Enhanced User-Friendly School Management System Using Spring Boot

Dr. V Sindhu[1*], Anjali Chauhan[2], Mona Kumari[3]

[1]Assistant Professor, School of Computer Applications, Lovely Professional University, Punjab, India.*
[2]Master of Computer Applications, School of Computer Applications, Lovely Professional University, Punjab, India.
[3]Master of Computer Applications, School of Computer Applications, Lovely Professional University, Punjab, India.

Email: [2]Anjalichauhan22099@gmail.com Corresponding Email:[1]Sindhu.work@gmail.com*

Abstract
A school management system is a web-based programme that offers a platform for controlling numerous activities in a school. HTML, CSS, and the Spring Boot framework is used to design the system. The application's user interface is created and designed using HTML and CSS. They make it possible for the system to offer an interactive and user-friendly interface via which they may access various system operations. The sophisticated foundation offered by Spring Boot, on the other hand, makes it possible to create web applications that are both scalable and effective. It gives the system the ability to manage a variety of modules, including student, instructor, course, attendance, and fee administration. The school administration system also has tools for managing results, online testing, and admissions. The system has the ability to provide reports that may be used to assess the performance of the school and guide intelligent decision-making. It increases overall academic achievement, improves communication between teachers, students, and parents, and improves school operations.

Keywords: School Management, HTML, CSS, SpringBoot

1. INTRODUCTION
Today, any nation's development depends greatly on its educational system. Several educational organizations work to raise the standard of instruction. Human society is anchored by education. Thus, it is crucial to offer every generation's youth a beautiful, solid, and high- quality education in order to ensure that their personalities are developed in the best possible way[1]. Due to advances in technology, school administrators who previously had to spend a lot of time manually searching for certain documents (such as a student's terminal report, school free records, or staff information) and keeping an eye on the school's activities now have better options. A school management system is a program that automates and improves a school's administrative procedures. It offers a consolidated platform for handling numerous tasks like scheduling classes, monitoring attendance, managing teachers, scheduling lessons, scheduling exams, and handling fees[2]. The school management system is intended to increase the effectiveness and efficiency of the school's operations by minimizing manual processes, removing errors, and enhancing communication among staff members, students, and parents. In order to analyze the performance of the school and make wise decisions, the system also enables school administrators to access real-time data and produce reports. The school management system has been a crucial instrument for schools to improve their operations and deliver high-quality education since the advent of technology [3]. Teachers, students, and parents can more easily utilize the system from anywhere and at any time thanks to web and mobile applications.

2. PROPOSED METHODOLOGY
The application is being developed and deployed using micro-services architecture. The micro- service architecture is developed using Spring-boot, a rapid application development platform and opinionated spring application. Requirements gathering, design, development and implementation, testing, and maintenance are the five stages of the suggested technique.
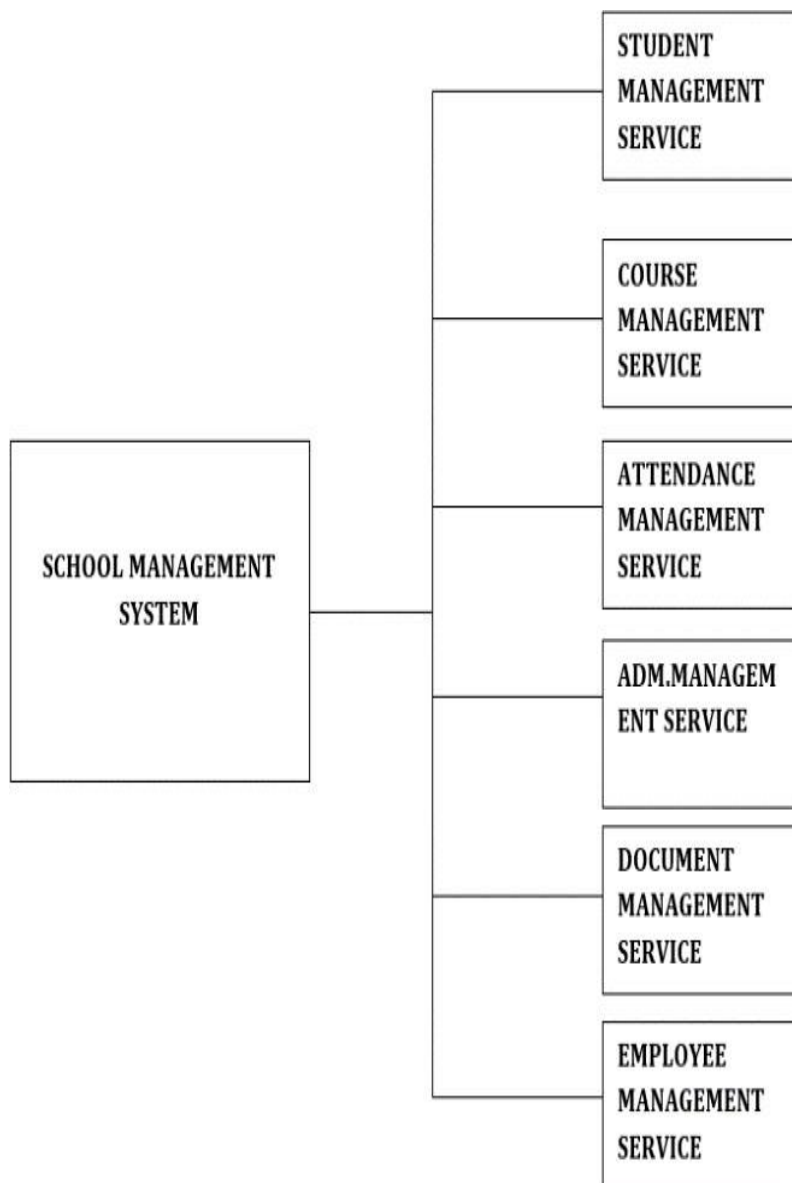
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Fig:1 School Management System Overall Design

A. Student Management Service
Via this service, the student will have access to their announcements, look over their schedule, view and submit assignments, check their attendance, progress report, and results, as well as send requests for any required documentation. Students may provide feedback on the teacher's performance in the classroom[4].

B. Course Management Service:
The administrator will be able to add, edit, and delete courses via this service [5]. The subjects of the specific course can also be added, updated, or deleted by the administrator. Only the admin-added courses can be viewed by the teacher, guardian, and students.

C. Attendance Management Service:
Supervisors can use this service to submit, update, and delete student attendance based on the course and class that the student is registered for. The attendance record is only accessible by the teacher, the guardian, and the students.

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D. Administration Management Service:

This service's administrator will have complete access to all resources. Push, SMS, and email are the available notification delivery methods for the administrator [6]. The admin can also change the staff, student, and guardian information.

E. Documentation Services:

The service's administrator will have complete access to all resources. Push, SMS, and email are all methods that the administrator can use to distribute the messages. The admin can also change the staff, student, and parent information [7].

F. Employee Management Service:

The service's user (teacher) will be able to see details on the children they are mentoring. The instructor will be able to summarise the students' actions and evaluate their performance. The assignments can be uploaded for the teacher to review.

Proposed Use Case Design

Once the needs have been gathered and evaluated, a proper framework must be given to them. The criteria acquired in the phase before will be used as a reference to build the project's architecture at this stage. [8] This phase entails the creation of several architectural diagrams, such as ER diagrams, DFDs (data flow diagrams), use case diagrams, etc. The relationships and dependencies between the items are described in the ER diagram.

School Management System DFD Level 0

The Level 0 DFD Diagram for School Management System also goes by the moniker "context diagram." Its component parts are users, the primary process, and data flow. Also, the single process visualization is used to illustrate the project concept. DFD Level 0 depicts the entities that interact with a system and delineates the boundary between the system and its surroundings. [9] A high-level representation of the school management system is also shown in this diagram.
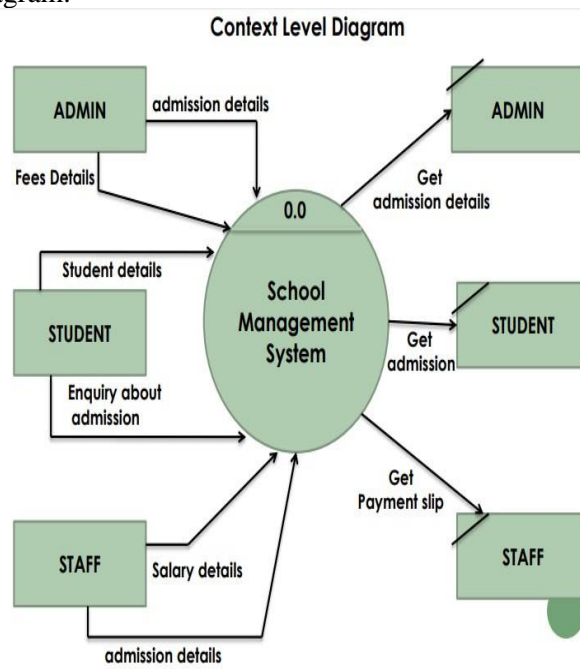

Fig:2 Context Level Use Case Diagram

School Management System DFD Level 1

In particular, level 1 displays School Management System DFD Level 0's more comprehensive details. [10] Clarifying the pathways (flow) of data and how it changes from input to output is the goal here.
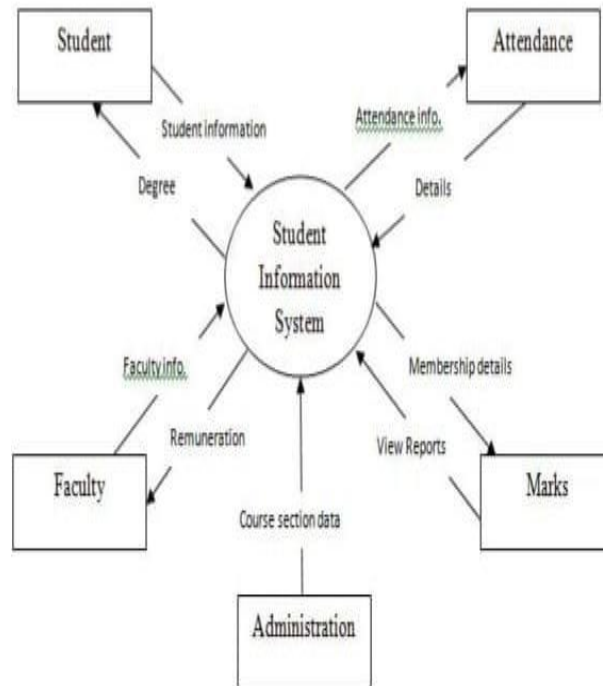
Fig:3 Level 1 Data Flow Diagram

The first source of data is the staff of the registrar and the students. The system then accommodates the transaction. This concept was based on procedures or transactions in school authorities.[11] The database or data store that is being used is also visible. Furthermore kept in a database are the user's data inputs. It then acts as the outputs' source.

School Management System Level 2
The data flow diagram's level two abstraction is used for the school management system. In addition, the concept from DFD level 1 is expanded upon this level.[12] Together with the data flow, it also includes the level 1 sub processes.
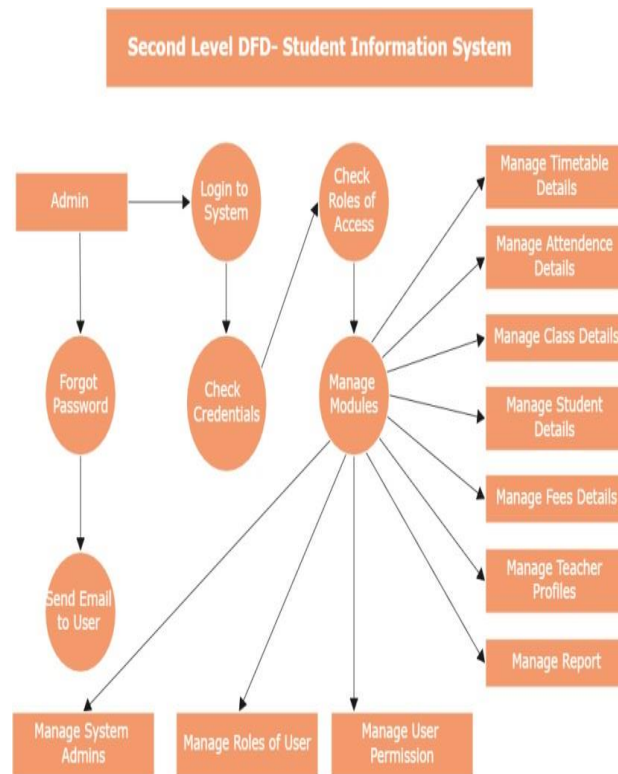
Figure:4 Level 2 Data Flow Diagram

3. EXPERIMENTAL RESULTS

Spring-boot is used to create applications built on micro services architecture. To communicate with the database, Java 1 frameworks like Hibernate and Spring-Data-JPA are employed.[13] The Spring-MVC architecture is also used. Six spring-boot apps are bootstrapped and hosted separately in accordance with the specifications and design, resulting in practically complete independence and loose coupling between all applications. [14] To preserve consistency throughout the development process, each application will have a consistent directory structure.

[15] Below are a few of the application's outcomes. The user interface for the application's screen, as well as its features and functionalities, are depicted in the figures below. In a nutshell, the project's output is a collection of web pages that the web and application server has generated.
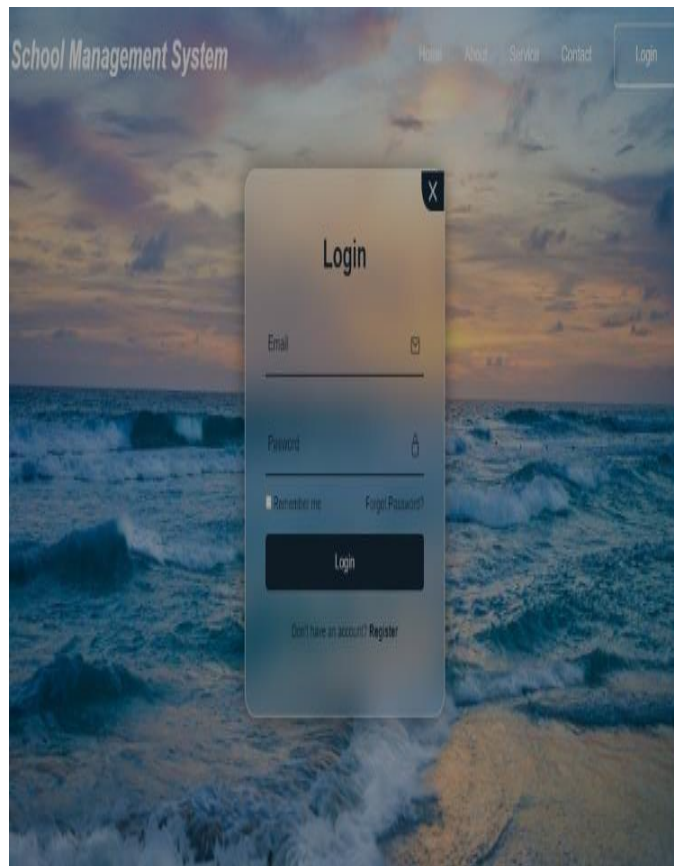
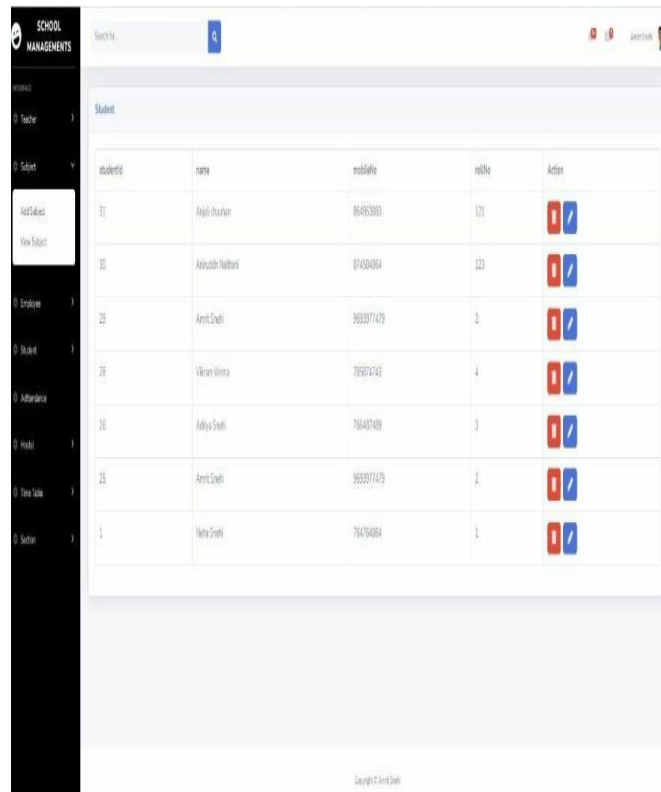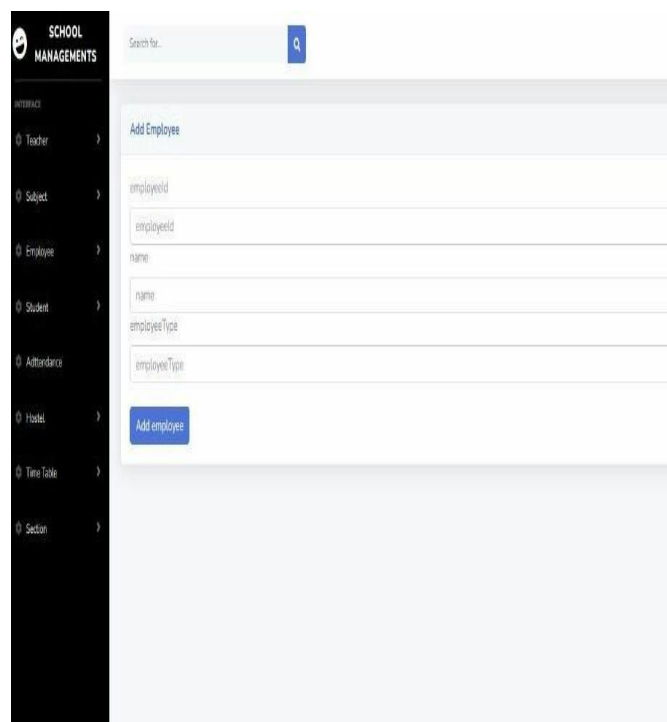Fig:5 Login Page

Fig:6 Registration Page

Fig:7 Dashboard

Fig:8 Employee Management

4. CONCLUSION AND FUTURE SCOPE

The results of the experiments and evaluation show that the suggested method is efficient and user-friendly. The project that results in centralized software streamlines work administration and management and provides comprehensive information about a user's chosen topic with just

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a single mouse click, in contrast to present methods of managing academic institutions. With the help of standardized software with a straightforward user interface that can be made available to the institution, all services connected to the educational institution can communicate with one another and share data. Future services can be added to the program without modifying the present code because it was designed utilizing a micro-service architecture and agile methodology. The future potential of a Spring Boot-based school administration system is highly encouraging.

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