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An Approach on school website and student management system

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Abstract

In the digital age, the role of technology in education has expanded far beyond the traditional confines of the classroom. In order to improve communication, streamline administrative procedures, and increase educational efficiency, this study proposes an inventive method of integrating a student management system with a school website. When these two systems are integrated, a complete solution is created that encourages a more collaborative and productive atmosphere for both teachers and students. This study explores the benefits and technical details of school website and student management system while highlighting the revolutionary potential it holds for contemporary education. This setup employs ADO.NET technology within a .NET environment, utilizing ASP.NET, Visual C#, and JavaScript as the programming languages to interact with the Microsoft SQL Server database. Access to this system is restricted to users with elevated security privileges, who must comply with the Role-Based Access Control (RBAC) mechanism for Web Services access control.

Keywords- Student Management System, database,

1. INTRODUCTION

The use of technology in education is a defining feature of the modern environment. Schools and other institutions are relying more and more on integrated solutions to handle both administrative and academic operations as there is a growing emphasis on delivering a seamless

learning experience. The combination of student management systems and school websites offers a strong strategy for reaching this objective.

For this project, the schools and colleges previously depended on paper records. While relying on paper records for storing student data is a traditional method, it comes with several drawbacks. Information should first be posted on the notice board and students must visit it to verify the information in order for it to be communicated to them. The learner is not given the knowledge for a very long period. Maintaining and handling paper records can be quite demanding. The manual effort required to access, update, and refile these records does not contribute to their overall value.

An easy-to-use interface is offered by this system for maintaining student data. Educational institutions, including colleges, can utilize an online student information management system to efficiently maintain student records. Unlike a manual system, where data is scattered, often duplicated, and gathering relevant information can be time-consuming, the online student information management system is designed to address these challenges. The primary objective of this platform is to enhance information accessibility by providing features such as online student registration and profile creation, reducing paperwork, and automating record generation within educational institutions.

For educational institutions, a student management system and school website are vital resources. They facilitate the simplification of administrative duties pertaining to registration, performance monitoring, and exams. Students can also get access to vital information like schedules, assignments, and grades through a well-designed school website. An educational institution can construct and manage a school website, which is a digital platform that offers services, resources, and information to a range of stakeholders, including parents, teachers, staff, students, and the community at large. With a wealth of features and content, school websites have developed into important hubs for information exchange and collaboration.

An extensive software platform known as a Student Management System (SMS), occasionally labeled as a Student Information System (SIS) or School Management System, has been developed to manage various aspects of student information, administrative responsibilities, and educational procedures within an academic setting. Schools, colleges, universities, and other educational institutions frequently employ these systems to consolidate and simplify the administration of student-related data. The following are some essential characteristics and features of a typical student management system:

II. SYSTEM DESIGN

A website created, designed, and updated by a school is called a school website. It is mandatory for schools to post specific information online, on their website, or in other places under numerous laws1. The website software is a specific type of internet-hosted Content Management System (CMS) that runs on a computer. A specialized computer software business designed and deployed it, under contract from the school governors. Following acceptance, the client—the school—is in charge of keeping the content up to date by adding new material and altering visual design elements1. The government has largely specified the website's essential material. The website's content must to abide by data protection laws1.

A school's website serves a variety of purposes, including informational gathering for potential and current parents, alumni, visitors, people keeping an eye on the school, and those involved in fundraising1. The website might be straightforward and adhere to tried-and-true

models, with merely the text and visuals altered to meet the needs of the school, or it can be unique and integrated into a bigger management suite.1.

A. Requirements of Student Management System

The primary goal of the Student Information Management System is to efficiently manage and maintain information pertaining to classes, the curriculum, and school admissions. Its goal is to increase the effectiveness of student information management. The two main functional needs in the system are those of the administrator and the students.

(1) Functional criteria for administrators

The person with the most rights is the administrator, who oversees students, classes, and curriculum data. The following are the specifics of the administrator functional requirements:

Information on students, class management, the foundational curriculum, and student scores can be added, changed, or removed. The accessed data comprises the student's name, gender, country of birth, date of birth, admission time, assigned class, ethnicity, and any supplementary comments.

The management and retrieval of class-related data involve several components, such as organizing classroom setups, handling grade-related information, facilitating exploration of core school courses (comprising course name, course type, duration, credit allocation, and course-specific descriptions), reviewing and aggregating student performance data based on specific criteria (like department, class, etc.), identifying courses, academic years, content, and other associated elements. System administration responsibilities encompass the management of passwords and user accounts.

(2) Functional criteria for students

The system is exclusively accessible to students for querying and entering their information, and it is essential to ensure that the following functional requirements are fulfilled:

- Looking through one's personal data, such as name, student ID, country, date of birth, class, ethnicity, and remarks.
- During the student login process, users are required to modify their personal data, with the system prompting them to change their passwords in order to enhance security.
- Review their personal performance messages and access course information, such as names, program types, hours, credits, course descriptions, and individual instructors.

B. Database Requirements

User demands are articulated through the need to save, modify, and retrieve various data types, requiring comprehensive support for input and output functions as well as all data structures within the database. Figure 2's data flow diagram was meticulously developed by adapting and scrutinizing student information.
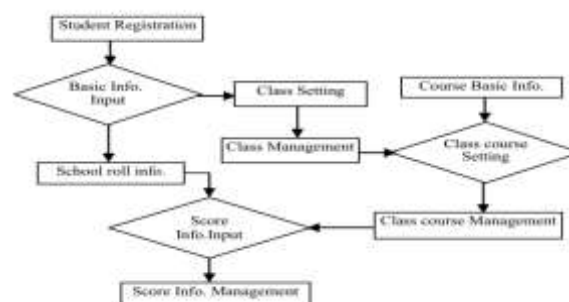

Fig. 1 Data flow diagram

C. Database description

The analysis of the database requirements specifies the need to establish entities and their connections to meet the diverse information needs of various user forms. These entities are not only vital for structuring the underlying logic but also for facilitating communication and the exchange of specific data types. Within the system, notable entities include the students (as depicted in Figure 3), the class (as shown in Figure 4), the grade (as represented in Figure 5), and the course (as illustrated in Figure 6).
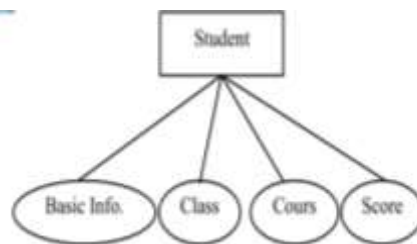

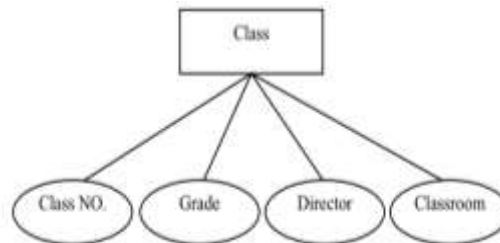Fig. 2 Student entity E-R diagram

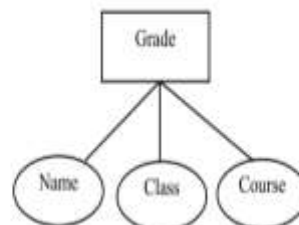Fig. 3 Class entity E-R diagram

Fig. 4 Grade entity E-R diagram

D. Database Design Process

One can make a valid argument that databases play a crucial role in almost every computer-dependent field, such as engineering, business, e-commerce, medicine, law, education, and library science. A database is a collection of interlinked data, and the following inherent attributes are associated with databases:

- Changes to the tiny world, also known as the Universe of Discourse (UOD), are mirrored in the database, which reflects a portion of the real world.
- A database is an intrinsically meaningful assembly of data that exhibits logical coherence. It is incorrect to refer to a collection of unorganized data as a database.
- A database is established, built, and populated with data for a particular purpose, serving a specific user group within a pre-planned application that actively involves these individuals.

A database management system (DBMS) is a collection of applications designed to enable users to create and oversee databases efficiently. This all-encompassing software

system, known as a database management system (DBMS), simplifies the processes of defining, constructing, manipulating, and sharing databases among diverse users and applications. Defining a database involves specifying the constraints, structures, and data types to be stored in the database. Constructing the database entails storing the data on a storage medium under the supervision of the database management system (DBMS). The database's descriptive information, referred to as metadata, is also stored within the database in the form of dictionaries.

Manipulating a database involves executing actions such as querying to retrieve specific data, updating the database to mirror alterations in the mini-world, and generating reports based on the available data. A database that is shared enables simultaneous access by numerous users and applications.

By submitting requests for data to the DBMS, an application program can access the database [5]. While some data is usually retrieved via a query, some data may also be read and written into the database during a transaction.

III. KEY TECHNOLOGIES

.NET Framework

.NET, an innovative software framework and development platform crafted by Microsoft, offers an extensive array of tools and technologies for constructing a wide range of applications, such as web applications, desktop applications, mobile apps, cloud-based services, and more. Opting for the .NET framework to create a Student Management System (SMS) proves to be a pragmatic and effective decision. .NET furnishes a resilient and adaptable development ecosystem, rendering it well-suited for the development of SMS applications. What truly sets .NET apart is its exceptional support for multiple programming languages.

ADO.NET

The .NET framework includes a collection of data access tools and components called ADO.NET (ActiveX Data Objects for.NET) that let programmers deal with databases and modify data. It offers a method for establishing a connection to databases, retrieving data, updating data, and interacting with databases within.NET applications. ADO.NET is made out of the essential elements and functions.

RBAC

RBAC (Role-Based Access Control) introduces the concept of Roles to separate the User (the primary actor, or Subject) from the Privilege (an operation performed on an Object, which combines Operation and Object). This approach ensures that all permissions are channeled through the Role rather than being granted directly to the User. RBAC is characterized by two key attributes: 1) Authorization management complexity and administrative overhead are reduced because the relationship between roles and permissions evolves more slowly than the relationship between roles and users. 2) RBAC provides substantial flexibility to accommodate changes within enterprises and adapt to corporate security policies. Figure 1 illustrates the connection between Users, Roles, and Privileges in the RBAC model.

Fig. 5 Relationship between users roles and privileges.

JAVA SCRIPT

JavaScript is undeniably one of the most renowned programming languages in existence, and it's primarily recognized as a scripting language for the World Wide Web. Its primary purpose is to elevate web functionality, which includes tasks like form validation, browser identification, cookie generation, and more. Back in the day, Internet Explorer and Opera were our preferred browsers for using JavaScript. To this day, JavaScript remains one of the most influential scripting languages at our disposal. It is frequently employed in the creation of client-side web applications. Web sites can be made more dynamic and interactive by using JavaScript.

JavaScript, a lightweight programming language, seamlessly integrates into HTML code. Its name suggests its inspiration from various languages, with Java being a prominent influence.

SQL

SQL, an acronym for Structured Query Language, serves as a means to access and manipulate databases. This language adheres to the American National Standards Institute (ANSI) standard. SQL exhibits its versatility by enabling the creation of fresh databases and tables, as well as the implementation of stored procedures, views, and functions. Furthermore, it possesses the capability to execute queries on databases, extract information from them, add new records, modify existing records, and delete records. Additionally, SQL offers the functionality to establish permissions for tables, procedures, and views.

IV. RESULTS

Login Form:

The process commences with a login interface, where an enrolled user is required to input their username and password to obtain entry. Figure 6 showcases the login form in conjunction with the registration option.
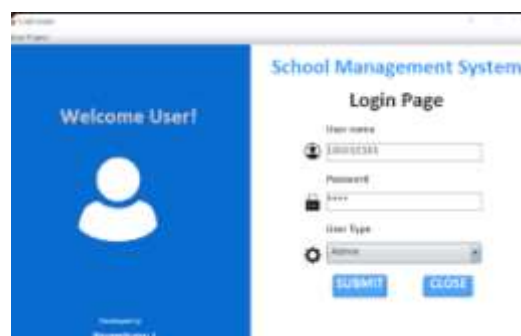

Fig. 6 Login form

Registration form:

Figure 7 depicts the enrollment form that includes student information details for the admission process.

Fig. 7 Registration form

Upon completing the registration form, an email containing the User Name and Verification Code will be sent to the student to verify their email address. The student's registration will be completed after providing the verification code. The administration department will then verify the student's information and, if it is determined to be accurate, will contact the student to inform them that their registration was successful and they can log in.

List of student form:

The essential student details are illustrated in Figure 8, encompassing the college serial number, university number, name, father's name, date of birth (DOB), class, year, and department.

Fig. 8 Table of student basic information

Exam section form:

Figure 9 displays the examination section form, which includes information such as the test timetable, final exam schedule, room assignments, and more. Any updates related to changes will be reflected as necessary.

Fig. 9 Exam Section form

Faculty form:

Figure 10 displays the faculty form, which encompasses fields for entering test marks for the students.

Fig. 10 Faculty form

V. CONCLUSION

The current manual system is being automated with the help of this paper. this is an electronic creation. It is remotely monitorable and controllable. It lowers the amount of labor needed. It consistently offers correct information. Misconduct can be minimized. Information accumulated over the course of several years can be kept and accessed whenever needed. The information kept in the repository assists management in making wise judgments. Therefore, having student management system along with school website is preferable. All parties involved, including teachers and administrators, can quickly obtain the necessary information. In the schools and colleges, this structure is crucial.

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