

A DIGITAL SYSTEM FOR ATTENDANCE, PAYMENT AND
PORTABLE ADMIT CARD GENERATOR

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GENERATOR

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SUPERVISOR'S DECLARATION

We hereby declare that we have checked this project and in our opinion, this project is adequate in terms of scope and quality for the award of the degree of Master of Engineering in Department of Information and Communication Engineering of Noakhali Science and Technology University.

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I hereby declare that the work in this project is my own except for quotations and summaries which have been duly acknowledged. This project report has not been accepted for any degree and is not concurrently submitted for the award of other degrees.

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ABSTRACT

Digital attendance system takes attendance and calculates the average attendance percentage for a certain period through digitally. The result of attendance system is used in payment system to identify whether a student is able to attend in exam and download admit after completing the examination fee. This system can minimize the time, effort, and cost of manual attendance system. The whole system has three modules i.e. Admin module, Teacher module, and Student module. Everyone has their own identity based on their role. Student can open their login credential using basic information and enroll in courses, monitoring attendance on a regular basis, complete course registration and exam fee payment through MFS or Internet Banking and download admit. Teachers' credentials are used for login in the system to take attendance. Teacher has the authority to enroll in a specific course. The whole system has one administrative credential that is used for authenticate the others necessary information and modify access rights. We used HTML, CSS and JavaScript for front end and PHP and Laravel framework used for back end design. We are trying to keep the entire project easy, efficient and convenient and designed in such way that specific tasks can be completed in less time. The essential time required for taking attendance to calculating average attendance, paying exam fee for acquiring admit to seat in exam must be decrease if the system implied in academic purpose. If this project fully implemented than it will save time, effort and money.

Keywords: Digital Attendance System, Digital Payment, Portable Admit Card, Examination.

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LIST OF ABBREVIATIONS

MFS	Mobile Financial Service
HTML	Hyper Text Markup Language
CSS	Cascading Style Sheet
PHP	Hypertext Preprocessor
ICT	Information and Communication Technology
AES	Advanced Encryption Technology
CBC	Cipher Block Chaining
IPSec	Internet Protocol Security
ATM	Automated Teller Machine
SHA	Secure Hashing Algorithm
VB.NET	Visual Basic .NET
PIN	Personal Identification Number
IT	Information Technology
SDLC	Software Development Life Cycle
MVC	Model-View-Controller
SQL	Structured Query Language
IMAP	Internet Access Messaging Acces Protocol
POP3	Post Office Protocol
LDAP	Lightweight Directory Access Protocol
HDD	Hard Disk Drive
ER	Entity Relationship

DOM	Document Object Model
DBMS	Database Management System
API	Application Programming Interface
JDBC	Java Database Connectivity
ODBC	Open Database Connectivity
CRUD	Create, Read, Update and Delete

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

Almost every part of life has been influenced by information and communication technology (ICT), which has transformed these fields in various ways. Higher education is definitely facing the consequences of ICT in the age of globalization, digitization, and information. Digital system allow us to obtain information from anywhere make the system more practical and reliable. Every educational institution needs to maintain a huge variety of things to educate its students. Attendance system is an integral part of any institutions or company to track the students or employee. It has taken daily basis by the course instructor. Each academic institute has assigned certain marks based on attendance. Every student must meet a certain attendance percentage to seat in the examination. Several form need to be filled to pay the fees before seating in the examination. Availability of internet and digital device make the digital payment system more accessible to us. Mobile financial service or internet banking extract the related information from the student profile in our proposed system. There are presently 18 banks offering mobile banking services in the nation under various brands such bKash, Rocket, UKash, MyCash, and SureCash, according to the most recent statistics from the Bangladesh Bank. Digital banking adopted different cryptographic measurements to secure every transaction. The Advanced Encryption Standard (AES) algorithm adds support for the new encryption standard AES, with Cipher Block Chaining (CBC) mode, to IPSecurity (IPSec). The development in AES triggered a transform for IPSec and Internet Key Exchange (IKE) are used in ATM, Cards and Mobile banking [1]. This project's goals were to automate higher education institutions and assess the automated system from

the viewpoint of emerging nations. The digital process of monitoring attendance and payment can be done from anywhere without going physically in an educational institute. The project we have developed focused on security of every aspect of this system.

1.2 MOTIVATION OF THE STUDY

There are various types of attendance system applications that are used in different situations, such as schools and higher education institutions. Many statistical research shows that almost every student in higher education has their own digital device to access internet. This data indicates the solution of wasting time and attendance cheating in each lecture time by using web based attendance system is the ultimate modern solution.

According to the Bangladesh Bank website, at least 18 MFS providers are running in Bangladesh serving millions of business firms and households all over the country. Among them, the most popular MFS provider is bKash which is used by approximately 170 institutions including schools, colleges, universities, and other institutes to pay tuition, exam, registration, and others fee. The following data shows us the acceptance rate of digital payment system. This digital payment system is widely accepted due to its simple and suitable features. Different types advance encryption technology such as Blockchain, SHA-256 etc. is used in digital payment system network.

The existing system for collecting admit card needs laborious work. The existing system for examination fees payment need to be cautious for both students and teacher as the student have to filled the form and teacher shall cross check accuracy of data. A student need to fill the several form before payment completion and require several days to collect the admit card from the authority.

1.3 PROBLEM STATEMENT

These days, using mobile technology to receive the latest information has become popular. There are a number of advantages of using technology such as smart phones and tablets. This essay will explain the three main benefits of using these devices: portability, features and price. The current process of taking class attendance and calculation is outdated and inefficient. The traditional and normal way of taking attendance is by using pen and paper manually which is seemed as unproductive, repetitive and tedious processes. This method of taking attendance will result in time lost rather than effective lecture delivery, especially if the class population is large. People are fully dependent on smartphones which is highly portable. Some faculty polices require attendance task to be performed by the teacher in each lecture. Moreover, there is no skipping the class by the help of classmates. None can give attendance of another student. This is done by the course teacher himself/herself. The goal of my project is to reduce these hassle of taking class attendance using notebook in a smart way with real time calculation, reduce the time of making attendance percentage and making a full monitoring system of a student class attendance performance by one click.

Mobile phones are argued to have the potential to be a low-cost accessible account or delivery channel for financial information, services, and transactions, facilitating innovations like electronic money (e-money), micropayments (m-payments), and a mobile banking channel (m-banking). Bangladesh Bank (BB) is issuing regulatory guidelines for mobile phone-based Financial Service (MFS) platforms in Bangladesh, with the aim of creating a defined, facilitating, and competitive environment for utilizing this new window of opportunity to creatively expand the reach of financial services [2]. MFS encourage the affordable use of formal financial services, especially unbanked population segments. Also the number digital banking users increasing day by day. Increasing number of mobile phone and internet user make the digital way for payment system is easily accessible and feasible.

Admit card or offline exam hall ticket utilized for identification purposes. Only when a student meets the pre-examination requirements can he/she pick up their admit card from the department or the appropriate authority. Admit card is used for identify student impersonation, authentication and verification of student. Collection of admit card manually from respective authority required much more time. Our system automatically fetch required data from student profile to generate portable admit card which is already examined by the teacher.

1.4 OBJECTIVES

The existing system for attendance, exam fee payment and admit card distribution is time consuming and challenging. The evolving internet infrastructure led the education system to be digital. We have already availed the benefit of distance learning and online examination due to COVID-19. Digital system can be absolute or the only solution in some extreme situation. The main objectives of this work are:

- To provide a secure full dynamic and real time system using server and internet
- To stop the class lecture skipping by giving fake attendance.
- To reduce the time of taking and calculating class attendance.
- To complete payment system without any paperwork
- To collect admit card instantly.
- To make user-friendly web-based system

1.5 SCOPE

A smart fast and efficient attendance system that reduces the fake attendance and saves time before the class lecture. This project is initiated in the first place because of the real time attendance tracking and stop the fake attendance. Student should be have careful while registering to create his/her account in this system. The whole examination process is complex task. The payment of different types of fees and charges, and admit card distribution is the part of examination process. This project facilitate the payment and admit card distribution for both students and authority.

1.6 PROJECT SIGNIFICANCE

We design our project to accomplish multiple task. Our final goal is to merge our system with existing and newly adopted model to digitalize our educational institution. Our web-based project has user interface to take attendance, calculating the average presence of every student. Every student pay their examination fee through digital channel only when he/she met minimum average attendance percentage criteria. Literature asserts that, for nearly every business, the simple act of collecting payments from consumers is actually quite complex and yet organizations want to make it easy and convenient for customers to pay, so they offer multiple choices of payment types and channels. Therefore, this project proposed the development of an alternative platform that enables students to pay university fees online from wherever they are using MFS, Credit and Debit cards. This will reduce the lengthy queues, and congestion at banks for payments. Moreover, this system will heavily reduce time wasting for each department as well teacher and students. Those wasted time can be used by doing productive work on departments.

1.7 SUMMARY

Lastly, in this chapter, we discussed how we can develop an application by writing the topics such as: motivation behind the project, significance, system description and so on.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

A digital system offers more possibilities than a manual procedure. From student entrance to the publishing of the final results, academic institutions must submit a lot of paperwork. Our digital system tries to lessen their paperwork to minimize educational institute hassle. The comprehensive digital educational system is made up of some parts, including an admissions process, a class management system, a learning process scheme, an exam control system, a result management solution, and an information management program. The first element of the digital educational processing system is started with the digital enrollment system. The enrollment process of an educational institution becomes very complex when the waiting time is prolonged. The most effective approach to address this issue is through technological means. The digital enrollment process, including student enrollment, registration, and reporting, was simplified, allowing for a reduction in congestion, time, and human effort [3]. We trace our enrolled students regularly through attendance based on their presence on weekdays.

Recording the attendance of employees in an organization and students in an academic institution are both crucial [4]. Students in academic institutions are only allowed to take exams if their average attendance fulfills the minimal criterion specified by the respective institute. Manual entry of each attendance on a sheet of paper is the traditional method of documenting attendance. These are then entered into log books or computer systems. Even after the computerization of database administration, the early phase comprises paper-based entry, which is extremely

vulnerable to illegal access, raising concerns about the original data's legitimacy. A digitally taken attendance system would help to support a paperless educational system. A paperless office is one in which the usage of paper is decreased, eliminated, or fully eliminated, and more ecologically friendly corporate operations [5]. The use of technology instruments in information management (creation, distribution, and storage) in association with a reduction in paper operations. The educational institutions needed a lot of paper for their documentation and exams.

Manual attendance systems can be replaced with automated biometric identification systems such as fingerprint sensors, iris recognition, or face detection. Aamir, Syed, Ahmed, Adnan, and Kamran created a digital attendance system that offers a twofold solution to the problem, it eliminates the need to manage paper records of attendance taken in class and stores attendance information in a database with the ability to display requested information extracted from the database [4]. A student can take an exam or not depending on the average present in a certain period of time. The average attendance percentage can provide by the institution authority written on paper. The web-based or digital system can provide real-time average attendance to the student which can sometimes facilitate the student.

In recent years, the volume and complexity of Bangladesh's financial industry have increased significantly. Rapid countrywide mobile phone network expansion, along with Bangladesh Bank-led modernization of the country's Payments system and financial sector IT infrastructure, has opened doors for innovating mobile phone-based cost-effective modes of off-branch financial service delivery to underprivileged populations [2]. Smart cards, blockchain transactions, online payments, mobile application, and biometric authentication are all examples of digital payment system [6]. Research shows that: (i) In COVID-19 pandemic, the digital payment system plays a crucial role in purchasing household products and sustainable economic development; (ii) lots of statistical data shows that digital payment has a significant positive impact on customer needs [7]. Different types of security incidents are occurring after technological advancements in financial institutions. Many educational institutes also used internet banking services to collect their different types of fees and charges. The outbreak of Covid-19 in early 2020 turbocharged internet banking as the

virus forced people to turn to technologies to communicate, work, study and find entertainment [8]. Many educational institutions already adopt digital payment systems to collect their different types of academic fees and charges due to hassle free and handy.

Distance learning, online examination, and digital payment system are already known to us in COVID-19 days. Offline examination hall ticket requires different authority approval. The falsification of this document can be detected through thorough monitoring. It is used to authenticate a person to appear exam by comparing name, roll number and photograph images on the hall ticket [9]. Online examination system also needs similar types of offline exam hall tickets to know that the student already meets the specific criterion to attend in the exam. The portable document with different security feature can be used as online exam hall tickets. This digital or portable token cannot be easily forged since it is downloaded only when a student pay their exam fee.

2.2 DIGITAL ATTENDANCE SYSTEM TECHNOLOGIES

In the earlier, punch cards, also recognized as Hollerith cards, were used to store data. Through these cards, organizations could save and access data by inserting the card into the computer system [10]. Employees used a punch card system to punch their time clocks, and supervisors manually added up their hourly shifts at the end of the pay period [11].

To track student daily attendance, a desktop application is developed by B.K. Sharma, Uma Joshi and S.K. Jain. The teacher supplies the daily attendance for specific class to the operator to save the in system. They chose the following technologies for their application: MS Access for the backend and VB.NET for the language [12].

A desktop program developed by Jainetal will display all registered lists of students for a specific course when the lecturer launches the application. The

attendance is recorded by checking the box next to each student's name who is present, and then clicking the register button to acknowledge their presence [13].

Gunjan Talaviya et. al [14], proposed an attendance system and record maintenance system for schools and colleges. This system automatically takes attendance using the fingerprint module and maintains the record on the computer. The report will be generated after 15 days.

2.3 DIGITAL PAYMENT SYSTEM TECHNOLOGIES

In the recent few years, the use of internet users and mobile phone has increased exponentially. This increasing number of internet users adopt digital payment due to ease, less time consumption, and availability of services. Mobile phone users can easily complete daily transaction using widely accepted MFS platforms. The mobile payment protocol removes the limitation of mobile payment systems that are based on the Full Connectivity Scenario, which needs direct contact between a client and a merchant for verification purpose [15]. The payers can access the payment system via web browsers or applications on mobile devices. More people nowadays are willing to pay for goods or services using their mobile [16]. Student or user can pay their bill with just several taps on mobile phones which is much more convenient and time worthy than the traditional banking system. To pay academic fees or bill through MFS, students or users need to select 'Pay Bill' from the home screen and tap on the respective bill payment icon. In next step, they should enter relevant information and proceed to payment with MFS platform PIN. Upon successful payment, students or users will get confirmation notification. They can save the environment-friendly digital receipt for future need [17]. Every transaction has its own unique transaction id by which every transaction can be easily distinguished.

Banks currently operate in an environment that is extremely globalized, liberalized, commercialized, and competitive. IT has ushered in a new business paradigm. It is becoming significant in terms of improving financial services. Internet banking is a system that allows individual clients to conduct financial transactions at

off-bank sites such as their homes, offices, and other locations using internet-based secure networks [18].

Authors of the paper from Gemalto [19] discuss usage of hardware tokens in strong online authentication and secure storage of personal information. They emphasized the importance of communication security between the token and the host computer as a vital component of the entire security system.

Payments can be made electronically using digital wallets. It allows users to transfer funds across transaction accounts, which can be conventional banking accounts or electronic money deposit accounts, as well as employ other payment instruments. Digital wallets replicate a physical wallet on a mobile device, in which users can store different payment instruments (e.g., cards, transfers) to make mobile payments [20].

Each financial institution always tries to improve the service in the institution looking for technology-oriented innovation. The mobile payment services that are now being created and upgraded play a vital role in the development ecosystems that include regulators, financial institutions, device manufacturers, retailers, and the customer himself. With the increasing use of mobile payment, it is important to know the key factors that make people use mobile payment. The key factor in the use of mobile payment can be an opportunity for financial services to build the right mobile payment for human needs [21].

2.4 SUMMARY

Literature review means, to study a lot of research paper that similar project topic. We mentioned those papers and references for better study at scope.

CHAPTER 3

METHODOLOGY

3.1 INTRODUCTION

Methodology is a study of context, a cohesive and logical scheme based on perspectives, ideas, and values that drives researchers' decisions. It involves a theoretical evaluation of the body of procedures and concepts related with a field of knowledge in such a way that the methodologies used from distinct disciplines differ based on their historical development. This creates a continuum of methodologies that reach through conflicting understandings of how best to comprehend knowledge and truth. In overarching theories and methods, this situates methodologies. In our project the schedule is divided into five stages. Issue finding, theory building, system creation, experimentation and discussion and assessment are the flows of the phases.

3.2 MODEL

Model design is a crucial phase that involves a multi-step process that represents the program structure, interface characteristics, and procedural details. It is a significant part of the software development life cycle (SDLC). An idea has so many uncertain things when we try to construct a system. Model gives us details information to transform the idea into a system. When we want to convert a proposition into a system, so many things to add or delete to develop the final system than a model play an important role to provide the right way to complete the system. And we get simple ideas as well as a functional specification of a device from this research section. In our project we follow the agile model.

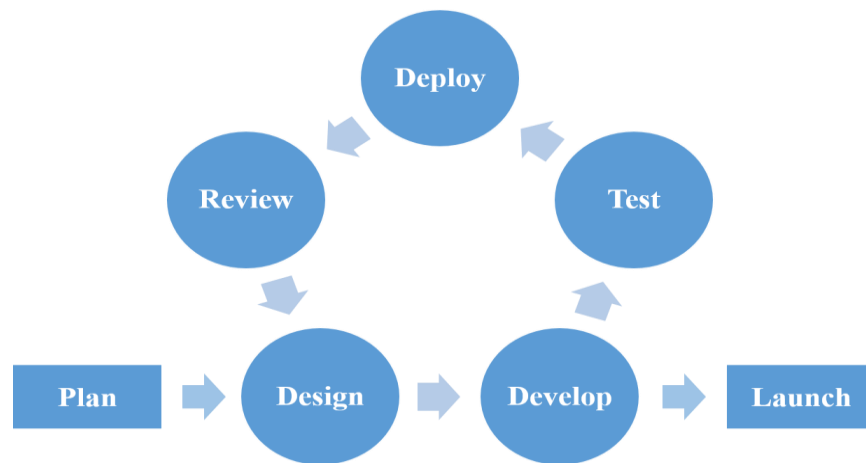


Figure 3.1: Agile Development Model

When all stages of production are complete, we examine the progress made towards achieving of the required specifications. We take accountability for the problem or incompleteness that occurred in the previous stage and find a solution to the problem. After that, a new phase of the agile software development lifecycle starts, either with a new iteration or by progressing to the next phase. We adopt agile paradigms for all of our programs and consistently provide good results.

Iterative development techniques, in a nutshell, plan, build, and implement project functionality in small portions (or iterations). The key to effective iterative delivery is that each small portion works as a smaller mini-project within the larger project. Iteration is the process of repeating the same procedure, sequence, and process in any measures undertaken. Iteration is the repetition of a procedure in order to get a result. The series will eventually reach an endpoint or value. Each iteration of the process is a single repetition of the process, and the conclusion of each iteration serves as the beginning point for the next iteration. We get the final project after the final iterations.

3.3 DESIGN

Software design is the process of converting user requirements into a suitable form that will aid the programmer in software coding and implementation. We use Laravel framework to develop our project. Laravel is a free and open-source PHP web

framework intended for the development of web applications following the model–view–controller architectural pattern. We use MVC architecture to grasp the whole process quickly. We use both the front end and the back end in our project. HTML, CSS and JavaScript are used in front-end design to build a user-friendly interface for users. Navigation bar is used for finding the process easily without waiting for a while. We use the PHP programming language and Laravel web platform in the back-end portion for a user-friendly interface. We try to make our whole system easy and simple.

3.3.1 Front End Design

Front-end developers turn designs into reality. The process of frontend design involves writing the presentational JavaScript, HTML, and CSS code that make up a graphical user interface and allow for direct interaction with a system. We gave Bellow the name of our language used and its explanation.

- i. HTML
- ii. CSS
- iii. Java Script

HTML

- i. HTML stands for Hyper Text Markup Language.
- ii. HTML describes the layout of Web pages by using markup.
- iii. The construction blocks of HTML pages are HTML elements.
- iv. The tags reflect the HTML elements.
- v. HTML tags mark content sections, such as heading, paragraph, table etc.

CSS

- i. Simply modify the style to create a global change, and all elements on all web pages will be automatically modified.

- ii. For multiple HTML pages, we can write CSS once and then reuse the same layer. For each HTML feature, we can define a style and add it to as many Web pages as we like.
- iii. HTML attributes are being discontinued now, and using CSS is preferred. It's a smart idea to start using CSS to make it compliant with future browsers on all HTML sites.
- iv. CSS defines how HTML elements are to be shown on a computer, document, or in other media.
- v. CSS is used in a clear and simple way to monitor the layout of a web document.

JavaScript

- i. JavaScript is an interpreted, lightweight programming language.
- ii. It is intended for the creation of network-centric applications.
- iii. It works in tandem and complements Java.
- iv. Since JavaScript is compatible with HTML, it is very simple to use.
- v. It is free to use and cross-platform.
- vi. JavaScript is now used in game development, mobile app development, and desktop app development.

jQuery

- i. jQuery is a lightweight JavaScript library.
- ii. jQuery has document object model (DOM) manipulation library.
- iii. It facilitates HTML document traversing, event handling, and animation.
- iv. It supports Ajax which is used to develop a responsive and feature rich site.
- v. The jQuery has cross browser support and works well in latest version of browser.

3.3.2 Back End Design

Back-end site of the system is the important part since it decides how much fast we interact with the system and speed of the site. We used the Laravel framework, which has all of the functionality we need to create web applications, such as validation, caching, queues, file storage, and more. The building front-end of a system of an application with Laravel leveraging by PHP for simple and spontaneous design. It is given as below:

PHP

- i. PHP stands for Hypertext Preprocessor
- ii. PHP is a server side scripting language and a powerful tool for making dynamic and interactive web pages.
- iii. PHP is a widely-used, easy and efficient.
- iv. PHP is integrated with number of popular database, including Oracle, MySQL, Sybase, Microsoft SQL Server and PostgreSQL.
- v. PHP executes quickly, especially when compiled as an Apache module on the Unix side.
- vi. PHP supports a large number of major protocols such as IMAP, POP3 and LDAP.

Laravel

- i. Laravel is an open-source PHP framework, which is robust and easy to understand.
- ii. Laravel provides a rich set of functionalities that combine the fundamental characteristics of PHP frameworks.
- iii. The Laravel framework makes the web application more scalable and flexible.
- iv. A Laravel-designed web application will run in different environments, which means its configuration will be constantly changing.

- v. Laravel features queue services to help with task completion without having to wait for the previous task to be completed.
- vi. Laravel simplifies designing authentication.

3.4 REQUIREMENTS

The requirements are an important project guideline which lead us whether a project become successful, user friendly and easy to use. The completion of the project must ensure every specification and criterion full fill. The success or failure of a system depends on whether a system meets every required aspect of the users. The criteria are the skills, attributes, and features that must be present in the final project output. To develop a successful system or model we need a specific crystal clear requirement. Undefined criteria lead to confusion, duplication of effort, rework, and time waste.

Students

The system develops based on requirements to be able to do some specific job. The main thing is to pay all types of fees and charges using MFS or Internet Banking. The course registration fee for a student depends on the total number of enrolled courses. The exam fee relies on a student's average attendance percentage which must be equal or above 70%. Otherwise, a student a never be able to proceed with his/her exam fee payment. The successful exam fee payment system led to download admit card automatically. The average attendance count from every workday presence or absence. The enrolled course teacher has the only right to submit the absent or present of a student.

- i. Login user panel
- ii. Update profile
- iii. View student average attendance
- iv. View the number of classes held
- v. View course wise attendance
- vi. View total enrolled courses
- vii. View payment system

- viii. Download admit card

Teachers

The teachers' panel shows the session-wise course details. If the teacher enrolled in specific session-wise course than all the information of these students who are enrolled in the course showing roll wise. Teacher has the authority to enroll the specific course by himself/herself.

- i. Sign into the teacher panel
- ii. Modify profile and login credential
- iii. Add or modify student attendance
- iv. Displaying total number of class
- v. Showing the number of class taken by student
- vi. Enrolled to a course

Admin

An admin is a special types of user. The internal database has full access to the admin. Admin can add, delete or modify course, department, hall and others information. The teachers' first time login credential provides by the admin which can be updated by the teacher. The overall internal data flow maintain by the database administrator. The dashboard for admin have showed total students, departments, courses and halls. The student's details display in students' navigation bar. Semester, Courses and Sessions navigation show the respective information that can be modified by the admin. Teacher login credential created form add new teacher button and also modified previous stored teacher information.

- i. Admin panel login
- ii. Control overall data flow
- iii. Set login credentials for teacher
- iv. Add, modify or delete department, hall, semester and session
- v. Validate students details information

Hardware

Table 3.1: Hardware Requirements

Computer Processor	Intel Pentium
Hard Disk (HDD)	More than 20 GB
Ram	More than 512 MB
Motherboard	Anyone
Internet Connections	Mobile Networks or Broadband or WiFi
Monitor	Any

Software

Table 3.2: Software Requirements.

Browsers	Google Chrome, Firefox, Edge, Opera Mini, UC Browsers, Safari
----------	---

3.5 DIAGRAMS AND SYSTEM OVERVIEW

Recognizing the effect, it is necessary to choose instruments, technologies and software for design and implementation phases. Research more than one potential technology in certain design decision cases and take the best performance for the best outcome.

3.5.1 Diagrams

We used here mainly two diagrams. These are: ER Diagram and Use Case Diagram.

Entity Relationship Diagram

An entity relationship diagram depicts the relationships of entity sets recorded in a database (ERD). An entity is an object, a data component in this context. A series of similar entities is an entity set. Such entities which have characteristics which define their properties. An ER diagram illustrates the relationship between sets of individuals. A collection of similar entities is an entity set and these entities may have attributes. In DBMS terminology, an object is a table or a table attribute in the database, so the ER diagram demonstrates the complete logical structure of a database by showing the relationship between tables and their attributes. To grasp this idea, let's take a look our ER diagram. Our ER diagram described our full project and connected all important attributes. It also described not only project system but also whole information and contents. Three basic concepts are based on this model:

- i. Entities
- ii. Attributes
- iii. Relationships

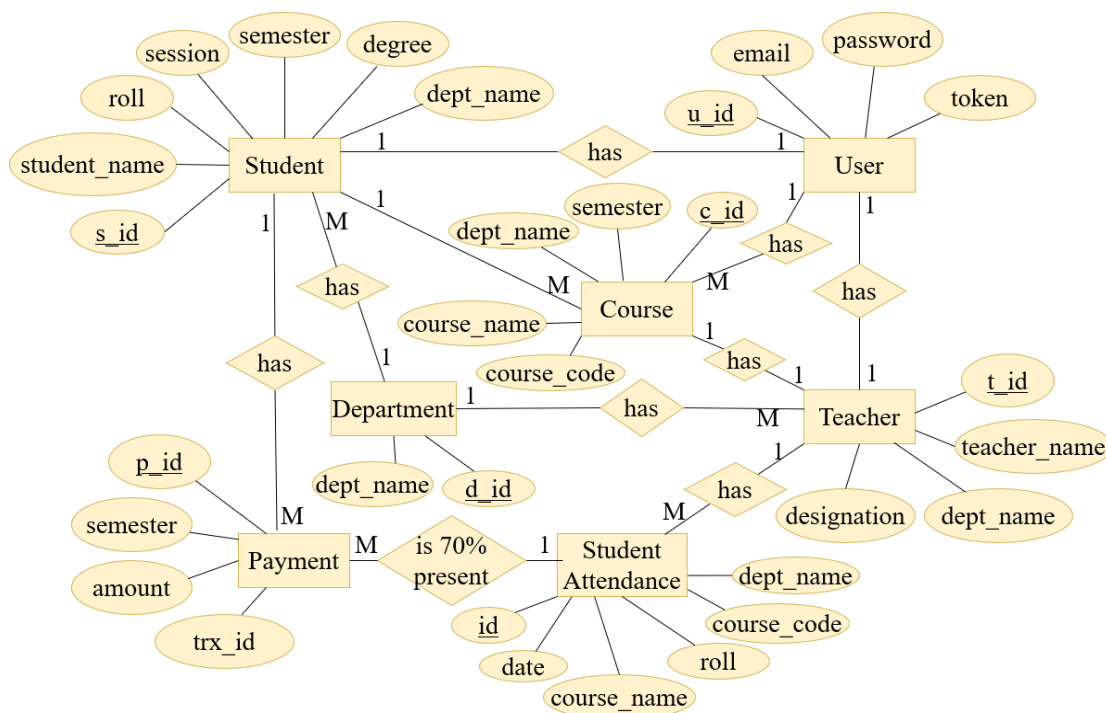


Figure 3.2: ER diagram

The location, person, object, event or concept that stores data in the database may be an entity. An attribute and a specific key must be present in the characteristics of entities. Each entity consists of certain 'attributes' representing that entity. In the following diagram, for example, some entities are: User, Teacher, Student, Student Attendance, and Payment. Attribute is either an entity type or a relation type single valued property. In this diagram, entities has some several attributes name, id, designation, session, email, dept_name, course_name, course_code, roll, semester etc. Here are some geometric shapes in ER diagram. These are called diamond, rectangle, ellipse, lines.

Use Case Diagram

A use case diagram is used to show the dynamic properties of a system. It includes the system's functionality by incorporating use cases, actors, and their relationships. It models the processes, services, and functionalities required by an application's system/subsystem. It represents a system's high-level functionality as well as how the user interacts with the system. Use case diagram contains four objects:

1. Actor
2. Use Case
3. System
4. Package

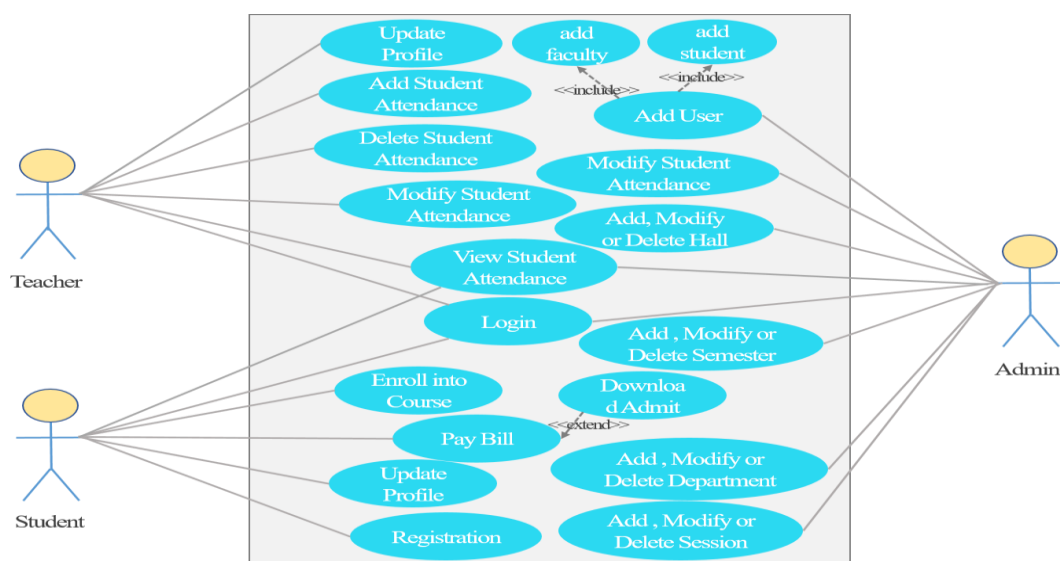


Figure 3.3: Use Case Diagram

In a use case diagram, an actor is any entity that performs a part in an given system. It could be a person, an organization, or an external system, and is typically depicted as the skeleton has shown below. In the following diagram, for example, some actors are: Admin, Teacher and Student. A use case is a function or an action within the system. In our diagram Add Student, Pay Bill, Update Profile, Add User etc. are used as use case. It has drawn as an oval and named with the function. The system is shown as a rectangle to define the scope of the use case. It demonstrates the project's scope. Packages are used to organize use cases.

3.5.2 System Overview

A successful project system overview gives sufficient information for the reader to understand the system's capabilities, what it can do, what it can interact with, and any specific requirements. The developed application is a web application that must be acceptable to all framework users. Users can access the program using a standardized platform. It is also simple to operate.

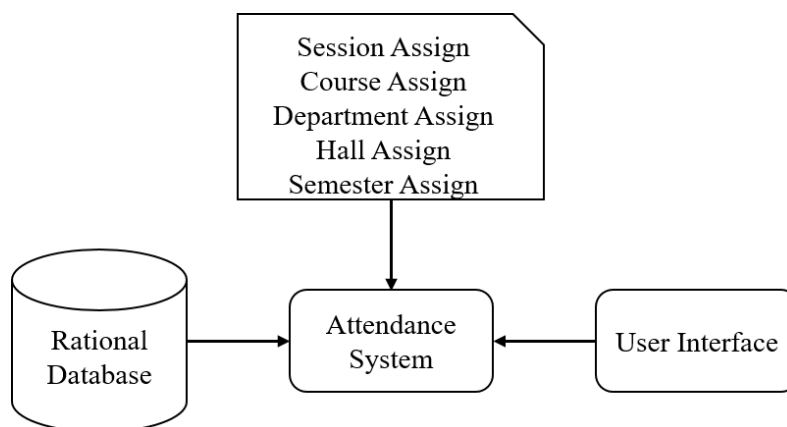


Figure 3.4: System Architecture.

Login Process

The flow chart diagram is commonly used to identify the basic method. In this flow chart, we used the Laravel web framework login procedure, which included an email and password system. The user enters their email and password. If the system is

valid, then log in and ultimately enter the system. If the username and password are not valid, the error message will be displayed. User authentication is an important aspect of most applications and may be thought of as the method that allows the system to validate the identity of a user connecting to a network resource.

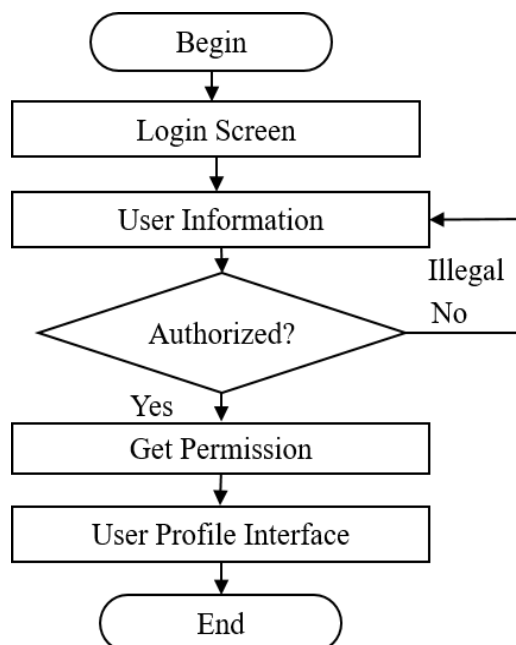


Figure 3.5: User Login Process.

3.6 IMPLEMENTATION

We must put together a number of programs or applications, such as text editors to render web applications, like Visual Studio Code, browsers, like Chrome, Firefox, Microsoft Edge, and utilized to install PHP-running framework, like Laravel. Additionally, it is ideal to be installed in our source code management system.

3.6.1 Database

A database management system (DBMS) is a computer program created to handle a sizable amount of organized data and perform operations on the users' desired data. It store the data in organized way so that desired data can be extracted easily. Currently Laravel supports four database systems: MySQL, Postgres, SQLite, and SQL Server. We used MySQL database in our project. MySQL is an open-source

relational database management system. It supports cross-platform, Query caching, Clustering, Built-in replication, Indexing, Searching and so on. The query caching reduces latency, since most queries now occur against the local cache and avoid a network round-trip. It also reduces the load on the network and on the central database server. Many programming languages include libraries for accessing MySQL databases, with language-specific APIs. These include the JDBC driver for Java and MySQL Connector/Net for .NET/CLI Languages. Additional programming languages that support the ODBC interface can communicate with a MySQL database via the MySQL Connector/ODBC interface [22].

- a. MySQL Installation
- b. MySQL Setup
- c. Running on a machine
- d. Creating Databases
- e. Table Construction Database

3.6.2 Front End and Back End Design

Front-end development deals with the user-facing part of a website. Front-end developers use programming languages, design skills, and other technologies to guarantee that visitors can easily interact with websites. They create website drop-down menus, layouts, and designs. Front-end developers create websites using computer programming languages such as JavaScript, Hyper Text Markup Language (HTML), and Cascading Style Sheets (CSS). Each language has a distinct function. Back-end developers use technical skills to execute behind-the-scenes work that provides the structure and overall performance of a website, allowing the front end to exist. These experts design the operations, databases, and application programming interfaces (API) for a website. The back end consists of an application, a database and a server.

3.6.3 Interactions

Interaction implementation is crucial for the development of an application or website. It is used in the development of online apps and webpages. An interactive web design is a website design that makes use of other built-in software, modules, programs or features to create an environment in which a website or web application user can actively participate throughout their visit. In our system, we have introduced a sensitive application management system.

3.6.4 Three-Tier Architecture

The below diagram depicts a three-tiered client-server with the three layers placed in the correct order. The first layer which is the user-interface interacts with the user, the user can then request for certain service. This request would be then sent to the application server which in the second layer. There would be some time taken for the request to be delivered from the user-interface to the application server. Once the request reaches the application server it would process the request to identify which data it needs from the database server. After identifying it would send a request to the database server requesting a particular piece of data. The database server would then retrieve that piece of data from the database and return the data back to the application server this process would take some time as shown by arrows in the diagram. Once the application server receives the data it would then convert the data into the version that is compatible with the user interface. This is done because most databases store data as raw data. In Laravel, the Model is usually a class with properties that match the columns in the database. Laravel resource routing assigns the typical “CRUD” routes to a controller with a single line of code and all the views are stored in the resources/views directory.

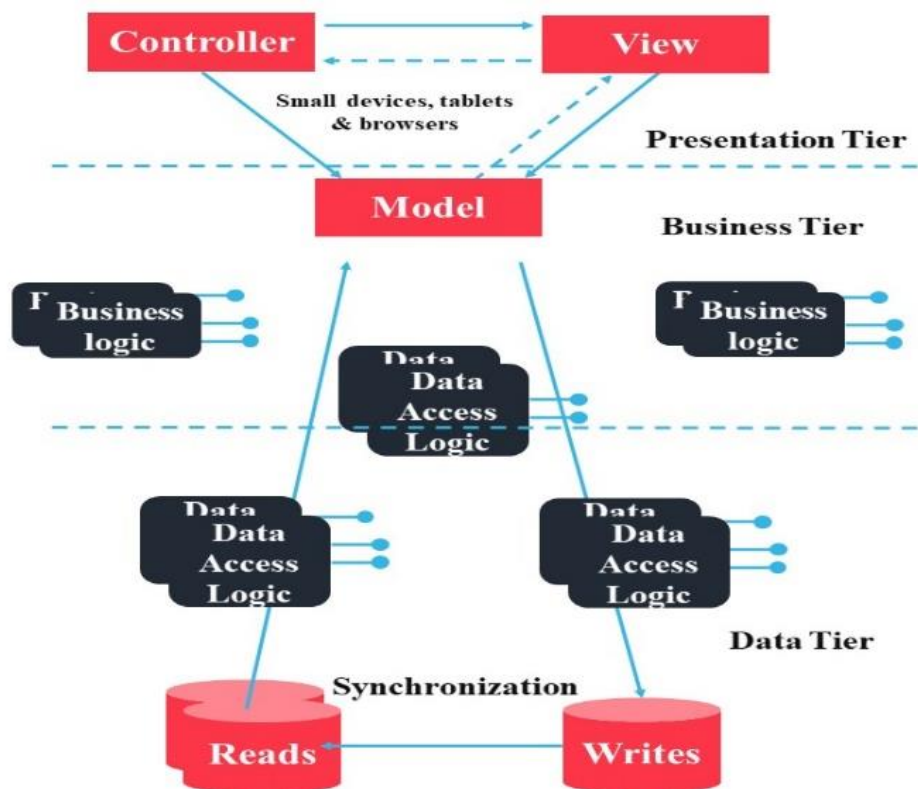


Figure 3.6: Three-Tier Architecture

3.7 SUMMARY

We now understand the design process, hardware, software, and the working method of the project from the above research. There are three types of users based on their role. The teacher receives first time login credential by admin and update relevant information including user id and password. This project used different web-based technology to make the system simple and elegant. The development process of this system starting after studying previous similar work and feasibility study of the existing system.

CHAPTER 4

TESTING AND MAINTENANCE

4.1 INTRODUCTION

A test plan is a document that contains details about the upcoming testing activities carried out in a project. Team members and stakeholders can adhere to the plan for the best pre-project preparation and for the project's status during it. The main purposes of creating a test plan:

1. The team members have a possibility to agree on scope, strategy and time frame of software components testing.
2. Another one important factor – here you define priority of the testing tasks.
3. Software testing company estimates of resources needed for performing software testing.
4. And significant aspect is that you evaluate and take into account of all possible risks.

4.2 TESTING

There are different types of testing are held to reach the final outcome of the project. We discuss all of them shortly.

Black Box Testing: Black box testing is a type of software testing where the software is tested without knowledge of the internal workings of the program or code.

White Box Testing: White box testing is a software testing technique in which the tester who will test the software is aware of its internal structure.

Unit Testing: A software testing technique called unit testing examines each individual piece of source code to see if it is ready for usage.

Integration Testing: Software testing at the integration testing level involves combining and evaluating many software components together. This level of testing aims to reveal errors in communication between integrated elements.

Functional Testing: Functional testing verifies that the functionality needed by the system requirements actually functions as stated. The application's source code is irrelevant to it.

System Testing: A type of software testing called system testing involves testing an integrated, whole program. This test's objective is to assess the system's compliance to the given specifications.

Acceptance Testing: A system is evaluated for acceptability during the acceptance testing stage of the software testing process. This test's objectives are to determine whether the system complies with business requirements and to determine whether it is suitable for delivery.

Usability Testing: Usability testing is placing a product to the test with actual people to determine how simple it is to use. Gaining a deeper understanding of how actual people engage with your product will help you enhance it. A usability test's main objective is to make a design better.

4.2.1 Testing Features and Strategy

As the changes made in the system to add new functionality or adapt the current functionality, a software function can be strong. All characteristics are supposed to have features designed to be useful, intuitive and effective. In reality, for testing that

feature consistent with the cycle of that announcement, a new test set is shaped. In each construction of that release, the enormously important and usually used new features must be methodically tested and reversion testing should also be performed relevant to those areas. A test strategy is a plan which defines the software development cycle's testing method. It is designed to notify project supervisors, testers, and users of some important testing process topics. Based on development design documents, they are created.

4.2.2 Testing Environment

A testing environment is a collection of software and hardware that allows testing teams to run test cases. In other words, it validates the use of hardware, software, and network settings. The main component to be set up for the test environment consists of:

- i. Framework and software
- ii. Research results
- iii. Front end running setting
- iv. Server database
- v. Network
- vi. Client method of service
- vii. Hardware requires the operating system server
- viii. Browser
- ix. Needed documentation

4.2.3 Test Cases

A test case is a set of criteria or variables that a tester uses to determine whether or not the test method fulfills or functions properly. The method of designing test cases may also help to recognize issues with an application's specifications or design.

4.3 CODING MAINTENANCE

When writing code, we are constantly making adjustments, such as adding functionality that we need or removing functionality that we no longer need. It can be difficult to learn a programming language and understand how calculations occur, but writing good code is sometimes more difficult.

4.3.1 Maintenance Plan

A digital system for attendance, payment, and portable admit card generator can impose corrective maintenance, adaptive maintenance, perfective maintenance, and preventive maintenance.

Corrective Maintenance: In the case that the program encounters errors, we will obtain a copy of the application from the server and hold it while the errors are fixed. The revised program will then be put in its place on the server. The errors will be fixed as soon as we are informed.

Adaptive Maintenance: Adaptive maintenance will be carried out when the system needs to accommodate the changing environment. This would be achieved, to satisfy the users' evolving needs.

Perfective Maintenance: When a user requests the installation of any functionality, the situation will be preserved perfectly. This will be done to improve the system service.

Preventive Maintenance: In order to prevent hackers and other unauthorized access to the device and its data, preventive maintenance will be implemented.

4.4 SUMMARY

Checking is a crucial component of an error-free system. All of the testing phases for that have been successfully completed. For a long-lasting operable module, the gadget needs to be carefully managed. The web-based device still needs special attention for the appropriate functionality.

CHAPTER 5

RESULTS & DISCUSSION

5.1 INTRODUCTION

Web-based digital attendance systems make the attendance procedure far more convenient than the manual method. The similar types of work has been studied to develop the project. Some of the systems appear prospective for the development of advanced systems that will actually be used. It is possible to further develop or merge with existing systems, which helps to make the system faster, stable and more user friendly.

5.2 USER INTERFACE

The interface between a user and a system is known as the user interface. An interface is a component of a system that makes it easier for information to be transferred from the system to the user and vice versa. The user can insert or extract specific data which is defined by the database administrator. Data cannot be added, modified or deleted by the users.

5.2.1 Homepage

A website's home page is its main web page. The word may also apply to the initial page displayed in a web browser when the application is launched. The home page is often found at the root of the website's domain or subdomain. The different users can login to the system from “Signin” option using their user id and password.

Before login to the system, a student need to complete the registration from “Student Registration” option. Student registration information authorized by the admin.

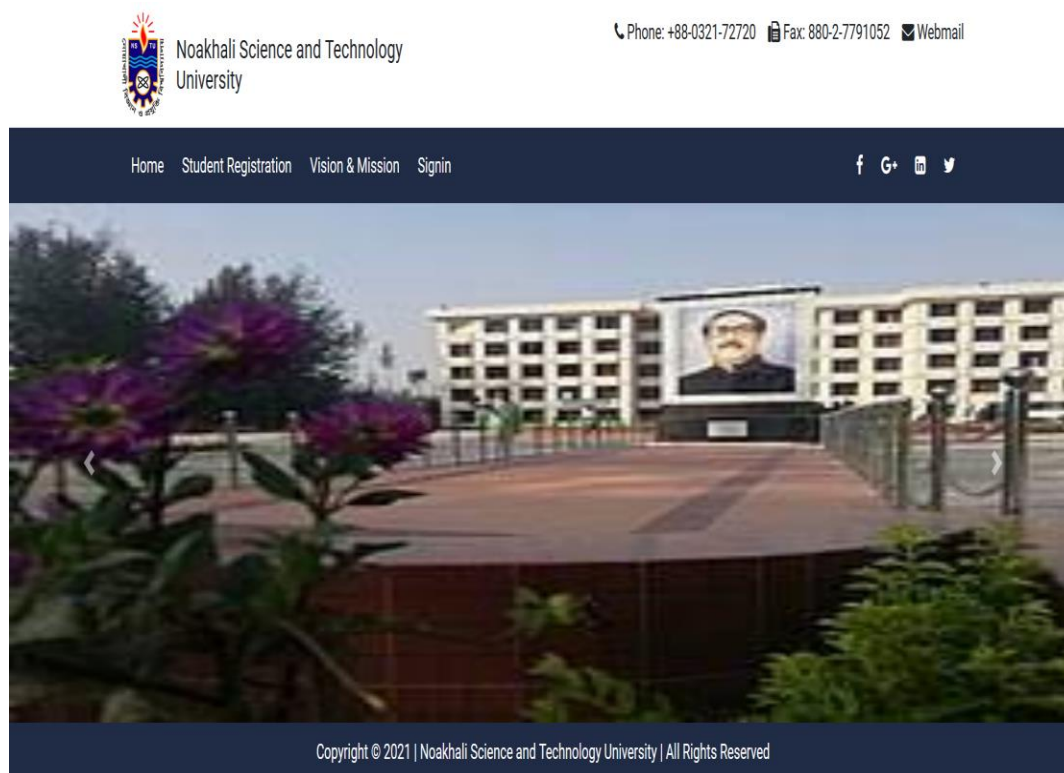


Figure 5.1: Homepage

5.2.2 Admin Panel

The admin of the whole project has full administrative access. He/she is the only one who can insert, alter and delete all the data stored in the server. The admin panel have a login page in which the admin will enter into the dashboard of the admin panel. System provider provides a username and password for login purpose.

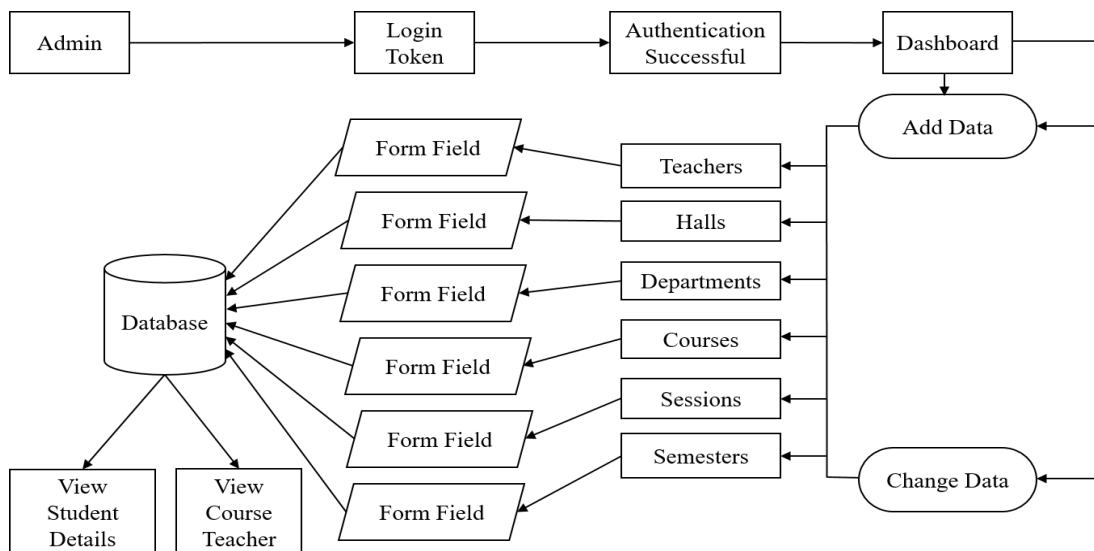


Figure 5.2: Block diagram for admin panel

Dashboard of the admin panel contains various kinds of facilities which are listed below:

1. Add data
2. Change data
3. Delete data
4. View and search students and teachers

Add Data: Admin has the capability to insert some of information for teachers to create login credentials. He/she can add halls, departments, semesters, courses and sessions. Admin can authorize the data submitted by the students.

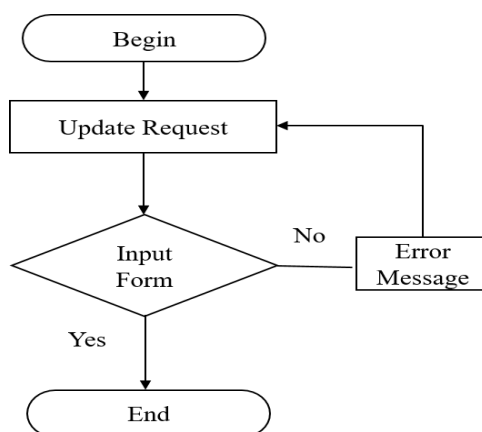


Figure 5.3: Add Data Flowchart

Delete Data: If the entry data does not require then admin can delete the information manually. It is done by selecting the objects of that information.

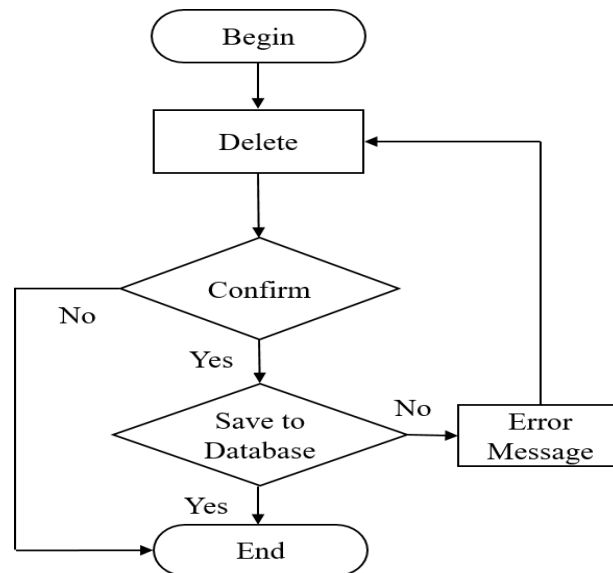


Figure 5.4: Delete Data Flowchart

Update Data: There would be various kinds of mistakes which can produce incorrect results. For this reason, this system provides real-time data change facility. From admin page, he/she can change incorrect information.

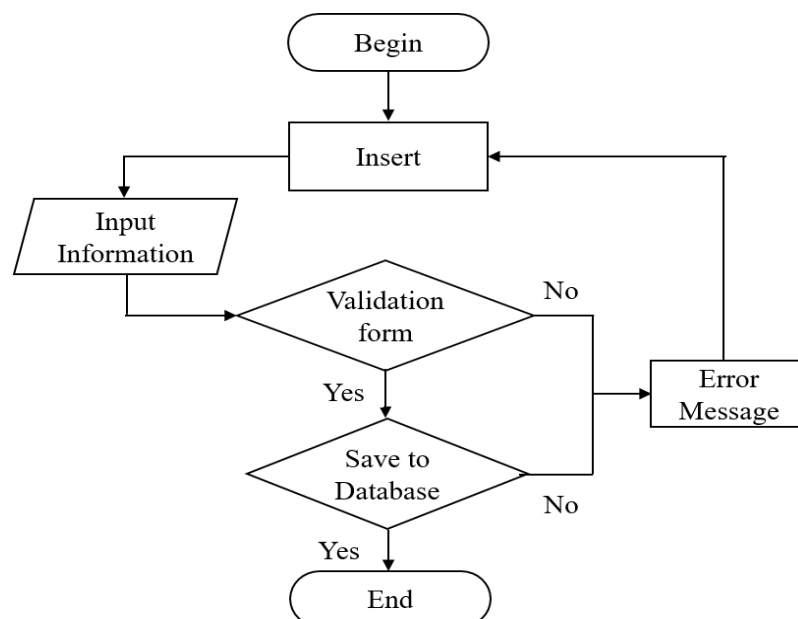


Figure 5.5: Update Data Flowchart

Admin can monitor all the models from Laravel admin framework. Admin create teacher user id and password from Teacher models, add students for Students, add hall from Halls, add departments from Departments, add semester from Semester, add new courses from Courses and add new session from Sessions. Before giving access to the new student, the given data cross checked by the admin whether the given information is wrong or right. Admin can easily find the any students details information just in using search feature.

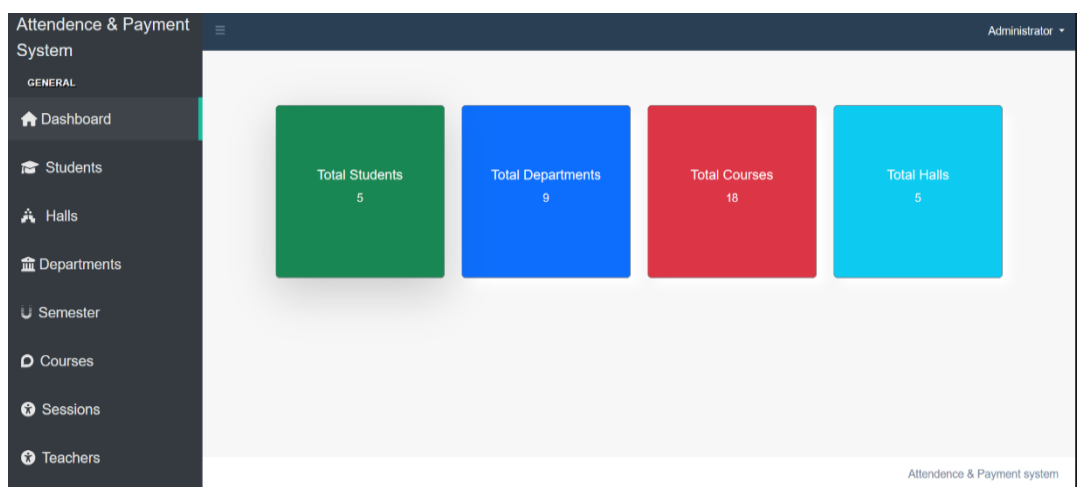


Figure 5.6: Admin Framework

Approval of Student: Admin handles the approval of the student information. He/she click on the “Students” side bar and the below picture has shown.

Attendance & Payment System

GENERAL

Dashboard

Students

Halls

Departments

Semester

Courses

Sessions

Teachers

Administrator

Show 10 entries

Search

#	Name	Father Name	Mother Name	Session	Department	Degree	Roll	Phone	E-mail	Nid/Birth	Date of Birth	Address	Status
1	Md Akram	Md Mosa Mia	Sabeda Begum	2018-19	Information & Communication Engineering	Masters	ASH1911ME111M	01571214835	akram@gmail.com	6853458454	1996-12-05	Brahmanbaria, Bangladesh	Approved
2	Akmdul Hossain Akid	Shohrab Mia	Amena Khatun	2018-19	Information & Communication Engineering	Masters	ASH1911ME114M	01515222316	akid@gmail.com	7548921234	1996-12-01	Feni, Chittagong	Approved
3	Md Redwan Hossen	Fake Father	Fake Mother	2018-19	Information & Communication Engineering	Masters	ASH1911MSc101M	01714286370	redwan@gmail.com	8974561234	1996-12-01	Feni, Chittagong	Approved
4	Nusrat Jahan	Fake Father	Fake Mother	2018-19	Information & Communication Engineering	Masters	BKH1911MSc102F	01711111111	nusrat@gmail.com	19969876754321234	1996-09-09	Chandpur, Chittagong	Approved
5	Asaduzzaman Nur Shuvo	Fake Father	Fake Mother	2018-19	Information & Communication Engineering	Masters	ASH1911MSc104	01722222222	shuvo@gmail.com	8769534529	1996-08-12	Jamulpur, Mymensingh	Approved
6	Farijana Akter	Fake Father	Fake Mother	2018-19	Information & Communication Engineering	Masters	BKH1911MSc106F	01722287943	farijana@gmail.com	6758679082	1996-09-23	Cumilla, Chittagong	Approved

Showing 1 to 6 of 6 entries

Previous 1 Next

Figure 5.7: Approval of student information

Add Hall: Student registration form need the name of hall where the student reside. Admin add the hall names from “Halls” side bar and click on “Add New Hall”.

Attendance & Payment System

GENERAL

Dashboard

Students

Halls

Departments

Semester

Courses

Sessions

Teachers

Administrator

Hall Info

Name ...

Close Add New Hall Update Hall

Search:

Actions

1													
2	Bangabandhu Sheikh Mujibur Rahman Hall												
3	Hazrat Bibi Khadiza Hall												
4	Abdus Salam Hall												
5	Abdul Malek Ukil Hall												

Showing 1 to 5 of 5 entries

Previous 1 Next

Figure 5.8: Add Hall

The number of hall name already inserted by the admin displaying as above shown in the picture. An admin can delete or modify the hall name by clicking on “Actions” button.

Add Teacher: The first time user id and password for the teacher created from the “Teachers” side bar. Admin can insert new teacher information click on the “Add New Teacher” placed on the upper-right side. All the necessary must be filled. The inserted data has shown as per picture in below. By clicking on “Actions” button, an admin can modify or delete teacher user id.

Present Address	Permanent Address	Actions
Noakhali, Bangladesh.	Noakhali, Bangladesh	
Noakhali, Bangladesh	Dhaka, Bangladesh	
Majdee Court, Noakhali	Modhupur, Tangail	

Figure 5.9: Teacher Info Form

Admin panel has the authority to add, modify or delete departments, courses, semesters and session. The process of this following procedure same as the one we previously discussed.

5.2.3 Teacher Interface Model

In this system, Laravel framework is used for web application. Teacher needs to enter his/her username and password in the login page. After getting the authentication is successful, teacher gets the attendance related necessary features.

Attendance Count: The first time login credential for teacher provided by the admin. Then the teacher logged in the system using the provided user id and password. Teacher can change the personal information including user id and password. An effective login to the system has shown the display provided in below picture. The

session of the student is selected by the class teacher which proceed the next page of the number of course has taken by that teacher. After that class teacher needs to select the “Present” or “Absent” radio button to count the attendance. He/she can be able to modify the already counted attendance. The attendance have already counted can be modified by the course teacher.

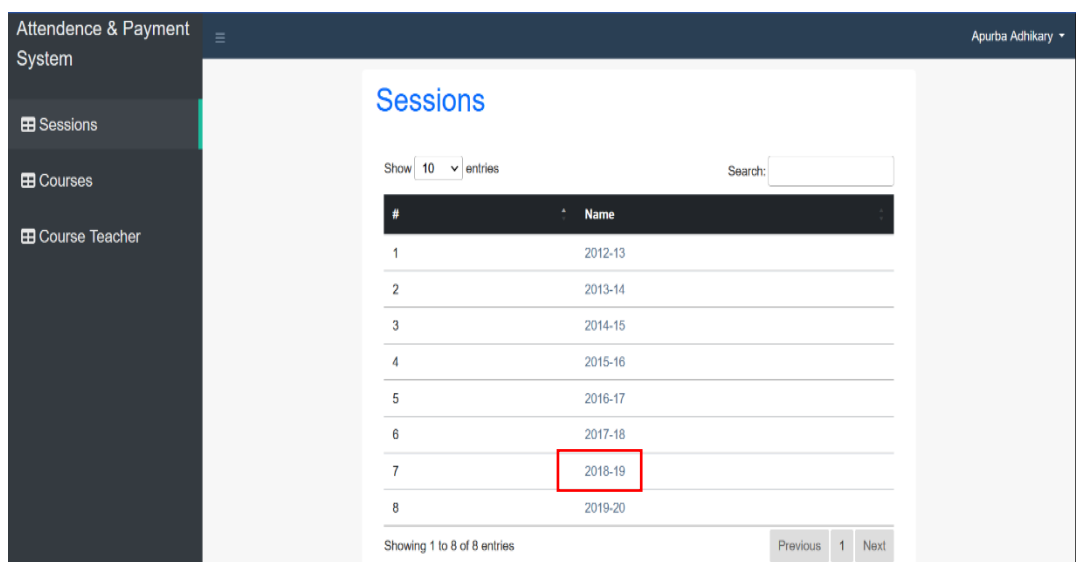


Figure 5.10: Attendance Count (1)

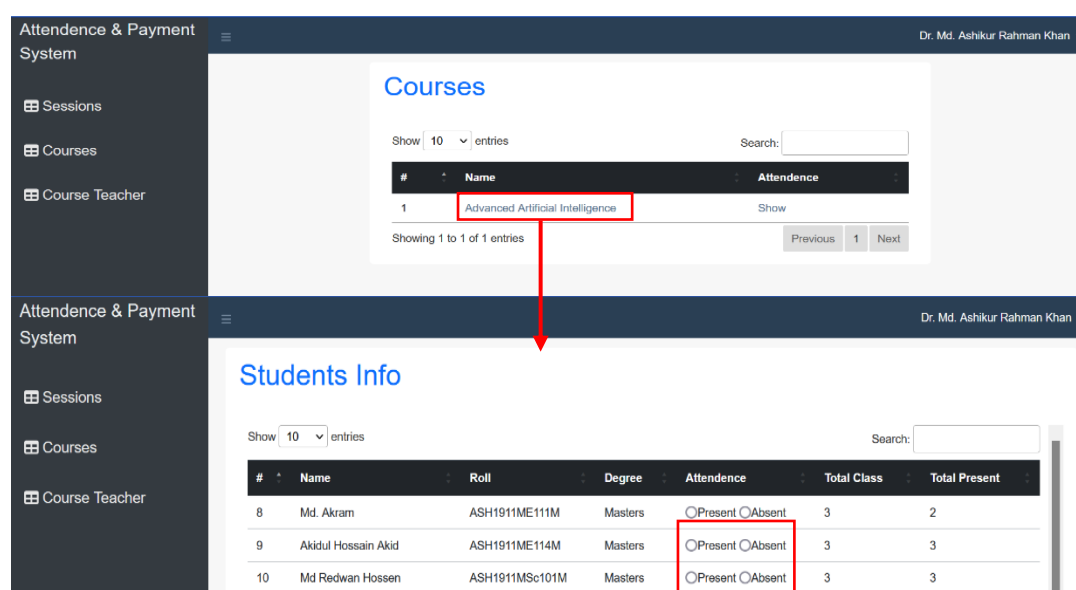


Figure 5.11: Attendance Count (2)

The screenshot displays the 'Attendance & Payment System' interface. The top section, titled 'Courses', shows a single entry for 'Advanced Artificial Intelligence' with a 'Show' button highlighted by a red box and a red arrow pointing to the bottom section. The bottom section shows a table of attendance records for three students, with the 'Action' column containing edit icons highlighted by a red box.

#	Name	Roll	Department	Course	Date	Present	Action
22	Akidul Hossain Akid	ASH1911ME114M	Information & Communication Engineering	Advanced Artificial Intelligence	2022-11-02	✓	
23	Md Redwan Hossen	ASH1911MSc101M	Information & Communication Engineering	Advanced Artificial Intelligence	2022-11-02	✓	
24	Nusrat Jahan	BKH1911MSc102F	Information & Communication Engineering	Advanced Artificial Intelligence	2022-11-02	✓	

Figure 5.12: Attendance Modify

5.2.4 Student Interface Model

A student complete the registration before login the system. Admin authorize the student data to cross-check the validation of the data. After that a student can login the system. An effective login for a student led to the following page as shown below.

The screenshot displays the 'Attendance & Payment System' interface. The top section, titled 'Attendance', shows a table of attendance percentages for five courses. The 'Average Percentage' is 86.67%.

#	Course Name	Present
1	Advanced Optical Communication	100 %
2	Advanced Digital Communication	100 %
3	Advanced Multimedia Communication	66.67 %
4	Advanced Artificial Intelligence	66.67 %
5	Distributed Database and Computing System	100 %
Average Percentage		86.67 %

Figure 5.13: View Average Attendance

The average attendance automatically counted from every course presence and total number of courses. A student can see the total number of classes held in a course and the number of absence and presence in this course. He/she need to click on course name to know the specific date wise absent or present.

Payment: Digital banking and mobile financial service is used to pay the examination fee. A student only able to pay the bill when he/she meet the 70% or above average attendance. Otherwise when a student try to pay the bill then “You are not allowed to pay the fee”.

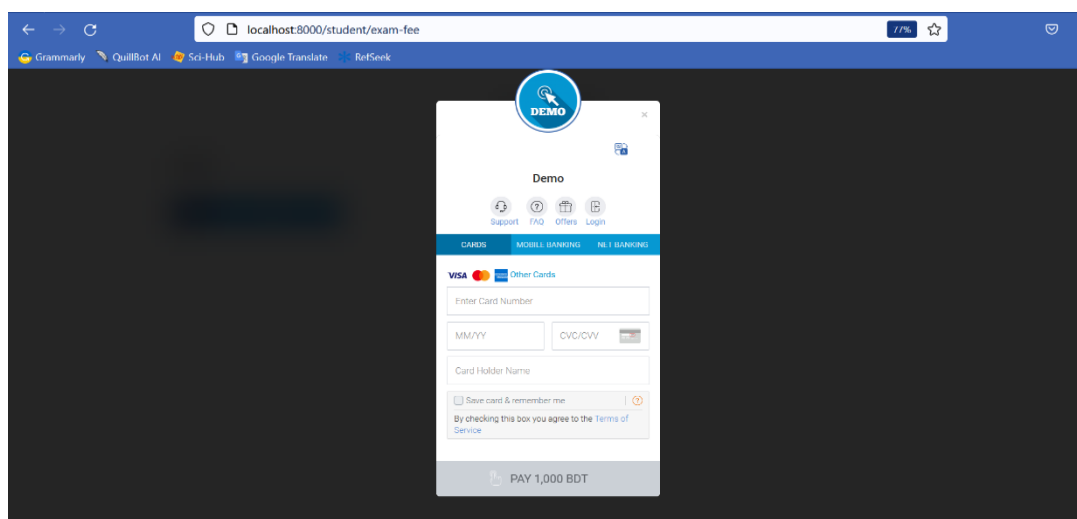


Figure 5.14: Payment Gateway

Before a student proceeds with the payment, he/she needs to select the payment gateway that will be used. A successful transaction led the user to the homepage.

Admit Card: Admit card automatically generate after successful payment. A student download the admit card clicking on “Admit Card” side bar. If any student does not qualify for examination payment and attempts to download admit card pop up “Pay the examination fee first” message. The admit card demo given in below:



Noakhali Science and Technology University

Year 5 Session 2018-2019
Term 1st Final Examination- 2022

Admit Card

Name : Md. Akram

Department : Information and Communication Engineering

Roll No :

A	S	H	1	9	1	1	M	E	1	1	1	M
---	---	---	---	---	---	---	---	---	---	---	---	---

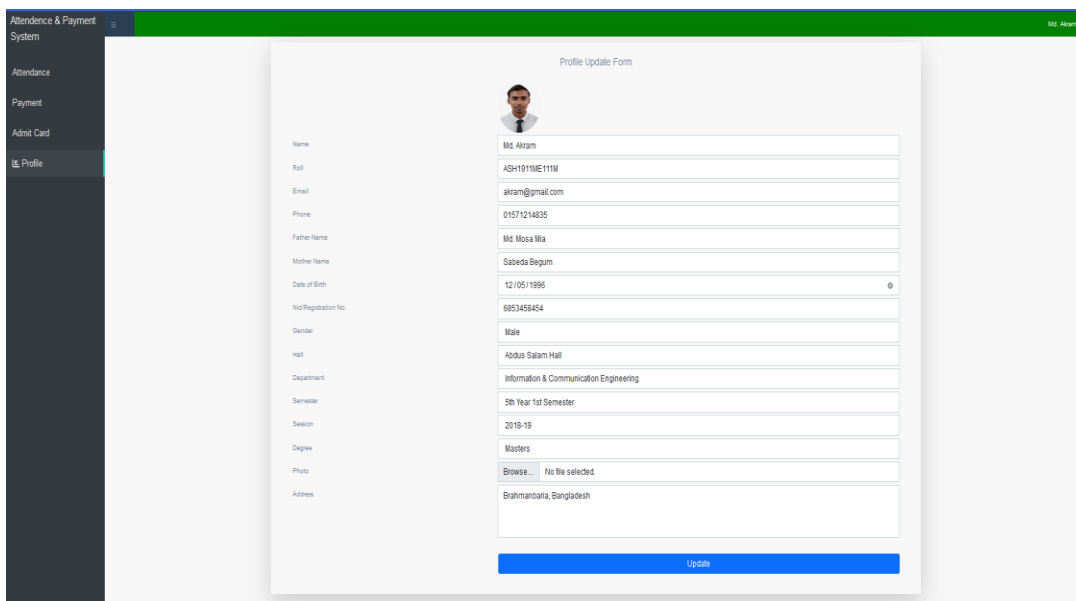
Hall : Abdus Salam Hall

Date of Commencement of Examination : 08-11-2022


Controller of Examinations
NSTU

Figure 5.15: Admit Card Demo

Profile Update: Every student should update their profile after completing a semester. Every new semester has new courses students should assign themselves. The course assigned by the teacher based on the session and semester automatically shows in the respective session and semester-wise student user interface.



Attendance & Payment System

Attendance

Payment

Admit Card

Profile

Md. Akram

Profile Update Form

Name: Md. Akram

Roll: ASH1911ME111M

Email: akram@gmail.com

Phone: 01571214635

Father Name: Md. Mossa Mita

Mother Name: Sabeda Begum

Date of Birth: 12/05/1996

MidRegistration No.: 6653458454

Gender: Male

Hall: Abdus Salam Hall

Department: Information & Communication Engineering

Semester: 5th Year 1st Semester

Session: 2018-19

Degree: Masters

Photo: Browse... No file selected.

Address: Brahmanbaria, Bangladesh

Update

Figure 5.16: Student Profile Update Form

5.3 SUMMARY

We try to make our system simple and elegant for every kinds of users. The developed project requires minimum time for the administrator, teacher and student to complete the manual task digitally. We delivered an excellent result for our project. Above we have shown all the exact outputs.

CHAPTER 6

CONCLUSION

6.1 INTRODUCTION

The attendance, payment and auto admit generator system is program that strengthens our existing processes. It provides database to store different information and records. Our system offers complete solution to problem we discussed in problem statement effectively and efficiently.

6.2 SUMMARY

The traditional attendance system can be solved in an efficient way. Taking plenty efforts for making a system which fit best for the stated purpose. Internet access and digital devices makes whole world easy and it is the best option to solve attendance troubles. The developed system presented in this paper has been successfully designed. The method we are currently using to take attendance is not too much efficient. It can be solved in an efficient way by this Web-based attendance system. It is an efficient method to store attendance in the database rather than wasting the paper. It takes less time to collect student attendance and gives accurate results. The existing payment system and admit card distribution time wasting, papered based and cautious. Since the admin validate all the users' data forgery can easily identify. All the data store in database can fetch at anytime from anywhere. The system was successfully developed by following the client-server framework. A readable and flexible design was create first and the implementation of all part done by following the design.

6.3 SCOPE FOR FUTURE DEVELOPMENTS

The Web application is a modern technology that enables everyone to access the Internet from computers or other devices. We are introducing this software and we intend to upgrade to additional functionality someday. In our university, there is a roadmap to digitalize the all procedure to adopt the digital Bangladesh vision. And add more functionality to the real life work of the student, as well. We are certainly converting it to Android users too. Some of the possible changes that can be achieved in future:

- i. Face detection login in android app.
- ii. Resource sharing and messaging system between teacher and student.
- iii. Online admission system.
- iv. Auto class scheduling system in teacher profile.
- v. Storing previous semester records.
- vi. There will be an update that takes into consideration the personal preference and comfort of the respective faculty.

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