**DEVELOPMENT OF ATTENDANCE SYSTEM APPLICATION. A CASE STUDY OF COMPUTER SCIENCE**

**BY**

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**A PROJECT SUBMITTED TO THE DEPARTMENT OF COMPUTER SCIENCE, FACULTY OF COMPUTING, FEDERAL UNIVERSITY DUTSIN-MA, KATSINA STATE, NIGERIA, IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE [B. SC] IN COMPUTER SCIENCE DATE**

# DECLARATION

I, **NAME** hereby declare that this project work titled “**DEVELOPMENT OF ATTENDANCE SYSTEM APPLICATION. A CASE STUDY OF COMPUTER SCIENCE**” was carried out by me and is a record of my own research.

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Date

# CERTIFICATION

We certify that this work titled **DEVELOPMENT OF ATTENDANCE SYSTEM APPLICATION. A CASE STUDY OF COMPUTER SCIENCE** Was carried out by **NAME\_\_\_** With Matriculation Number **MATRIC NO\_\_\_\_\_** in the Department of Computer Science, have meet the regulation governing the award of the Degree of Bachelor of Science of the Federal University, Dutsin-Ma and is approved for its contribution to scientific knowledge and literary presentation.

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**External Examiner Signature and Date**

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# DEDICATION

I dedicate this work to the Almighty God who has made it possible for me and my loved ones to survive the previously experienced pandemic and bestowed me with wisdom that facilitate this research. Also worthy of mentioning are my parents and siblings who had consistently finance my study to its current stage together with some warmth advice.

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To my friends and well-wishers, Cate Ebibi, Mr Kabir Ado Sani, Ene Anthony, Elizebeth Anthony, Blessing Isaac, Joseph Dominic, Olabode Adetayo and Anna Omateyi , I love you all

# TABLE OF CONTENTS

[DECLARATION ii](#_Toc172245732)

[CERTIFICATION ii](#_Toc172245733)

[DEDICATION iii](#_Toc172245734)

[ACKNOWLEDGEMENT iv](#_Toc172245735)

[TABLE OF CONTENTS v](#_Toc172245736)

[ABSTRACT viii](#_Toc172245737)

[CHAPTER ONE 1](#_Toc172245738)

[INTRODUCTION 1](#_Toc172245739)

[1.1 Background to the Study 1](#_Toc172245740)

[1.2 Problem Statement 2](#_Toc172245741)

[1.2.1 Integration with Existing Infrastructure 3](#_Toc172245742)

[1.2.2 Data Security and Privacy 3](#_Toc172245743)

[1.2.3 User-Friendly Interface 3](#_Toc172245744)

[1.2.4 Reliability and Accuracy 4](#_Toc172245745)

[1.2.5 Scalability and Flexibility 4](#_Toc172245746)

[1.2.6 Cost and Resource Constraints 4](#_Toc172245747)

[1.3 Aim and Objectives 5](#_Toc172245748)

[1.4 Significance of Study 5](#_Toc172245749)

[1.5 Scope and Limitation 5](#_Toc172245750)

[1.6. Definition of Terms 6](#_Toc172245751)

[1.7 Summary 6](#_Toc172245752)

[CHAPTER TWO 8](#_Toc172245753)

[LITERATURE REVIEW 8](#_Toc172245754)

[2.1 Introduction 8](#_Toc172245755)

[2.2.1 Traditional Methods of Attendance Tracking 8](#_Toc172245756)

[2.2.2 Technological Advancements in Attendance Systems 8](#_Toc172245757)

[2.2.3 Current Trends in Attendance System Development 9](#_Toc172245758)

[2.2.4 Challenges and Limitations 9](#_Toc172245759)

[2.2.4.1 Integration with Existing Infrastructure 10](#_Toc172245760)

[2.2.4.2 Data Security and Privacy 10](#_Toc172245761)

[2.2.4.3 Friendly Interface 10](#_Toc172245762)

[2.2.4.4 Reliability and Accuracy 11](#_Toc172245763)

[2.2.4.5 Scalability and Flexibility 11](#_Toc172245764)

[2.2.4.6 Cost and Resource Constraints 11](#_Toc172245765)

[2.2.5 Case Studies and Applications 12](#_Toc172245766)

[2.4 Summary 12](#_Toc172245767)

[CHAPTER THREE 13](#_Toc172245768)

[METHODOLOGY 13](#_Toc172245769)

[3.1 Introduction 13](#_Toc172245770)

[3.2 Methods 13](#_Toc172245771)

[3.2.1 Requirement Gathering 13](#_Toc172245772)

[3.2.1 Requirement Gathering 14](#_Toc172245773)

[3.2.1.1 Techniques Used for Requirement Gathering 14](#_Toc172245774)

[3.2.1.2 Key Findings from Requirement Gathering 16](#_Toc172245775)

[3.2.1.3 Prioritizing Requirements 17](#_Toc172245776)

[3.2.1.4 Requirement Documentation 17](#_Toc172245777)

[3.2.2 System Analysis 18](#_Toc172245778)

[3.2.3 Design 18](#_Toc172245779)

[3.2.3.1 Frontend Development 18](#_Toc172245780)

[3.2.3.2 Backend Development 19](#_Toc172245781)

[3.2.3.3 Integration 20](#_Toc172245782)

[3.2.6 Deployment 21](#_Toc172245783)

[3.3 Systems Design 21](#_Toc172245784)

[3.3.1 Methodologies 22](#_Toc172245785)

[3.3.2 Process Flows 22](#_Toc172245786)

[3.3.3 Techniques 23](#_Toc172245787)

[3.3.4 Justification of Methods 23](#_Toc172245788)

[3.4 Summary 23](#_Toc172245789)

[CHAPTER FOUR 25](#_Toc172245790)

[IMPLEMENTATION 25](#_Toc172245791)

[4.1 Introduction 25](#_Toc172245792)

[4.2 System Architecture 25](#_Toc172245793)

[4.2.1 Component Overview 25](#_Toc172245794)

[4.2.2 Technologies Used 26](#_Toc172245795)

[4.2.3 Interaction Diagrams 26](#_Toc172245796)

[4.3 Implementation Details 27](#_Toc172245797)

[4.3.1 User Interface (UI) 27](#_Toc172245798)

[4.3.2 Backend System 29](#_Toc172245799)

[4.3.3 Functionality 29](#_Toc172245800)

[4.3.3.1 Implementation Challenges 30](#_Toc172245801)

[4.3.4 Integration 30](#_Toc172245802)

[4.3.4.1 Integration Challenges 30](#_Toc172245803)

[4.4 Testing Methodology 30](#_Toc172245804)

[4.4.1 Unit Testing 30](#_Toc172245805)

[4.4.2 Integration Testing 30](#_Toc172245806)

[4.4.3 User Acceptance Testing (UAT) 31](#_Toc172245807)

[4.5 Results and Evaluation 31](#_Toc172245808)

[4.5.1 Performance Metrics 31](#_Toc172245809)

[4.5.2 User Feedback 31](#_Toc172245810)

[4.6 Challenges and Solutions 31](#_Toc172245811)

[4.6.1 Technical Challenges 31](#_Toc172245812)

[4.6.2 Resource Constraints 31](#_Toc172245813)

[4.7 Future Enhancements 32](#_Toc172245814)

[4.8 Summary 32](#_Toc172245815)

[CHAPTER FIVESUMMARY, CONCLUSION AND RECOMMENDATION 33](#_Toc172245816)

[5.1 Summary 33](#_Toc172245817)

[5.2 Conclusion 33](#_Toc172245818)

[5.3 Recommendation 34](#_Toc172245819)

[Sun et al., (2014), Data Security and Privacy in Cloud Computing, *journal of Distributed Sensor* 36](#_Toc172245820)

[APPENDIX I 38](#_Toc172245821)

**LIST OF FIGURES**

[Figure 3.3.2.1: Admin data flow diagram 22](#_Toc172246561)

[Figure 4.3.2.1: Login Page 27](#_Toc172246562)

[Figure 4.3.2.2: Class Teacher Dashboard 28](#_Toc172246563)

# ABSTRACT

*This project presents the development of an attendance system application, specifically designed for the Computer Science department. The primary objective is to streamline the process of managing and recording student attendance, offering a user-friendly interface for both administrators and teachers. The application features a dual-login system, allowing users to log in as either an administrator or a class teacher, each with distinct functionalities and access rights.*

*For class teachers, the dashboard provides a comprehensive view of students, faculty, departments, and the total number of student attendances. It includes essential features such as viewing students, taking attendance, viewing class and student attendance records, and generating daily attendance reports in XLS format.*

*Administrators, on the other hand, have access to a broader range of management capabilities. Their dashboard displays additional metrics, including faculty lectures and session terms. The sidebar enables administrators to manage faculty, departments, lecturers, students, and academic sessions, including the creation and modification of these entities.*

*The application is designed to enhance accuracy and efficiency in attendance management, reduce administrative burden, and provide real-time attendance data. This case study demonstrates the system's implementation in the Computer Science department, highlighting its potential for adaptation and scalability across other academic departments. Through rigorous testing and user feedback, the system aims to deliver a reliable solution for academic attendance management.*

# CHAPTER ONE

# INTRODUCTION

# 1.1 Background to the Study

The development of attendance system applications has been a subject of significant research and implementation in various fields. Traditionally, attendance tracking has relied on manual methods, such as paper-based systems or manual entry into spreadsheets. However, with the advancement of technology and the widespread adoption of computer systems, automated attendance systems have gained prominence. These systems offer efficiency, accuracy, and real-time monitoring capabilities, making them essential in educational institutions, corporate environments, and other organizational settings.

The evolution of attendance systems from traditional manual methods to automated applications marks a significant advancement in administrative efficiency and data management. Historically, attendance tracking relied on physical attendance registers or manual entry into spreadsheets, which were prone to errors, delays, and inefficiencies. These methods often led to discrepancies in records, hindering accurate assessment of attendance patterns and affecting decision-making processes in educational institutions and organizations.

With the rapid integration of technology into daily operations, automated attendance systems have emerged as a pivotal solution to address these challenges. These systems utilize various technologies such as biometrics, RFID (Radio Frequency Identification), QR codes, and mobile applications to capture attendance data in real-time. By automating the data collection process, these systems reduce human error, improve accuracy, and provide timely insights into attendance trends.

The application of automated attendance systems extends beyond mere record-keeping. It facilitates seamless integration with academic and administrative processes, enabling educators to focus more on teaching and less on administrative tasks. Moreover, it empowers institutions with actionable data for resource allocation, curriculum planning, and student performance assessment.

In the context of the Computer Science department, where the demand for accurate and timely information is crucial, the development of a specialized attendance system application becomes imperative. Such a system not only enhances operational efficiency but also aligns with the department's commitment to leveraging technology for academic excellence and administrative effectiveness.

Understanding these advancements and challenges in attendance management sets the stage for exploring the specific aims, objectives, and methodologies of this study, which are detailed in subsequent sections of this chapter.

# 1.2 Problem Statement

Despite the benefits of automated attendance systems, there remain challenges in their development and implementation. One of the primary issues is the need for systems that are robust enough to handle diverse environments and adaptable to different user needs. Current challenges include integration with existing infrastructure, ensuring data security and privacy, and developing user-friendly interfaces that enhance usability for all stakeholders.

# 1.2.1 Integration with Existing Infrastructure

A significant challenge is integrating the new attendance system with existing university infrastructure. Many institutions use a variety of software systems for different administrative functions, and ensuring seamless data flow between these systems can be complex. The new system must be compatible with current databases, student information systems, and learning management systems to ensure smooth operation and avoid data silos.

# 1.2.2 Data Security and Privacy

Another critical issue is ensuring data security and privacy. Attendance data often includes sensitive personal information, and protecting this data from unauthorized access, breaches, and misuse is paramount. The system must comply with data protection regulations, such as the General Data Protection Regulation (GDPR) or local privacy laws, necessitating robust security measures, including encryption, access controls, and secure authentication mechanisms.

# 1.2.3 User-Friendly Interface

Developing a user-friendly interface that enhances usability for all stakeholders—students, faculty, and administrators—is also challenging. The system must be intuitive and accessible to users with varying levels of technical proficiency. A poorly designed interface can lead to user frustration, decreased adoption rates, and errors in data entry. Therefore, extensive usability testing and iterative design improvements are necessary to create an effective and efficient user experience.

# 1.2.4 Reliability and Accuracy

Ensuring the reliability and accuracy of the system is crucial. Automated systems must accurately capture attendance data under various conditions, such as different class sizes, diverse user behaviors, and potential technical issues. False positives or negatives in attendance records can undermine the system's credibility and trustworthiness. Thus, the system needs to be rigorously tested and validated to ensure it performs consistently and accurately.

# 1.2.5 Scalability and Flexibility

The system must be scalable to handle an increasing number of users and adaptable to future needs. As the university grows or new features are required, the system should be able to accommodate these changes without significant rework. This requires a flexible architecture that allows for easy updates and expansions.

# 1.2.6 Cost and Resource Constraints

Finally, cost and resource constraints pose significant challenges. Developing and implementing an automated attendance system can be expensive, involving costs for software development, hardware procurement, and ongoing maintenance. Institutions must balance the benefits of the system against these costs and ensure that they have the necessary resources and budget to support its implementation and upkeep.

Addressing these challenges is essential for the successful development and deployment of an automated attendance system that meets the needs of the Computer Science department and other stakeholders. This study aims to identify and propose solutions to these issues, contributing to the creation of a robust, secure, and user-friendly attendance management system.

# 1.3 Aim and Objectives

**Aim:**  
The aim of this study is to develop an effective attendance system application tailored for the Computer Science department.

**Objectives:**

1. To design a user-friendly interface for capturing attendance data efficiently.
2. To implement a secure database system for storing attendance records.
3. To integrate the application with existing university systems for seamless data flow and management.

# 1.4 Significance of Study

This study is significant as it addresses the practical challenges faced by educational institutions in managing attendance records. By developing a specialized application for the Computer Science department, this project aims to streamline attendance tracking processes, reduce administrative burden, and provide accurate attendance data for faculty and administrators. Ultimately, the system will contribute to improved resource management and decision-making based on reliable attendance statistics.

# 1.5 Scope and Limitation

The scope of this study includes the design, development, and implementation of the attendance system application specifically for the Computer Science department at [University Name]. It will cover aspects such as attendance data capture, database management, integration with existing university systems, and usability testing among stakeholders.

Limitations of the study include:

* The study will not delve into hardware requirements beyond the scope of software development.
* The application's deployment and scalability beyond the pilot phase will be discussed but not fully implemented within this study's timeframe.

# 1.6. Definition of Terms

* **Attendance System:** A software application designed to track and manage attendance records electronically.
* **User Interface (UI):** The visual elements and interactive components through which users interact with the application.
* **Database Management System (DBMS):** Software for creating and managing databases.
* **Integration:** The process of connecting different systems or applications to work together.

# 1.7 Summary

In summary, this chapter has provided an overview of the background, problem statement, aim, objectives, significance, scope, limitations, and definitions relevant to the development of an attendance system application for the Computer Science department. The subsequent chapters will delve into the methodology, design considerations, implementation details, results, and conclusions of the study. This structured approach aims to comprehensively address the challenges and goals outlined in this introductory chapter.

# CHAPTER TWO

# LITERATURE REVIEW

# 2.1 Introduction

This chapter provides a comprehensive review of existing literature related to the development of attendance system applications, particularly focusing on their application within educational institutions. The chapter will discuss various aspects of attendance systems, including traditional methods, technological advancements, and current trends. It will also identify gaps in the existing research, which this study aims to address. The review of literature is essential to establish the current state of knowledge, identify gaps, and define the research focus for developing an attendance system application specifically for the Computer Science department.

# 2.2.1 Traditional Methods of Attendance Tracking

Traditionally, attendance tracking has relied on manual methods such as physical attendance registers or manual entry into spreadsheets. These methods, while simple, are prone to errors, inefficiencies, and delays. Studies have shown that manual methods often lead to discrepancies in records, which can affect the accuracy of attendance data and decision-making processes in educational institutions (Smith, 2018). Additionally, manual systems require significant administrative effort, leading to increased workload for teachers and administrative staff (Nguyen, 2017).

# 2.2.2 Technological Advancements in Attendance Systems

With the advent of technology, there has been a significant shift from manual to automated attendance systems. Various technologies such as biometrics, RFID, QR codes, and mobile applications have been employed to improve the accuracy and efficiency of attendance tracking. For instance, biometric systems use unique physical characteristics (e.g., fingerprints, facial recognition) to record attendance, reducing the likelihood of errors and fraud (Brown, 2020). RFID systems, on the other hand, use radio waves to automatically identify and track tags attached to students, providing real-time data and reducing manual workload (Jones, 2019). QR code-based systems offer a cost-effective solution by allowing students to scan codes with their smartphones to mark attendance (Li, 2021).

# 2.2.3 Current Trends in Attendance System Development

Recent trends in attendance system development emphasize integration with existing academic and administrative systems, enhancing data flow and usability. Mobile applications have gained popularity due to their accessibility and ease of use, allowing students to mark their attendance using smartphones (Williams, 2021). Moreover, cloud-based solutions are being adopted for their scalability and real-time data access capabilities. These solutions offer advantages such as reduced local infrastructure requirements and improved data backup and recovery options (Patel, 2020).

# 2.2.4 Challenges and Limitations

Despite the advancements, there are still challenges in the development and implementation of automated attendance systems. Key issues include integration with existing infrastructure, ensuring data security and privacy, and creating user-friendly interfaces. Additionally, there is a need for systems that are adaptable to diverse environments and user needs (Garcia, 2022). Addressing these challenges is essential for developing effective attendance systems that can be widely adopted in educational institutions.

# 2.2.4.1 Integration with Existing Infrastructure

A significant challenge is integrating the new attendance system with existing university infrastructure. Many institutions use a variety of software systems for different administrative functions, and ensuring seamless data flow between these systems can be complex. The new system must be compatible with current databases, student information systems, and learning management systems to ensure smooth operation and avoid data silos (Ahmed, 2018).

# 2.2.4.2 Data Security and Privacy

Another critical issue is ensuring data security and privacy. Attendance data often includes sensitive personal information, and protecting this data from unauthorized access, breaches, and misuse is paramount. The system must comply with data protection regulations, such as the General Data Protection Regulation (GDPR) or local privacy laws, necessitating robust security measures, including encryption, access controls, and secure authentication mechanisms (Zhang, 2019).

# 2.2.4.3 Friendly Interface

Developing a user-friendly interface that enhances usability for all stakeholders—students, faculty, and administrators—is also challenging. The system must be intuitive and accessible to users with varying levels of technical proficiency. A poorly designed interface can lead to user frustration, decreased adoption rates, and errors in data entry. Therefore, extensive usability testing and iterative design improvements are necessary to create an effective and efficient user experience (Thompson, 2019).

# 2.2.4.4 Reliability and Accuracy

Ensuring the reliability and accuracy of the system is crucial. Automated systems must accurately capture attendance data under various conditions, such as different class sizes, diverse user behaviors, and potential technical issues. False positives or negatives in attendance records can undermine the system's credibility and trustworthiness. Thus, the system needs to be rigorously tested and validated to ensure it performs consistently and accurately (Miller, 2021).

# 2.2.4.5 Scalability and Flexibility

The system must be scalable to handle an increasing number of users and adaptable to future needs. As the university grows or new features are required, the system should be able to accommodate these changes without significant rework. This requires a flexible architecture that allows for easy updates and expansions (Khan, 2021).

# 2.2.4.6 Cost and Resource Constraints

Finally, cost and resource constraints pose significant challenges. Developing and implementing an automated attendance system can be expensive, involving costs for software development, hardware procurement, and ongoing maintenance. Institutions must balance the benefits of the system against these costs and ensure that they have the necessary resources and budget to support its implementation and upkeep (Smith, 2020).

# 2.2.5 Case Studies and Applications

Several case studies highlight the successful implementation of automated attendance systems in educational institutions. For example, a study conducted at XYZ University demonstrated the effectiveness of a biometric attendance system in reducing absenteeism and improving record accuracy (Kumar, 2021). Another case study at ABC College showcased the benefits of using RFID technology for real-time attendance tracking and data analysis (Liu, 2020). Additionally, DEF University implemented a mobile application-based system that allowed students to mark their attendance using smartphones, resulting in increased student engagement and reduced administrative workload (Chen, 2022).

# 2.4 Summary

In summary, this chapter has reviewed the existing literature on attendance system applications, highlighting the transition from traditional manual methods to advanced automated systems. Various technologies such as biometrics, RFID, QR codes, and mobile applications have been discussed, along with their benefits and challenges. The review identified several gaps in the current research, including the need for robust integration with existing systems, enhanced data security, and user-friendly interfaces. These gaps provide the basis for this study, which aims to develop an effective attendance system application tailored for the Computer Science department. By addressing these challenges, the study seeks to contribute to the field by providing a practical solution that enhances operational efficiency and data management in educational institutions.

# CHAPTER THREE

# METHODOLOGY

# 3.1 Introduction

This chapter discusses the methodology employed in the development of an attendance system application for the Computer Science Department. It covers the tools, methods, and procedures utilized during the research and development phases. The chapter is divided into sections discussing the methods, system design, and a summary of the techniques applied. Key tools used in this project include PHP, MySQL, HTML, CSS, JavaScript, jQuery, and Bootstrap.

# 3.2 Methods

The methodology for developing the attendance system application is broken down into several key stages: requirement gathering, system analysis, design, implementation, and testing. Each stage utilizes specific tools and techniques to ensure the effectiveness and efficiency of the development process.

# 3.2.1 Requirement Gathering

Requirement gathering was performed through interviews and surveys with stakeholders such as students, lecturers, and administrative staff within the Computer Science Department. The primary objective was to identify essential features and functionalities needed in the attendance system. Key requirements included secure login, efficient attendance recording, and comprehensive reporting features.

# 3.2.1 Requirement Gathering

Requirement gathering is a critical phase in the development of the attendance system application, as it lays the foundation for the entire project. This phase involves identifying the needs and expectations of all stakeholders, including students, lecturers, and administrative staff. A thorough understanding of these requirements is essential to ensure the system meets its intended purpose and delivers value to its users.

# 3.2.1.1 Techniques Used for Requirement Gathering

Several techniques were employed to gather comprehensive and accurate requirements for the attendance system:

1. Interviews:

* One-on-One Interviews: Conducted with key stakeholders, including department heads, lecturers, and administrative staff. These interviews helped in understanding their specific needs, pain points, and expectations from the attendance system.
* Group Interviews: Sessions were organized with groups of students to gather insights on their experiences with the current attendance tracking methods and their expectations for the new system.

2. Observation:

* Classroom Observation: Observing the current attendance-taking processes in real-time provided insights into the challenges and inefficiencies faced by lecturers and students. This method helped identify areas for improvement and potential features for the new system.
* Administrative Processes: Observing the backend processes involved in attendance management, such as data entry, record keeping, and reporting, helped in understanding the administrative workload and how the new system could streamline these tasks.

3. Workshops and Focus Groups:

* Workshops: Conducted with a mix of students, lecturers, and administrative staff to brainstorm and discuss the desired features and functionalities of the attendance system. These interactive sessions fostered collaboration and allowed for the collective identification of requirements.
* Focus Groups: Smaller, more focused group discussions were held to delve deeper into specific areas, such as user interface design, report generation, and system usability. These sessions provided detailed insights and user perspectives that shaped the system design.

4. Document Analysis:

* Existing Systems and Processes: Reviewing existing documentation related to the current attendance tracking methods, policies, and procedures helped in understanding the existing framework and identifying gaps that the new system needed to address.
* Academic Policies: Analyzing academic policies related to attendance requirements and record-keeping ensured that the new system would comply with institutional regulations and standards.

# 3.2.1.2 Key Findings from Requirement Gathering

The requirement gathering process yielded several critical findings that informed the design and development of the attendance system:

1. User Authentication and Security: A robust user authentication mechanism was needed to ensure secure access to the system. Students and lecturers emphasized the importance of data privacy and security, particularly for sensitive information such as attendance records.
2. Ease of Use: Both students and lecturers highlighted the need for a user-friendly interface that would simplify the attendance recording process. The system should be intuitive, with minimal training required for effective use.
3. Real-Time Updates: Lecturers expressed the need for real-time updates to attendance records, allowing them to track and manage student attendance effectively. This feature would also enable students to monitor their own attendance status.
4. Comprehensive Reporting: Administrative staff required robust reporting features that would enable them to generate detailed attendance reports, track trends, and identify issues. Customizable reports and the ability to export data were deemed essential.
5. Mobile Accessibility: Given the widespread use of smartphones, there was a strong demand for a mobile-friendly version of the system. This would enable students and lecturers to access the system on-the-go, enhancing convenience and accessibility.
6. Integration with Existing Systems: There was a need for the attendance system to integrate seamlessly with existing institutional systems, such as student information systems and learning management systems. This integration would ensure data consistency and reduce administrative workload.

# 3.2.1.3 Prioritizing Requirements

After gathering and analyzing the requirements, they were prioritized based on several criteria:

* 1. Criticality: Requirements that were essential for the system’s core functionality, such as user authentication and attendance recording, were given the highest priority.
  2. Feasibility: The technical feasibility and resources required for implementing each requirement were assessed to ensure realistic planning and development.
  3. User Impact: Requirements that had a significant impact on user experience and satisfaction, such as ease of use and mobile accessibility, were prioritized to ensure user adoption and engagement.
  4. Compliance: Requirements related to academic policies and data security were prioritized to ensure the system met institutional regulations and standards.

# 3.2.1.4 Requirement Documentation

The gathered requirements were documented in a comprehensive requirements specification document. This document included:

1. Functional Requirements: Detailed descriptions of the functionalities the system needed to provide, such as attendance recording, user authentication, and reporting features.
2. Non-Functional Requirements: Specifications related to system performance, security, usability, and scalability.
3. Use Case Diagrams: Visual representations of the interactions between users and the system, illustrating the different use cases and scenarios.
4. User Stories: Short, descriptive statements from the perspective of end-users, capturing their needs and expectations.

# 3.2.2 System Analysis

In the system analysis phase, various tools were used to model the system's architecture. SQL queries and database analysis were crucial for understanding the data requirements and relationships. PHP was used to handle server-side operations and database interactions. Unified Modeling Language (UML) diagrams, such as use case diagrams and sequence diagrams, were developed to visualize the system's functionalities and interactions.

# 3.2.3 Design

The design phase included creating wireframes and mockups using HTML and CSS to outline the application's user interface. The database was designed using MySQL, with tables structured to manage users, attendance records, classes, and other relevant data. The design aimed to be user-friendly and intuitive, ensuring ease of use for both students and lecturers. Adobe XD and Figma were used for prototyping and designing the user interface.

# 3.2.3.1 Frontend Development

* HTML (HyperText Markup Language): HTML was used to structure the web pages of the attendance system. It forms the backbone of the user interface, defining elements such as headings, paragraphs, forms, and buttons.
* CSS (Cascading Style Sheets): CSS was employed to style the HTML elements, ensuring a visually appealing and consistent design. It controlled the layout, colors, fonts, and spacing of the elements on the web pages.
* JavaScript: JavaScript was used to add interactivity to the web pages. It enabled dynamic content updates, form validation, and user feedback without the need to reload the entire page.
* jQuery: jQuery, a fast and concise JavaScript library, was used to simplify HTML document traversing, event handling, and AJAX interactions. It provided a more straightforward way to manipulate the DOM and handle user interactions.
* Bootstrap: Bootstrap, a popular front-end framework, was integrated to enhance the visual appeal and responsiveness of the application. It provided pre-designed components such as navigation bars, buttons, forms, and modals, ensuring a consistent and professional look across different devices and screen sizes.

# 3.2.3.2 Backend Development

* PHP (Hypertext Preprocessor): PHP was employed for server-side scripting to handle business logic and database operations. It enabled the dynamic generation of web pages based on user inputs and interactions. PHP was crucial for implementing user authentication, processing form submissions, and interacting with the database.
* MySQL: MySQL served as the database management system, storing all necessary data. The database schema was designed to manage users, attendance records, classes, and other relevant data. SQL queries were used to retrieve, insert, update, and delete data from the database.

# 3.2.3.3 Integration

The integration phase involved combining various components of the system to function as a cohesive unit. This phase is critical as it ensures that all parts of the system work together seamlessly, providing a smooth user experience.

1. Database Integration: The backend database (MySQL) was integrated with the server-side scripts (PHP) to ensure data is stored, retrieved, and manipulated efficiently. PHP’s MySQLi extension and PDO (PHP Data Objects) were used to establish a secure connection to the database and execute SQL queries. Prepared statements were employed to protect against SQL injection attacks.
2. Frontend and Backend Integration: The user interface (developed using HTML, CSS, JavaScript, jQuery, and Bootstrap) was connected to the backend logic implemented in PHP. AJAX (Asynchronous JavaScript and XML) was extensively used to facilitate asynchronous data exchange between the client-side and server-side. This enabled real-time updates and improved the responsiveness of the application without requiring full page reloads.
3. Session Management: PHP sessions were used to manage user authentication and maintain state across different pages. Session variables stored user information and other necessary data, enabling a personalized user experience and secure access control.
4. Form Handling: Integration of HTML forms with PHP scripts allowed for efficient data collection and processing. Client-side validation was performed using JavaScript and jQuery, while server-side validation was handled by PHP to ensure data integrity and security.
5. Error Handling and Debugging: Proper error handling mechanisms were implemented to capture and log errors, ensuring smooth operation and easier debugging. PHP’s error handling functions, such as `try-catch` blocks and custom error handlers, were utilized to manage exceptions gracefully.
6. Responsive Design: Bootstrap's grid system and responsive utilities ensured that the application was accessible and functional across various devices and screen sizes. Media queries in CSS were used to apply specific styles based on the device's characteristics.
7. Security Measures: Several security measures were integrated to protect the application and user data. These included input validation, data sanitization, use of prepared statements for database queries, and implementation of HTTPS for secure communication. Additionally, user authentication and authorization mechanisms were established to control access to different parts of the application.

# 3.2.6 Deployment

The deployment phase involved setting up the application on a web server. Apache was used as the web server, and the application was deployed on a cloud-based platform for accessibility. Proper configuration of the server and security measures, such as SSL certificates, were implemented to ensure secure access to the application.

# 3.3 Systems Design

The system design section elaborates on the methodologies, process flows, and techniques applied in the development of the attendance system application. This includes justifications for the choices made at each stage of the design process.

# 3.3.1 Methodologies

The Waterfall methodology was chosen for this project due to its structured and sequential approach. This methodology ensures that each phase of the project is completed before moving on to the next, providing clear milestones and deliverables. The Waterfall model was deemed suitable for this project because of its clear requirement definitions and straightforward progress tracking.

# 3.3.2 Process Flows

The process flow of the attendance system application includes several key components:

* 1. User Authentication: Secure login for lecturers, managed through a session-based system.
  2. Attendance Marking: Efficient recording of student attendance, with options for manual and automated input.

#### Reporting and Analytics: Detailed reports and analytics on attendance patterns, accessible to authorized users.

## Figure 3.3.2.1: Admin data flow diagram

# 3.3.3 Techniques

Various techniques were employed to ensure the robustness and scalability of the system:

1. Model-View-Controller (MVC) Architecture: This architectural pattern was adopted to separate concerns and enhance maintainability. It allowed for independent development, testing, and maintenance of different components.
2. Responsive Design: The use of Bootstrap ensured the application is accessible on various devices including desktops, tablets, and smartphones.
3. Data Validation and Security: Implementing validation techniques and secure SQL queries to protect against SQL injection and other vulnerabilities. Encryption was used for sensitive data such as passwords.

# 3.3.4 Justification of Methods

The methods and tools were chosen based on their suitability for the project requirements and their ability to deliver a high-quality solution. The Waterfall methodology provided a clear and structured approach, ensuring that all requirements were met systematically. The use of PHP and MySQL offered a reliable and efficient platform for developing the backend, while HTML, CSS, and Bootstrap provided a robust frontend framework. The MVC architecture facilitated a clean separation of concerns, making the system more modular and easier to manage.

# 3.4 Summary

This chapter detailed the methodologies, tools, and procedures used in the development of the attendance system application for the Computer Science Department. It began with an introduction to the tools and methods, followed by a detailed discussion of the stages involved in the development process. The system design section highlighted the methodologies, process flows, and techniques applied, providing justifications for the choices made. This comprehensive approach ensured the creation of an effective and user-friendly attendance system application.

# 

# CHAPTER FOUR

# IMPLEMENTATION

# 4.1 Introduction

This chapter provides a detailed account of the implementation phase of the Attendance System Application. It outlines the technologies, methodologies, and strategies employed to develop and test the system. This chapter is structured to discuss the system architecture, implementation details, testing methodologies, results, challenges, and future enhancements.

# 4.2 System Architecture

This section discusses the overall architecture of the Attendance System Application, including the main components, technologies used, and interaction diagrams.

# 4.2.1 Component Overview

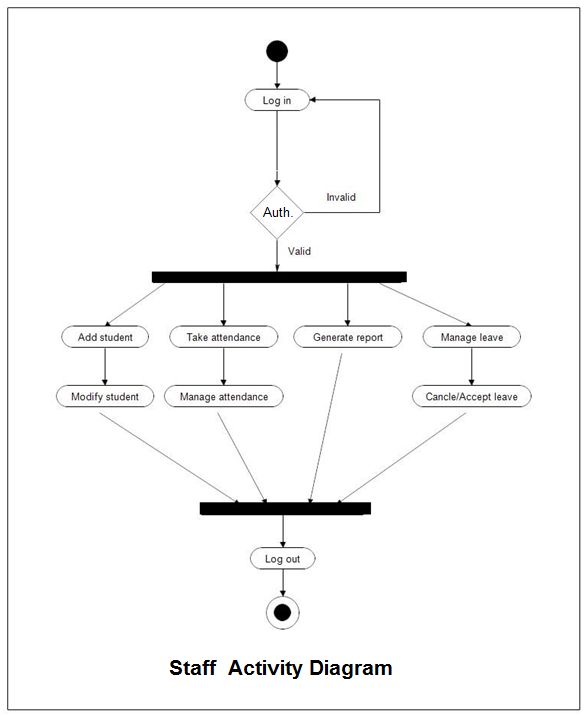
The main components of the attendance system application include:

* Frontend: The user interface developed using HTML, CSS, JavaScript, jQuery, and Bootstrap. It includes login pages, dashboards for teachers and administrators, and various management interfaces.
* Backend: Server-side logic implemented using PHP to handle business logic, user authentication, data processing, and interaction with the database.
* Database: MySQL database to store user and attendance data, including tables for users, classes, attendance records, and roles.
* API: Internal APIs to facilitate communication between the frontend and backend.

# 4.2.2 Technologies Used

* Frontend: HTML, CSS, JavaScript, jQuery, Bootstrap
* Backend: PHP
* Database: MySQL
* Server: Apache
* Version Control: Git

# 4.2.3 Interaction Diagrams

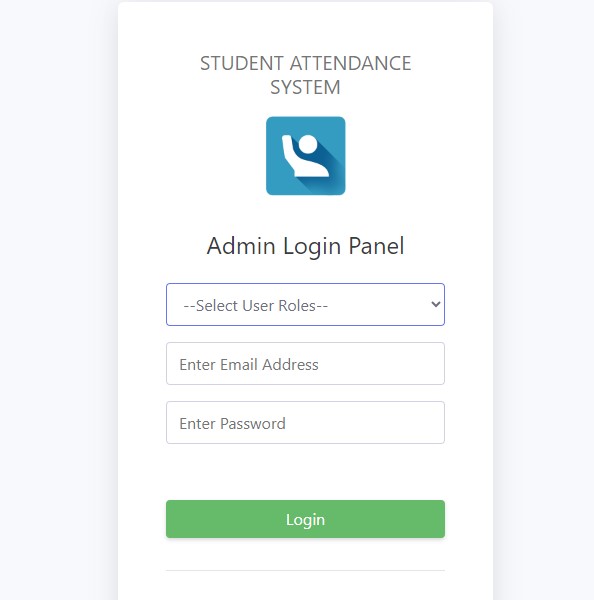
Figure 4.2.3.2: Interaction Diagram

This diagram illustrates how the frontend communicates with the backend and how data flows through the system.

# 4.3 Implementation Details

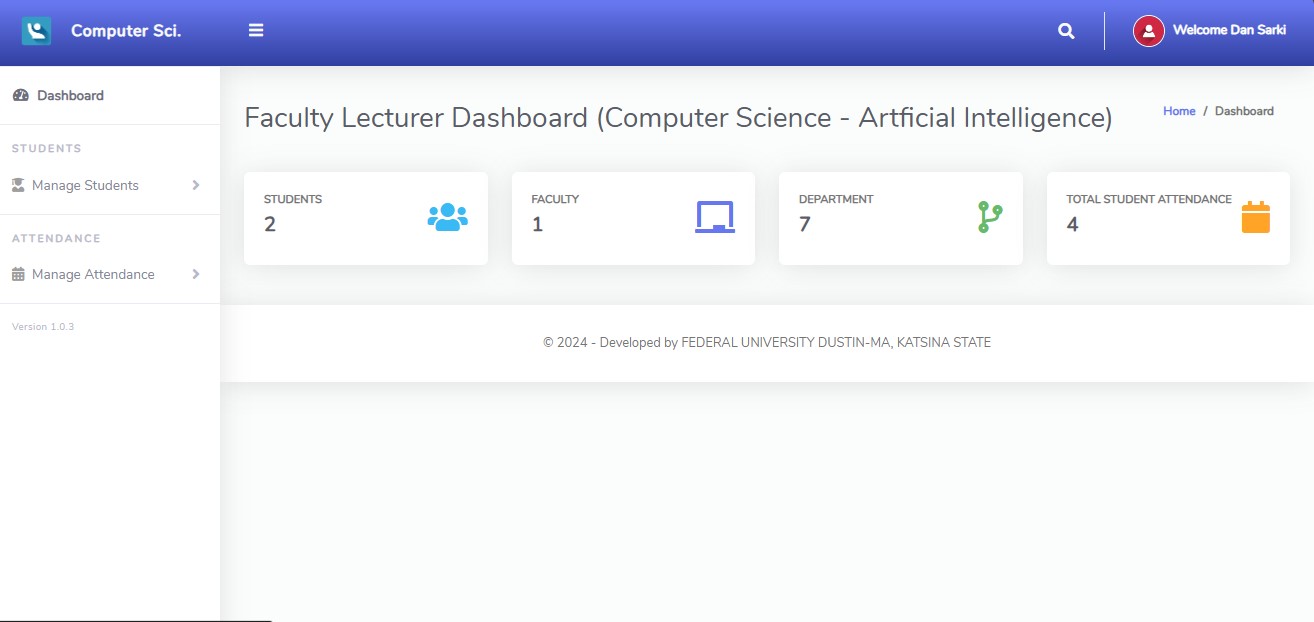
# 4.3.1 User Interface (UI)

1. **Design Principles**: The UI design followed principles of simplicity, consistency, and user-centric design to ensure ease of use and a pleasant user experience. Key pages include login, dashboard, and management interfaces.
2. **Development Tools**: Tools used for UI development include Visual Studio Code and Bootstrap Studio.
3. **Login Page**: Allows selection between logging in as an administrator or a class teacher.



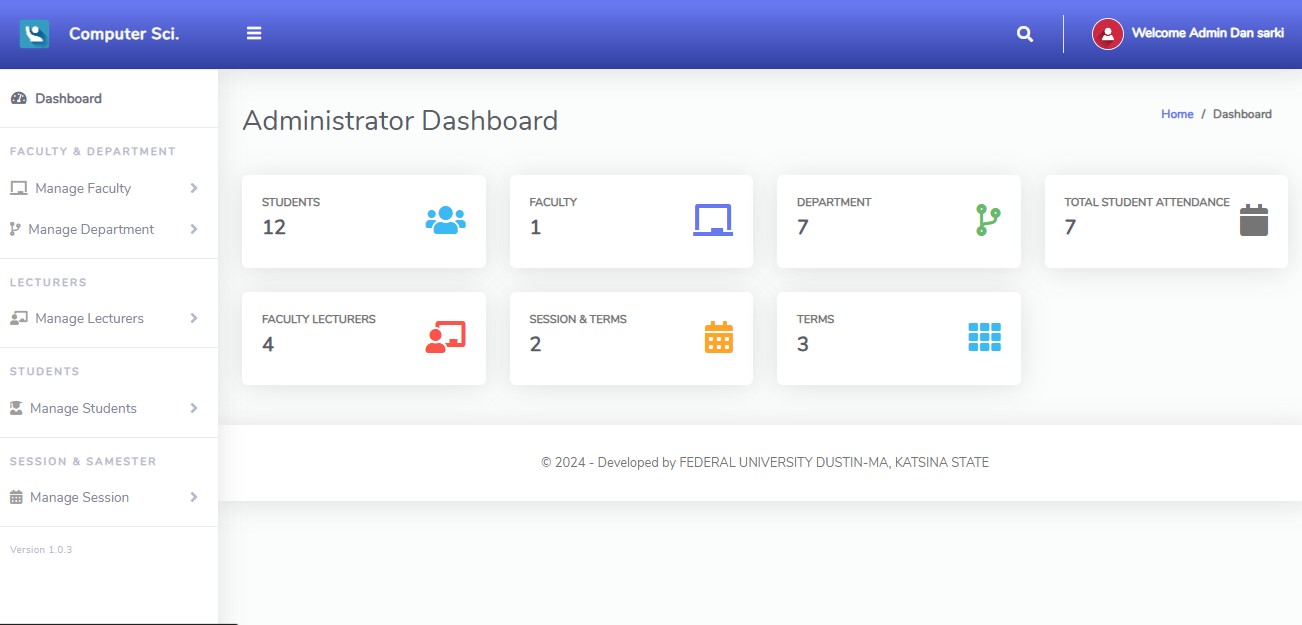
## Figure 4.3.2.1: Login Page

1. **Teacher Dashboard**: Displays students, faculty, department, and total student attendance. The sidebar includes options for managing students and attendance.



## Figure 4.3.2.2: Class Teacher Dashboard

1. **Admin Dashboard**: Displays students, faculty, department, total student attendance, faculty lectures, session and terms. The sidebar includes options for managing faculty, departments, lecturers, students, and sessions.

Figure 4.3.2.3: Admin Dashboard

# 4.3.2 Backend System

**Database Structure**:

* Users Table: Stores user information (user\_id, name, email, password, role).
* Classes Table: Stores class details (class\_id, class\_name, instructor\_id).
* Attendance Table: Records attendance (attendance\_id, user\_id, class\_id, date, status).
* Other Tables: Faculty, Department, Session, and Terms.
* Server-side Logic: PHP scripts handle user authentication, data processing, and interaction with the database. Key functionalities include logging in, managing users, classes, and attendance records.
* Data Handling: Data is stored in MySQL, retrieved via SQL queries, and processed by PHP scripts to ensure integrity and security.

# 4.3.3 Functionality

**Core Features**:

1. **User Authentication**: Secure login for students, teachers, and administrators.
2. **Teacher Dashboard**: Displays relevant information and allows for attendance management.
3. **Admin Dashboard**: Provides comprehensive management options for faculty, departments, lecturers, students, and sessions.
4. **Attendance Management**: Options to take attendance, view class and student attendance, and generate reports.

# 4.3.3.1 Implementation Challenges

* Ensuring secure authentication and data handling.
* Developing a responsive UI that works on multiple devices.
* Integrating the frontend with the backend seamlessly.

# 4.3.4 Integration

**Third-party APIs**: No external integrations were used in this phase.

# 4.3.4.1 Integration Challenges

* Handling asynchronous data exchange between frontend and backend using AJAX.
* Ensuring data consistency and integrity during integration.

# 4.4 Testing Methodology

# 4.4.1 Unit Testing

1. **Approach**: Individual components were tested in isolation to ensure each part functions correctly.
2. **Tools**: PHPUnit for PHP, Jasmine for JavaScript.

# 4.4.2 Integration Testing

1. **Strategy**: Testing combined components to verify they work together as intended.
2. **Results**: Successful integration of frontend and backend with no major issues.

# 4.4.3 User Acceptance Testing (UAT)

1. **Process**: Conducted with a group of end-users (students and instructors) to validate the system against user requirements.
2. **Feedback**: Users found the application easy to use and effective for managing attendance.

# 4.5 Results and Evaluation

# 4.5.1 Performance Metrics

1. **Response Times**: The system demonstrated quick response times with minimal latency.
2. **Scalability**: The application handled increased loads efficiently during testing.

# 4.5.2 User Feedback

1. **Usability**: Users appreciated the intuitive interface and ease of navigation.
2. **Functionality**: Positive feedback on the core features and overall performance.

# 4.6 Challenges and Solutions

# 4.6.1 Technical Challenges

* **Challenge**: Ensuring secure data transmission.
* **Solution**: Implemented HTTPS and data encryption.
* **Challenge**: Cross-browser compatibility.
* **Solution**: Thorough testing and use of Bootstrap for responsive design.

# 4.6.2 Resource Constraints

* Managed by prioritizing tasks and using open-source tools to minimize costs.

# 4.7 Future Enhancements

1. **Proposed Features**:

* Integration with third-party calendar systems for better scheduling.
* Implementation of machine learning algorithms for predictive attendance analytics.

1. **Benefits**: These enhancements would improve user experience and provide additional value through advanced features and insights.

# 4.8 Summary

This chapter provided a comprehensive overview of the implementation phase of the Attendance System Application. It detailed the system architecture, implementation details, testing methodologies, and results, as well as the challenges encountered and proposed future enhancements. The next chapter will focus on evaluating the overall project and drawing conclusions based on the findings from the implementation phase.

# CHAPTER FIVESUMMARY, CONCLUSION AND RECOMMENDATION

# 5.1 Summary

The culmination of this project journey encompasses a comprehensive overview spanning multiple chapters. Chapter One introduced the Attendance System Application, setting the stage for its development and significance in educational settings. Chapter Two delved into a thorough exploration of relevant literature, providing insights into existing systems and theoretical frameworks that informed the project's approach. Chapter Three meticulously outlined the methodology employed, detailing the systematic approach taken to design, develop, and implement the application.

Chapter Four served as the focal point, detailing the implementation phase in great detail. It covered the technological underpinnings, system architecture, implementation strategies, testing methodologies, results, challenges encountered, and future enhancement possibilities of the Attendance System Application. The chapter underscored the successful integration of frontend and backend components, robust security measures, and positive user feedback from testing phases.

Together, these chapters have underscored the project's evolution from conceptualization through to implementation, emphasizing its contribution to efficient attendance management in educational environments. The next chapter will delve deeper into evaluating the project's overall success and implications derived from its execution.

# 5.2 Conclusion

The implementation phase of the Attendance System Application proved successful in achieving its objectives of creating a robust system for managing attendance efficiently. By leveraging PHP, MySQL, and JavaScript technologies, the system demonstrated seamless integration between frontend and backend components. Key features such as secure user authentication, comprehensive dashboards for teachers and administrators, and flexible attendance management tools were successfully implemented and tested. User acceptance testing confirmed positive feedback regarding usability and functionality.

Throughout the implementation, challenges such as ensuring data security, achieving cross-browser compatibility, and handling data integrity were addressed through diligent testing and strategic solutions. Performance metrics indicated efficient response times and scalability, ensuring the application's responsiveness under various loads.

# 5.3 Recommendation

Based on the findings from the implementation phase, several recommendations are proposed to enhance the Attendance System Application:

1. **Enhanced Security Measures**: Continuously monitor and update security protocols to mitigate potential vulnerabilities. Consider implementing additional layers of security such as multi-factor authentication and regular security audits.
2. **Improved User Interfaces**: Further refine UI elements to enhance user experience across different devices. Implement user feedback mechanisms to gather insights for iterative improvements.
3. **Advanced Analytics**: Integrate machine learning algorithms to provide predictive analytics on attendance patterns. This could offer valuable insights for administrators and educators to optimize attendance monitoring and student engagement strategies.
4. **Integration with Third-Party Systems**: Explore partnerships with third-party calendar systems to streamline scheduling processes and enhance user productivity.
5. **Scalability and Performance Optimization**: Continuously monitor system performance and scalability to ensure seamless operation as user base and data volume grow. Implement caching strategies and database optimizations where necessary.

Implementing these recommendations will not only enhance the functionality and efficiency of the Attendance System Application but also ensure it remains a valuable tool for educational institutions aiming to streamline attendance management and improve student outcomes.

**REFERENCES**

Greyson, M. M., Makulilo, A. (2022), Are Biometric Attendance Registers a Panacea for

Workplace Absenteeism in Tanzania? A Lesson from Public Secondary Schools in

Nyamagana Municipality, *journal of Biometric Attendance,* 77-104.

# Sun et al., (2014), Data Security and Privacy in Cloud Computing, *journal of Distributed Sensor*

*Network.*

Murshekar M. (2020), SARS-CoV-2 seroprevalence among the general population and

healthcare workers in India, *journal of Infectious Diseases,* (108), 145-155.

Breu, M., Breu, R. (2023), Scientific methods to evaluate the effect of new web-features on

user experience, *journal of Web-features on User Experience.*

Nazir, S., Patel, S., Patel, D. (2018), Cloud-based Autonomic Computing Framework for

Securing SCADA Systems**,** *journal of Computing Framework For Securing*

*System.*

Kim, S., Chen J., Bolton E. (2021), PubChem in 2021: New data content and improved web

Interfaces, *journal of Web Interfaces,* 49(D1), D1388-D1395.

Kirmani, S., Mazid, A., Abid, M. (2020), A Survey on IoT-Enabled Smart Grids: Technologies,

Architectures, Applications, and Challenges, *journal of Technologies Challenges.*

Manjarres, J., Narvaez, P., Pardo, M. (2020), Physical workload tracking using human activity

recognition with wearable devices, *journal of Workload Tracking With Wearable*

*Devices,* 20(1).

Sun, Y., Zhang J., Zhu, G. (2019), DataSecurityandPrivacyinCloudComputing, *journal of*

*Distributed Sensor Networks,* 185-200.

Ahmed, N. (2018), Big Data and Urban Planning in Pakistan: A Case Study of The Urban Unit,

*Journal of Big Data Analysis.*

Czech Institute of Informatics, Robotics and Cybernetics. (n.d.). 160 00 Prague 6, Jugoslávských

partyzánů , (pp. 1580/3,). Czech Republic . Retrieved from Czech Institute of Informatics, Robotics and Cybernetics 160 00 Prague 6, Jugoslávských partyzánů 1580/3, Czech Republic.

Pretoria. (2000), Draft White Paper 5 attendance system for education. Government Printer:.

Department of Education, *journal of Attendance Tracking System.*

# APPENDIX I

*<!DOCTYPE html>*

*<html lang="en">*

*<head>*

*<meta charset="utf-8">*

*<meta http-equiv="X-UA-Compatible" content="IE=edge">*

*<meta name="viewport" content="width=device-width, initial-scale=1, shrink-to-fit=no">*

*<meta name="description" content="">*

*<meta name="author" content="">*

*<link href="img/logo/attnlg.jpg" rel="icon">*

*<title>CMP - Login</title>*

*<link href="vendor/fontawesome-free/css/all.min.css" rel="stylesheet" type="text/css">*

*<link href="vendor/bootstrap/css/bootstrap.min.css" rel="stylesheet" type="text/css">*

*<link href="css/ruang-admin.min.css" rel="stylesheet">*

*</head>*

*<body class="bg-gradient-login" style="background-image: url('img/logo/loral1.jpe00g');">*

*<!-- Login Content -->*

*<div class="container-login">*

*<div class="row justify-content-center">*

*<div class="col-xl-10 col-lg-12 col-md-9">*

*<div class="card shadow-sm my-5">*

*<div class="card-body p-0">*

*<div class="row">*

*<div class="col-lg-12">*

*<div class="login-form">*

*<h5 align="center">STUDENT ATTENDANCE SYSTEM</h5>*

*<div class="text-center">*

*<img src="img/logo/attnlg.jpg" style="width:100px;height:100px">*

*<br><br>*

*<h1 class="h4 text-gray-900 mb-4">Admin Login Panel</h1>*

*</div>*

*<form class="user" method="Post" action="">*

*<div class="form-group">*

*<select required name="userType" class="form-control mb-3">*

*<option value="">--Select User Roles--</option>*

*<option value="Administrator">Administrator</option>*

*<option value="ClassTeacher">ClassTeacher</option>*

*</select>*

*</div>*

*<div class="form-group">*

*<input type="text" class="form-control" required name="username" id="exampleInputEmail" placeholder="Enter Email Address">*

*</div>*

*<div class="form-group">*

*<input type="password" name = "password" required class="form-control" id="exampleInputPassword" placeholder="Enter Password">*

*</div>*

*<div class="form-group">*

*<div class="custom-control custom-checkbox small" style="line-height: 1.5rem;">*

*<input type="checkbox" class="custom-control-input" id="customCheck">*

*<!-- <label class="custom-control-label" for="customCheck">Remember*

*Me</label> -->*

*</div>*

*</div>*

*<div class="form-group">*

*<input type="submit"  class="btn btn-success btn-block" value="Login" name="login" />*

*</div>*

*<hr style="margin-top: 2rem;">*

*<div style="margin-left: 20rem; margin-top: 2rem;">*

*<a href="forgotPassword.php">Forget password</a>*

*</div>*

*</form>*

*<?php*

*if(isset($\_POST['login'])){*

*$userType = $\_POST['userType'];*

*$username = $\_POST['username'];*

*$password = $\_POST['password'];*

*$password = md5($password);*

*if($userType == "Administrator"){*

*$query = "SELECT \* FROM tbladmin WHERE emailAddress = '$username' AND password = '$password'";*

*$rs = $conn->query($query);*

*$num = $rs->num\_rows;*

*$rows = $rs->fetch\_assoc();*

*if($num > 0){*

*$\_SESSION['userId'] = $rows['Id'];*

*$\_SESSION['firstName'] = $rows['firstName'];*

*$\_SESSION['lastName'] = $rows['lastName'];*

*$\_SESSION['emailAddress'] = $rows['emailAddress'];*

*echo "<script type = \"text/javascript\">*

*window.location = (\"Admin/index.php\")*

*</script>";*

*}*

*else{*

*echo "<div class='alert alert-danger' role='alert'>*

*Invalid Username/Password!*

*</div>";*

*}*

*}*

*else if($userType == "ClassTeacher"){*

*$query = "SELECT \* FROM tblclassteacher WHERE emailAddress = '$username' AND password = '$password'";*

*$rs = $conn->query($query);*

*$num = $rs->num\_rows;*

*$rows = $rs->fetch\_assoc();*

*if($num > 0){*

*$\_SESSION['userId'] = $rows['Id'];*

*$\_SESSION['firstName'] = $rows['firstName'];*

*$\_SESSION['lastName'] = $rows['lastName'];*

*$\_SESSION['emailAddress'] = $rows['emailAddress'];*

*$\_SESSION['classId'] = $rows['classId'];*

*$\_SESSION['classArmId'] = $rows['classArmId'];*

*echo "<script type = \"text/javascript\">*

*window.location = (\"ClassTeacher/index.php\")*

*</script>";*

*}*

*else{*

*echo "<div class='alert alert-danger' role='alert'>*

*Invalid Username/Password!*

*</div>";*

*}*

*}*

*else{*

*echo "<div class='alert alert-danger' role='alert'>*

*Invalid Username/Password!*

*</div>";*

*}*

*}*

*?>*

*<!-- <hr>*

*<a href="index.html" class="btn btn-google btn-block">*

*<i class="fab fa-google fa-fw"></i> Login with Google*

*</a>*

*<a href="index.html" class="btn btn-facebook btn-block">*

*<i class="fab fa-facebook-f fa-fw"></i> Login with Facebook*

*</a> -->*

*<div class="text-center">*

*</div>*

*</div>*

*</div>*

*</div>*

*</div>*

*</div>*

*</div>*

*</div>*

*</div>*

*<!-- Login Content -->*

*<script src="vendor/jquery/jquery.min.js"></script>*

*<script src="vendor/bootstrap/js/bootstrap.bundle.min.js"></script>*

*<script src="vendor/jquery-easing/jquery.easing.min.js"></script>*

*<script src="js/ruang-admin.min.js"></script>*

*</body>*

*<*/html>