted, it is difficult to isolate any errors found, because attention is not paid to verifying the interfaces across individual units.

5.6 USER INTERFACE TESTING

User interface testing, a testing technique used to identify the presence of defects is a product/software under test by Graphical User interface [GUI].

5.7 TEST CASES:

Test case id	Test case description	Actual value	Entered value	Status
1	Register user details in registration page	Fill all the fields while registering user	All the fields are filled	Pass
2	Give user name in text box	User name must be given in alphabets	User name given in alphabets and numeric values	Fail
3	Password to be entered in password box	Password must be given correctly	Password is entered wrongly	Fail
4	Phone number must be entered in phone number box during registration	Phone number must be given in 10 digits	Phone number given in 10 digits	pass

5.7.1 Test Table For QR Based Attendance System

6.RESULTS

QR Code Based Attendance System

In this project we are designing QR code based employee attendance system and this project consist of two modules

- 1) Admin module: admin can login to application by using username and password as 'admin' and 'admin' and then can ADD New Employee Details and then application will generate QR CODE on EMPLOYEE ID and then admin can download that image and give to employee and employee can show that image to QR CODE scanner to mark attendance. Admin can view all employee details and then can view employee attendance by using start and end date.
- 2) Employee Login Module: employee can login to system by using his ID and can view his attendance from start and end date selection
- 3) QR CODE WEBCAM SCANNER: employee has to show his QR CODE image from his mobile to webcam and then webcam will read QR CODE and mark attendance. Only one attendance for each employee for each day will be marked.

All details will be stored in MYSQL database and to run project install MYSQL database and PYTHON 3.7 and then copy content from 'DB.txt' file and then paste in MYSQL console to create database.

Now double click on 'run.bat' file to start python web server and get below screen

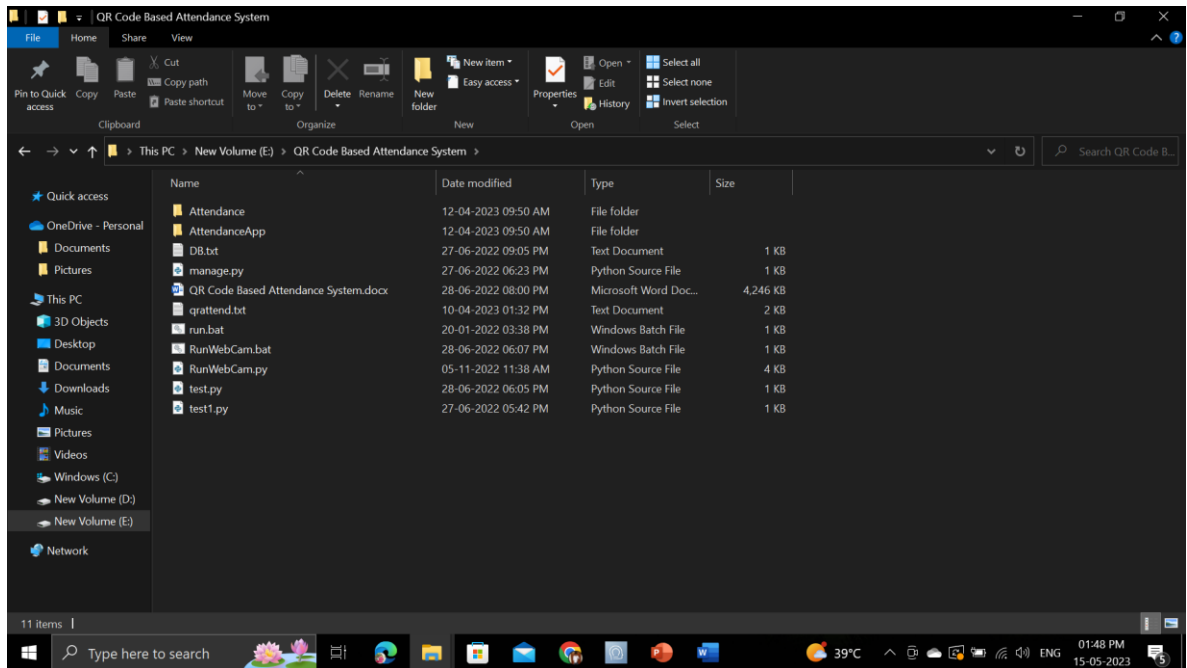


Fig 6.1: File Location

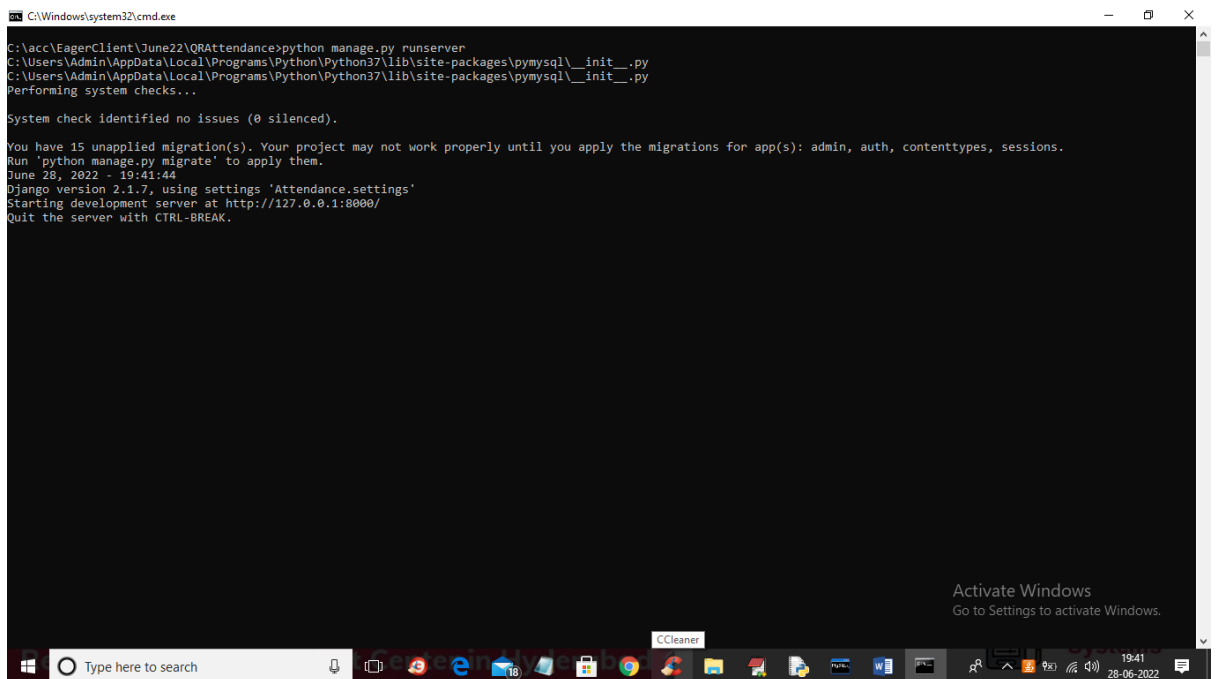


Fig 6.2: Use CMD for Home page

In above screen python web server started and now open browser and enter URL as 'http://127.0.0.1:8000/index.html' and press enter key to get below page

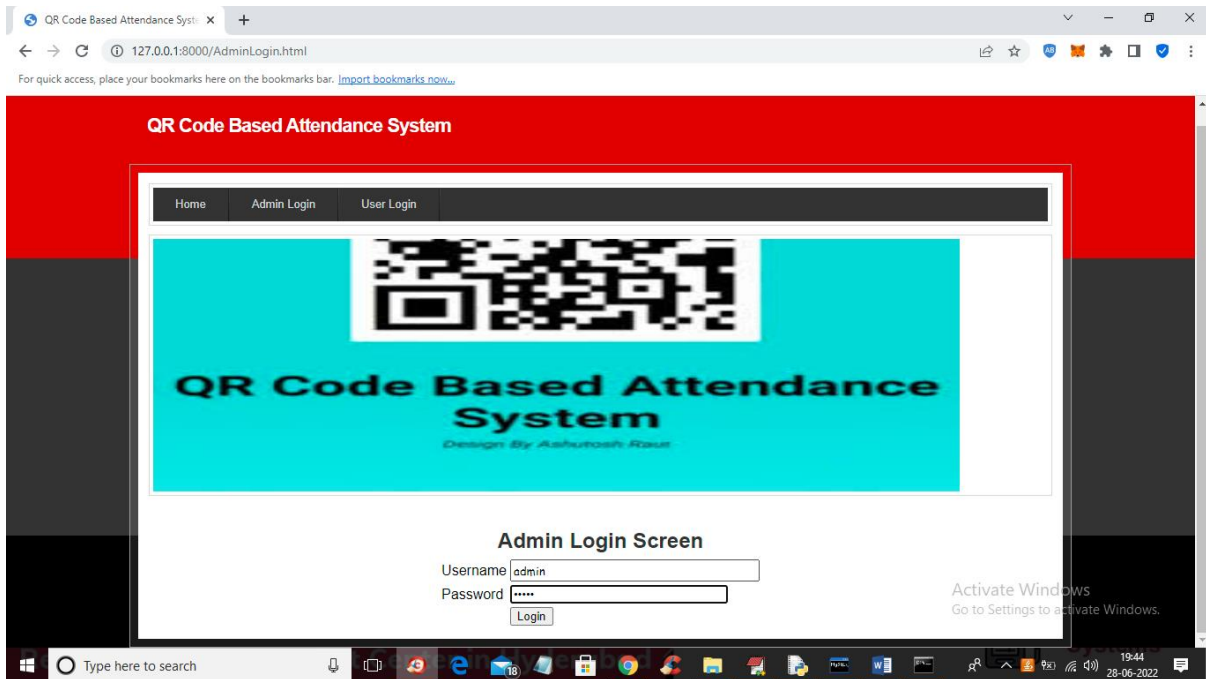


Fig 6.3: Enter Admin Data

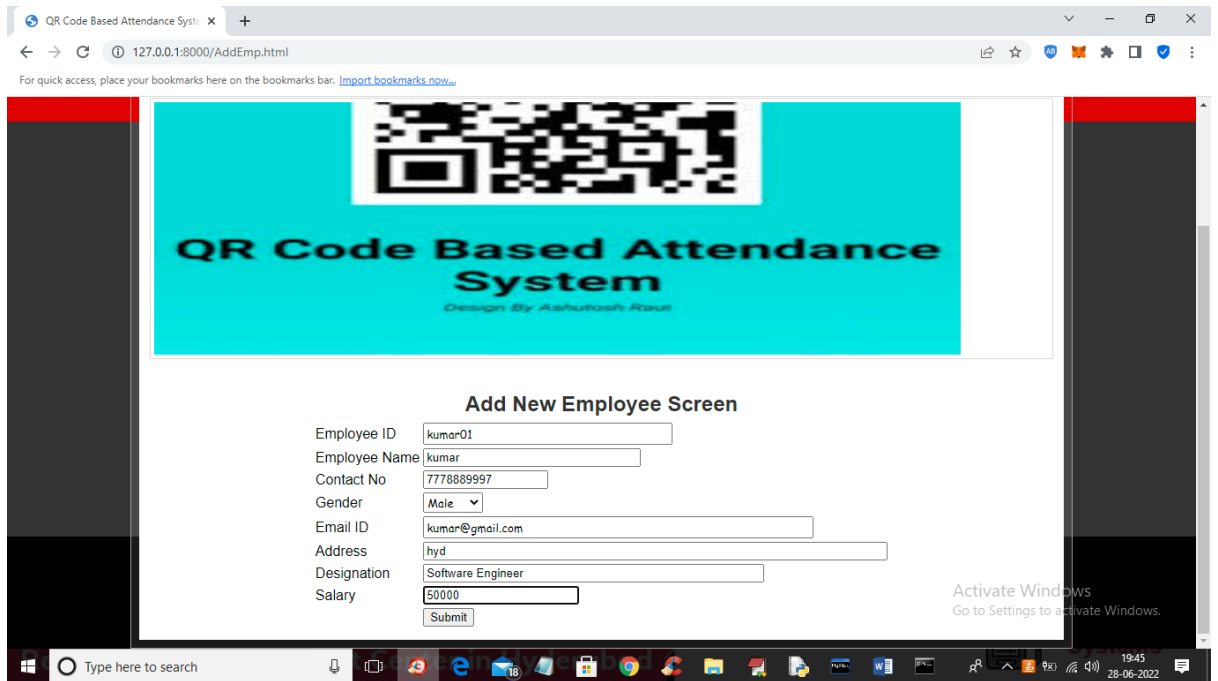


Fig6.4:Enter Employee Details

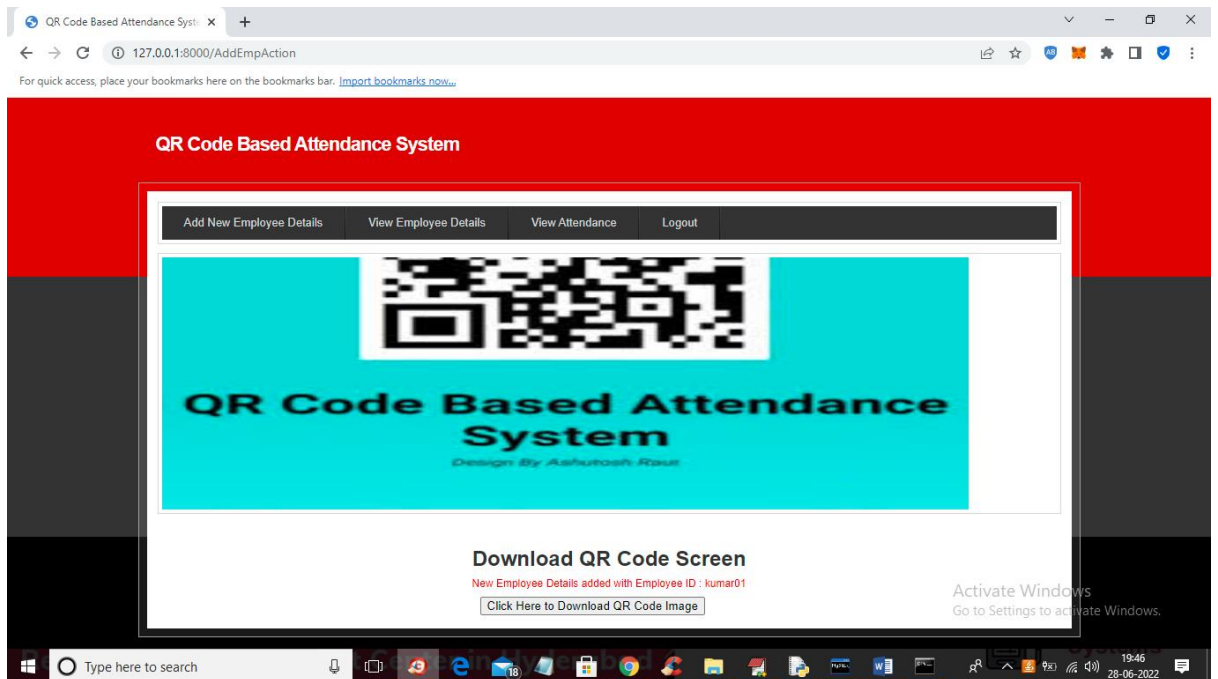


Fig:6:5 Download QR Code

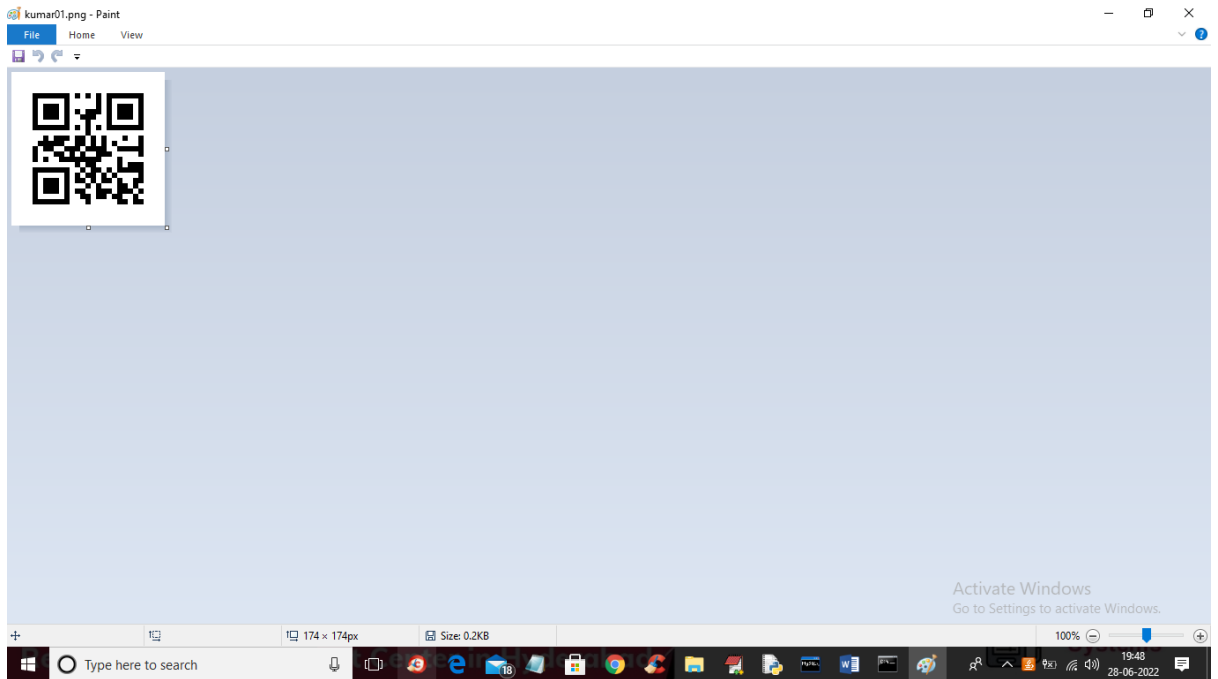


Fig6.6:Copy Qr Code

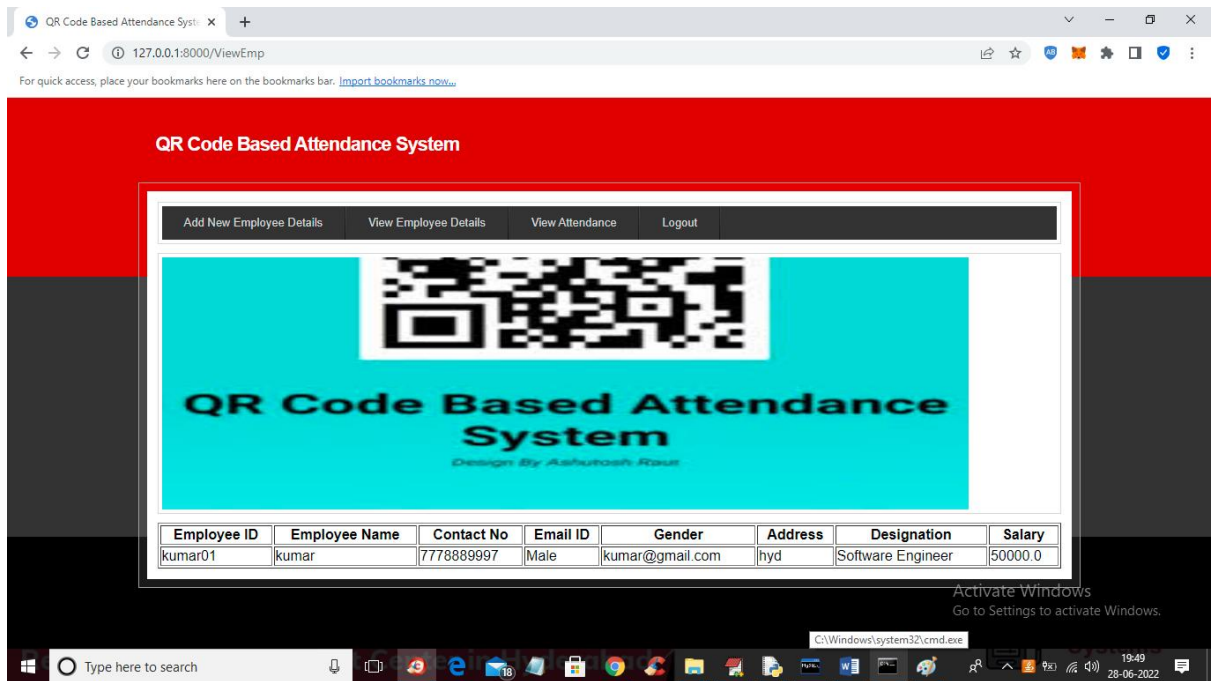


Fig6.7:Employee Details Are Shown

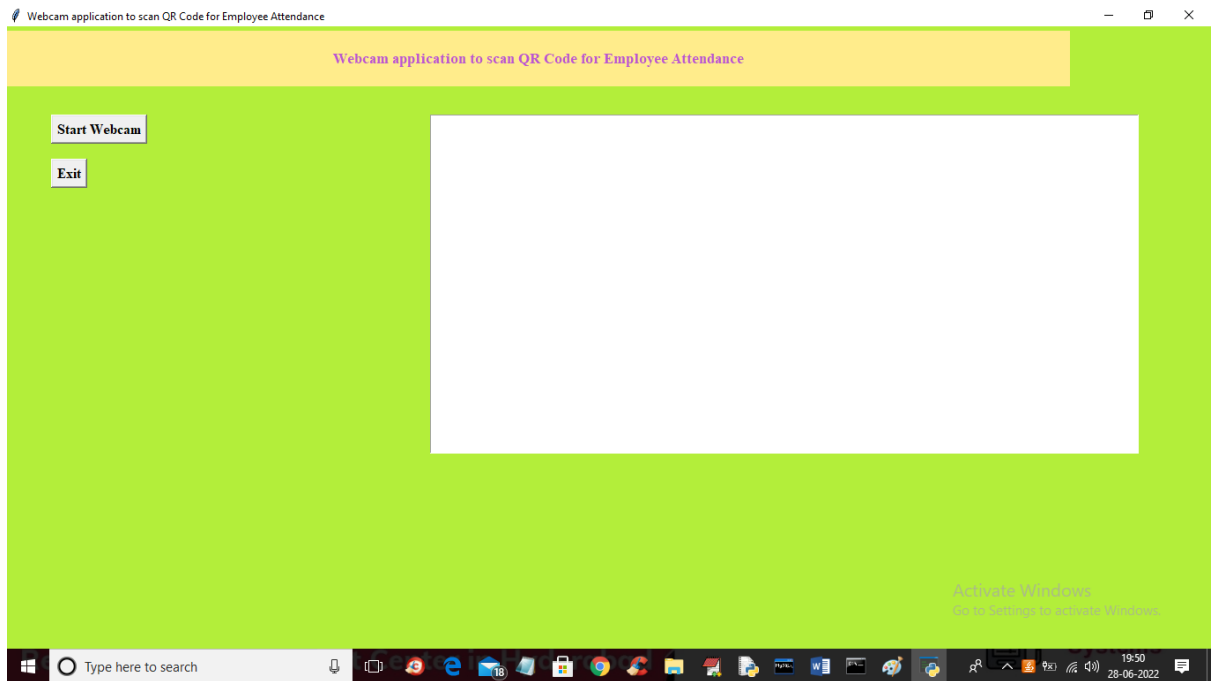


Fig.6.8:RunWebCam.bat To Open Camera

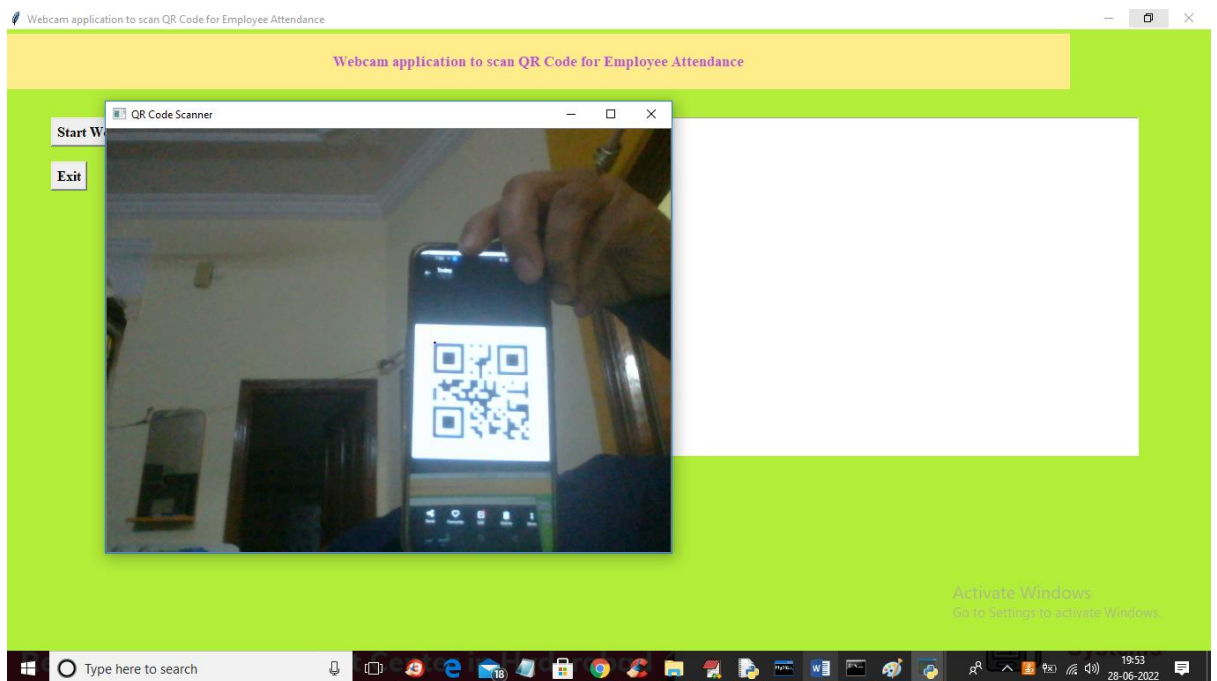


Fig.6.9:Place Qr In Camera Position To mark Attendance

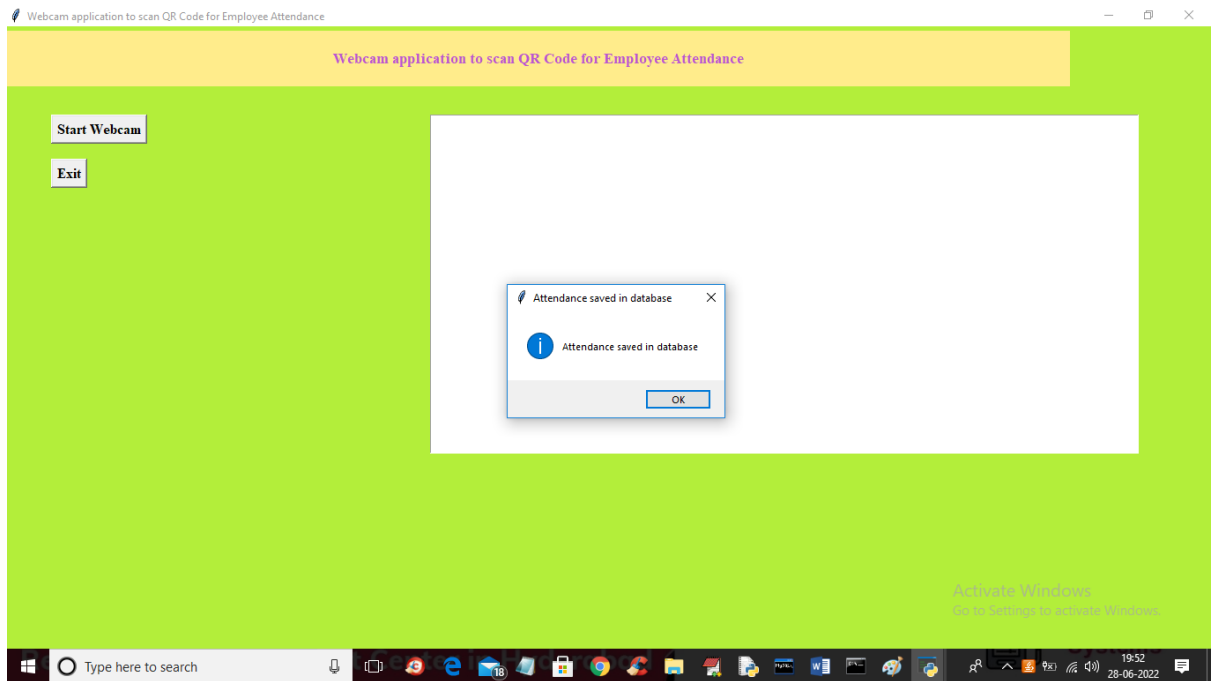


Fig.6.9:A Pop Box Will Present After QR Scanned

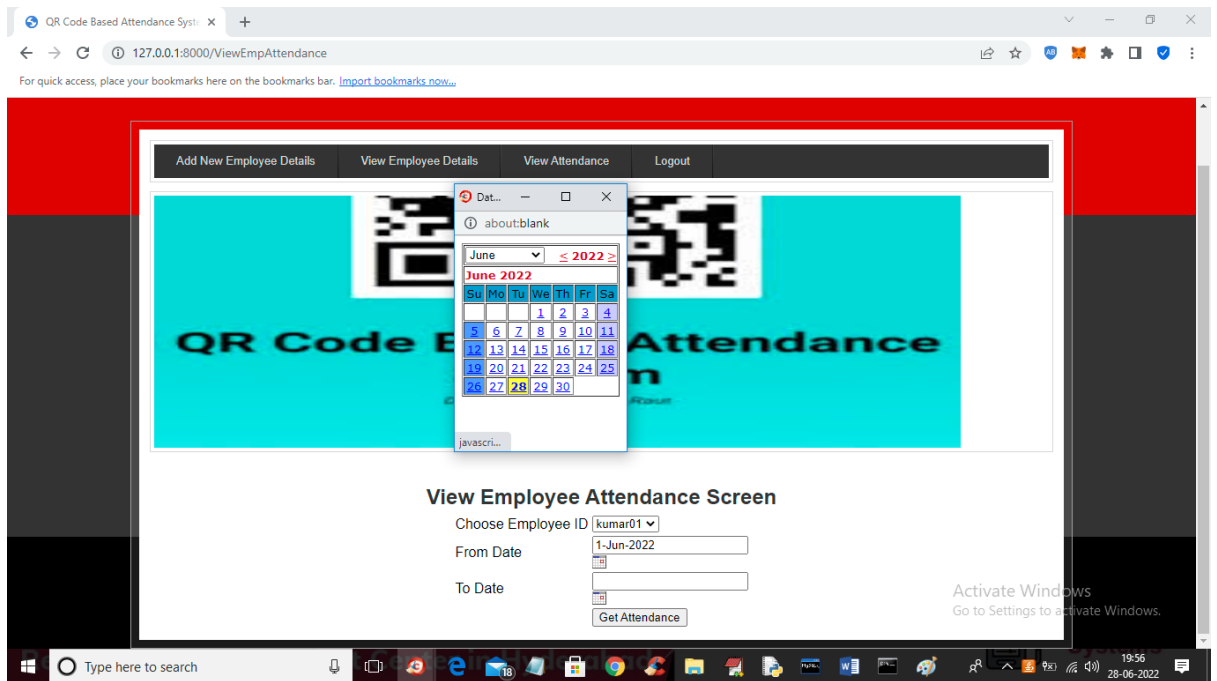


Fig.6.10:Admin Can Check The Employee Presenting Days

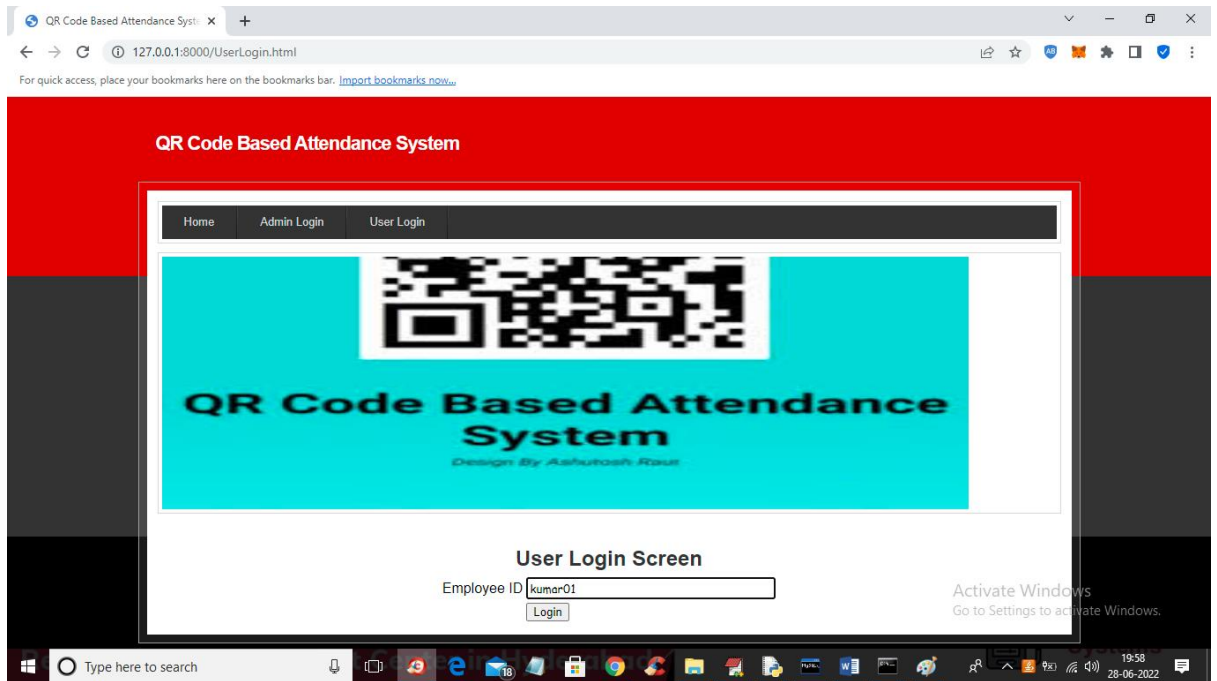


Fig.6.11:User can Login And Check Attendace Details

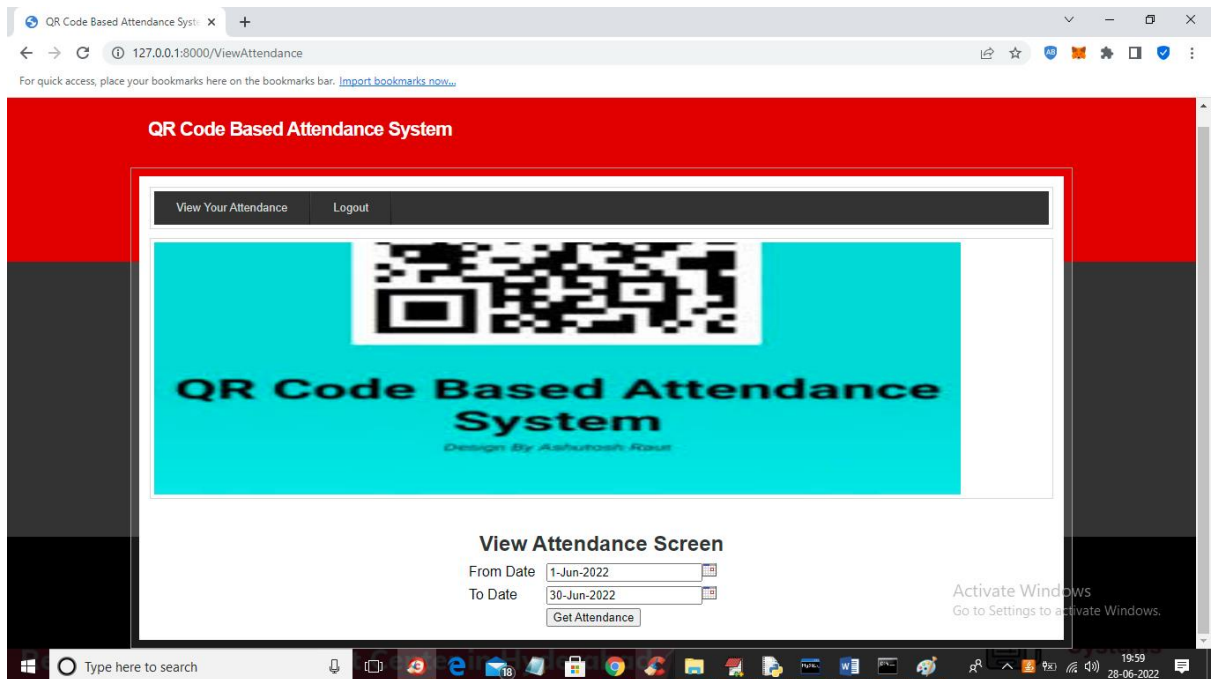


Fig.6.12:Attendance Will be Viewd

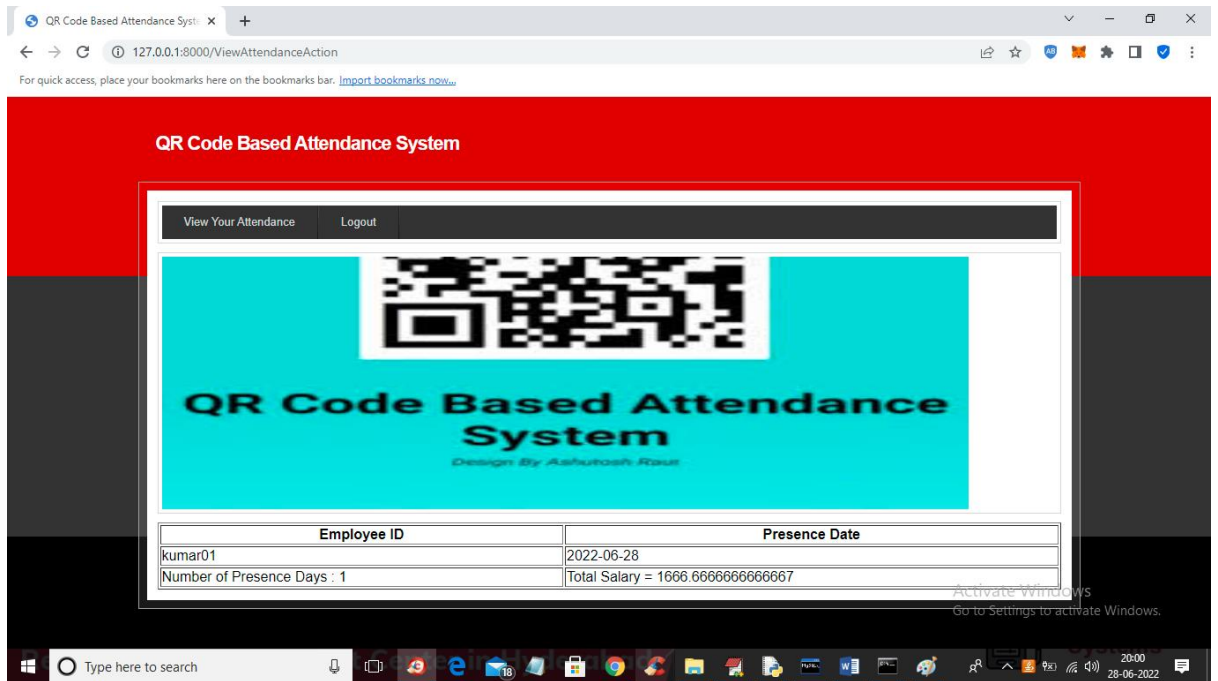


Fig6.13:Salary To Be Paid Will Be Shown Here

8.CONCLUSION & FUTURE SCOPE

The developed system presented in this paper has been successfully designed and tested. The student's attendance status will be analysed and exported. Attendance monitoring system is very important in our daily life. It is possesses a really great advantage, among the whole types of code scanning technology, QR Code Based Smart Attendance System is the most accurate. In this project report, we have given an introduction of Attendance monitoring system and its advantage.

9. REFERENCES

Journals:

- [1] Hendry, M. R. M., Rahman, M. N. A., & Seyal, A. H. (2017). Smart attendance system applying QR code. In 12th International Conference on Latest Trends in Engineering and Technology (ICLTET'2017) May (pp. 22-24).
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4. Learning with Python, Allen B. Downey

Websites:

- <https://www.tutorialspoint.com/python/index.htm>
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