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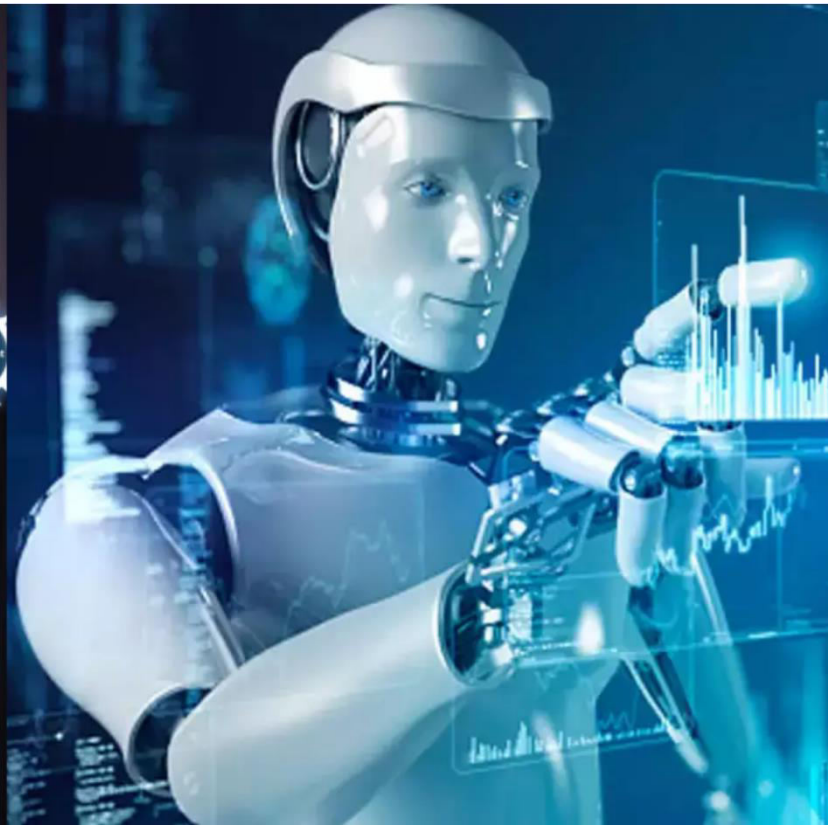

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Student Performance Evaluation Application

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ABSTRACT: The Student Performance Evaluation System in Academics and Extracurricular Project is a pioneering system designed to offer a holistic assessment of students' caabilities by integrating academic performance evaluation with a sophisticated mechanism for analysing extra-curripcular participation. Utilizing data analytics and machine learning algorithms, System assesses academic performance, identifying strengths and areas for improvement, while also tracking and evaluating participation in extracurricular projects, clubs, and events. By providing educators and students with a comprehensive overview of both academic and non-academic achievements, System fosters a nuanced understanding of student's capabilities, enabling personalized academic support and recognition of overall growth and development. The project aims to contribute to informed decision-making processes for academic and career development, thereby creating a more dynamic and responsive educational environment.

I. INTRODUCTION

The Student Performance Evaluation in Academics and Extracurricular Project represents a pioneering initiative aimed at comprehensively assessing and analysing students' holistic development within educational institutions. By seamlessly integrating academic performance evaluation with a mechanism for tracking extracurricular activities, this project offers a comprehensive understanding of each student's capabilities. At its core, advanced data analytics and machine learning algorithms are employed to evaluate students' academic performance. However, this assessment extends beyond mere performance and assignment tracking, encompassing a dedicated module for monitoring and assessing students' participation in extracurricular projects, clubs, and events. This inclusive approach acknowledges the significance of non-academic participation in shaping students' overall growth and development. Ultimately, the project strives to create a more dynamic and responsive educational environment that recognizes and encourages students' growth beyond traditional classroom boundaries. By promoting a well-rounded educational experience, the Student Performance Evaluation paves the way for personalized support in education.

II. LITERATURE SURVEY

The literature survey encompasses a range of studies that delve into the complexities surrounding Analysing Student Performance using machine learning Techniques such as ID3and C4.5 to analyse and evaluate the performance. This was done by Aditya Gaykar and Rohit Jha and published the paper in 2013 October. The accuracy achieved in this Analysis the accuracy achieved was seventy five percent. In 2022 the student result was analysed using various machine learning algorithms and the performance of these student were evaluated and to decide where the student is in decline or is improving. This was done by Rosemary Vargheese and Adlene Peraira they used Svm Algorithm to analyze the result and evaluated the performance. In 2018 Jayalakshmi Indiresan conducted research on Impact of Extracurricular Participation on Student Academic Performance Paper investigates the relationship between students' participation in extracurricular activities and their academic performance. Using statistical analysis and survey data, the study examines whether involvement in clubs, sports, and community service correlates with higher grades, improved attendance, and overall academic success.

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III. OVERVIEW OF THE SYSTEM

3.1 Existing System

The current system for evaluating student performance in academics and extracurricular activities is often fragmented and lacks comprehensive analysis. While academic performance is typically assessed through traditional methods such as grades and test scores, tracking extracurricular participation and its impact on overall development is often overlooked. Without a unified system in place, educators and stakeholders may struggle to gain a holistic understanding of students' capabilities and needs. Moreover, existing systems may not leverage advanced technologies like data analytics and machine learning algorithms to provide deeper insights into student performance. As a result, opportunities for personalized support and tailored guidance may be missed, hindering students' academic and personal growth.

3.2 Proposed System

An online student portal serves as a centralized platform that offers students convenient access to academic resources and administrative services. Typically hosted on university or educational institution websites, these portals provide students with a range of features, including course registration, grade tracking, class schedules, and communication tools. Students can view and download study materials, submit assignments, and communicate with professors and peers. Additionally, student portals often facilitate administrative tasks such as exam schedules, extracurricular and degree progress tracking. The goal is to streamline communication, enhance accessibility to educational resources, and empower students to manage their academic journey efficiently. These portals contribute to a more connected and technologically integrated learning experience for students in today's digital age.

3.3 Module Description

The architecture of the system comprises three distinct modules, each serving a specific purpose:

User Interface: This module is responsible for the user interface of the system. It includes components such as web pages, forms, and interactive elements. Features within this module enable users to access student records, track attendance, and input/update student data. Dashboards are provided for convenient navigation and management of student-related information.

Data Management Module: The data management module handles the storage, retrieval, and manipulation of student-related data. It utilizes database management systems like MySQL to store various types of information, including student records, attendance data, grades, and other academic details. This module ensures efficient organization and accessibility of data for the system's functionalities.

Functional Module: The functional module encompasses the core functionalities of the system related to student performance management. It includes features such as attendance management, performance analysis, and generation of performance reports. This module plays a crucial role in evaluating and monitoring student performance, providing insights to educators and stakeholders for informed decision-making.

IV. OBJECTIVE

The Objective of the Student Performance Evaluation in Academics and extracurricular project is to comprehensively assess and analyse students' development in educational institutions. By integrating academic performance with extracurricular activities. The project aims at providing an Interface where the educator and student can interact where the attendance of the student can be taken and assignment can be assigned and the student can have the academic performance evaluated and identify the weakness and areas of improvement.

4.1 Planning (Discovery Phase):

- Define project scope and objectives
- Identify target audience (students, teachers, administrators)
- Determine technical requirements (database integration, authentication)
- Conduct competitor analysis (existing evaluation systems)
- Create project timeline and budget

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- Identify key performance indicators (KPIs) for evaluation

4.2 Requirements Gathering

- Determine evaluation criteria (GPA, attendance, assignments)
- Identify data sources (student information system, grade books)
- Define user roles and permissions (students, teachers, administrators)
- Gather reporting requirements (academic reports, progress tracking)
- Determine notification and alert requirements (grade updates, reminders)

4.3 Design (Concept Phase)

- Develop wireframes and prototypes for:
  - Student dashboard
  - Teacher grading interface
- Create visual design concepts (UI/UX)
- Define branding and identity guidelines
- Produce high-fidelity design mock-ups

4.4 Development (Build Phase)

- Front-end development:
  - HTML, CSS, JavaScript
  - Responsive design for mobile devices
- Back-end development:
  - Server-side programming (e.g., PHP, Python)
  - Database design and integration (e.g., MySQL)
  - API integration (e.g., student information system)
- Feature's development:
  - Grade tracking and calculation
  - Attendance tracking
  - Assignment submission and grading
  - Reporting and analytics
- Security implementation:
  - Authentication and authorization
  - Data encryption

4.5 Testing and Quality Assurance (QA)

- Unit testing and debugging
- Integration testing
- User acceptance testing (UAT)
- Cross-browser and device testing
- Performance optimization
- Security testing and vulnerability assessment

4.6 Launch and Deployment

- Set up hosting and server environment
- Configure security and backups
- Deploy webpage to production
- Conduct final testing and QA
- Launch webpage to the public

V. SYSTEM ARCHITECTURE

The system employs a client-server architecture, with the client-side interfacing via a web-based application. This application manages data storage, retrieval, and processing, utilizing a layered architecture. Clients interact with the

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web-based application, which retrieves data such as attendance, student performance, and deadlines from the database. This modular design enhances scalability, maintainability, and efficiency in handling user interactions and data management tasks.

5.1 System Design:

During analysis, the focus is on what needs to be done, independent of how it is done. During design, decisions are made about how the problem will be solved, first at high level, then at increasingly detailed levels.

System design is the first design stage in which the basic approach to solving the problem is selected. During system design, the overall structure and style are decided. The system architecture is the overall organization of the system into components called subsystems. The architecture provides the context in which more detailed decisions are made in later design stages. By making high level decisions that apply to the entire system, the system designer partitions the problem into subsystems so that further work can be done by several designers working independently on different subsystems.

The system designer must make the following decisions:

- Organize the system into subsystems.
- Identify the concurrency inherent in the problem.
- Allocate subsystems to processors and tasks.
- Choose an approach for management of data stores.
- Handle access to global resources.
- Choose the implementation of control in software.
- Handle boundary conditions.
- Set trade-off priorities.

5.2 Breaking the System into Subsystems:

The first step in system design is to divide the system into small number of components. Each major component of a system is called a sub system. Each subsystem encompasses aspects of the system that share some common property similar functionality, the same physical location, or execution on the same kind of hardware.

A subsystem not an object nor a function but a package of classes, associations, operations, events, and constraints that are interrelated and that have a reasonably well-defined and small interface with other subsystems. A subsystem usually identified by the services it provides. A service is a group of related functions that share some common purpose such as I/O processing. A subsystem defines a coherent way of looking at one aspect of the problem.

Each subsystem has a well-defined interface to the rest of the system. The interface specifies the form of all interactions and the information flow across subsystem boundaries but does not specify how the sub system is implemented internally. Each subsystem then can be designed independently without affecting the others. The decomposition of systems into subsystems may be organized as a sequence of horizontal layers or vertical partitions.

A layered system is an ordered set of virtual worlds, each built in terms of the ones below it and providing the basis of implementation for the ones above it. The objects in each layer can be independent, although there is often some correspondence between objects in different layers. Knowledge is one-way only: a subsystem knows about the layers below it, but has no knowledge of the above layers. Each layer may have its own set of classes and operations. Each layer is implemented in terms of the classes and operations of lower layers.

Layered architecture comes in two forms: closed and open. In a closed architecture, each layer is built only in terms of the immediate lower layer. In a open architecture, a layer can use features of any lower layer to any depth.
We decomposed our system into three subsystems as layers. The three layers are closed architecture form. The three layers are GUI layer, Network layer and I/O layer. The purpose of GUI layer is to provide an efficient user interface to the user to interact with the system. It is built upon the Network layer which provides basic FTP services. The lowest layer is the I/O layer that provides services like reading or writing file to and from local and remote systems.

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Table 5.2 Sub System Classification

GUI subsystem
N/W subsystem
I/O subsystem

When top-level subsystems are identified, the designer should show the information flow among the sub systems. There are several architectural frameworks that are common in existing systems. They are batch transformation, continuous transformation, interactive interface, dynamic simulation, real-time system and transaction manager.

In the architectural frameworks specified above, our system will best suit in interactive interface architecture, since there are large number of interactions between system and user.

An interactive interface is a system that is dominated by interactions between the system and external agents, such as humans, devices or other programs. The external agents are independent of system, so their inputs can't be controlled, although the system may solicit responses from them.

5.3 Identifying Concurrency:
One important goal of system design is to identify which objects must be active concurrently and which objects have activity that is mutually exclusive. The latter objects can be folded together in a single thread of control or task. But there is no part that is concurrent in our system.

5.4 Allocating Subsystems to Processor:
In this step system designer estimates the hardware resources required and the implementation choice of either hardware or software. In our system all the subsystems will be implemented in software. The hardware requirements are general such as Pentium – III, 128 MB of RAM.

5.5 Management of Data Stores:
In this stage the system designer decides what format is used to store the data stores. There are DBMS systems or file systems and others. Here in our project there are no data stores except files. We then definitely prefer files to download and upload.

5.6 Choosing Software Control Implementation:
During the analysis, all interactions are shown as events between objects. But the system designer must choose among several ways to implement control in software. There are two kinds of control flows in a software system: internal and external. External control is the flow of externally visible events among the objects in the system. There are three kinds of control for external events: procedure driven, event driven sequential and concurrent. Internal control is the flow of control within a process.

Our system falls in external control flow like event driven control. Events are fired by external agent such as user in different order but sequential not concurrent.

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VI. TECHNOLOGY DESCRIPTION

6.1 ASP.NET Framework:

ASP.NET is an open-source web framework, created by Microsoft, for building web apps and services using the .NET Framework or the .NET Core. We have both ASP.NET and ASP.NET Core. ASP.NET Core is the new approach built on .NET Core.

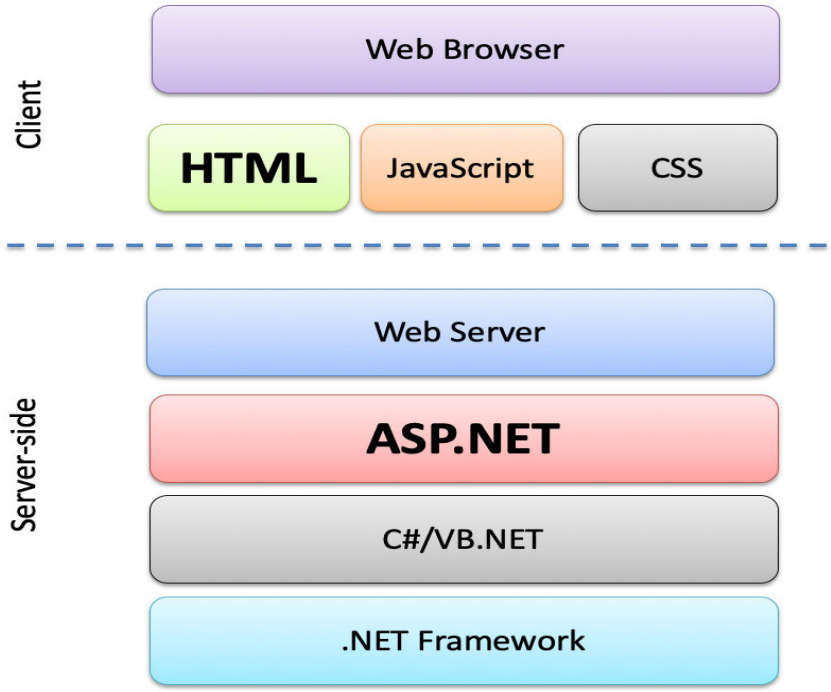

Figure 6.1 .NET Framework

ASP.NET comes in many flavors:

• ASP.NET Web Forms - The same programming model as WinForms. If you already know WinForms, this is an easy access to the world of web programming.
• ASP.NET MVC (Model-View Controller). If you are familiar with the MVC approach, this could be your choice.
• ASP.NET with Razor Pages - This is the latest and recommended way. This hasbecome the "default" approach for ASP.NET today. It mixes the best from all theothers combined with PHP like syntax (PHP is probably the most popular WebFramework today)

6.2 Introduction to C#:

C# is pronounced “see sharp”. C# is an object-oriented programming language and part of the .NET family from Microsoft. C# is very similar to C++ and Java. C# is developed by Microsoft and originally it worked only on the Windows platform. Now .NET has become an open-source project, and the new .NET Core is also cross platform meaning it works on Windows, macOS and Linux.

Object-oriented programming (OOP) is a programming language model organized around "objects" rather than "actions" and data rather than logic. Historically, a program has been viewed as a logical procedure that takes input data, processes it, and produces output data.

The first step in OOP is to identify all the objects you want to manipulate and how they relate to each other, an exercise often known as data modeling. Once you've identified an object, you generalize it as a class of objects and define the kind of data it contains and any logic sequences that can manipulate it. Each distinct logic sequence is known

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as a method. A real instance of a class is called an "object" or an "instance of a class". The object or class instance is what you run in the computer. Its methods provide computer instructions and the class object characteristics provide relevant data. You communicate with objects – and they communicate with each other.

Important features with OOP are:

- Classes and Objects
- Inheritance
- Polymorphism
- Encapsulation

Simula was the first object-oriented programming language. Simula was developed in the 1960s by Kristen Nygaard from Norway.

Java, Python, C++, Visual Basic .NET and C# are popular OOP languages today

6.3 The Web:

Learning Web Technology is essential today because Internet has become the number one source to information, and many of the traditional software applications have become Web Applications. Web Applications have become more powerful and can fully replace desktop application in most situations.

It all started with Internet (1960s) and the World Wide Web - WWW (1991). The first Web Browser, Netscape, came in 1994. This was the beginning of a new era, where everything is connected on internet, the so-called Internet of Things (IoT).

That's why you need to know basic Web Programming, including HTML, CSS and JavaScript.

To create more powerful Web Sites and Web Applications you also need to know about Web Servers, Database Systems and Web Frameworks like PHP, ASP.NET, etc.

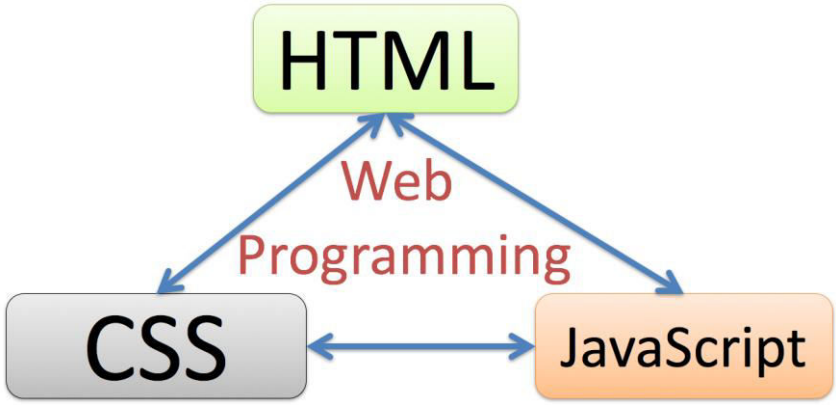

Figure 6.3.1 Web Technology Program

Use HTML to define the content of web pages, CSS is used to specify the layout of web pages, while JavaScript is used to program the behavior of web pages.

For creating more dynamic web pages, we typically also use a web framework like PHP or ASP.NET, etc. With these frameworks you can communicate with a database for storing or retrieving data.

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6.4 Database Systems:

A Database is a structured way to store lots of information. The information is stored in different tables. Some of the most popular Database Systems today are:

- SQL Server
- MySQL
- MariaDB
- Etc.

ER Diagram (Entity-Relationship Diagram) is used for design and modelling of databases. It specifies tables and relationship between them (Primary Keys and Foreign Keys), see Figure

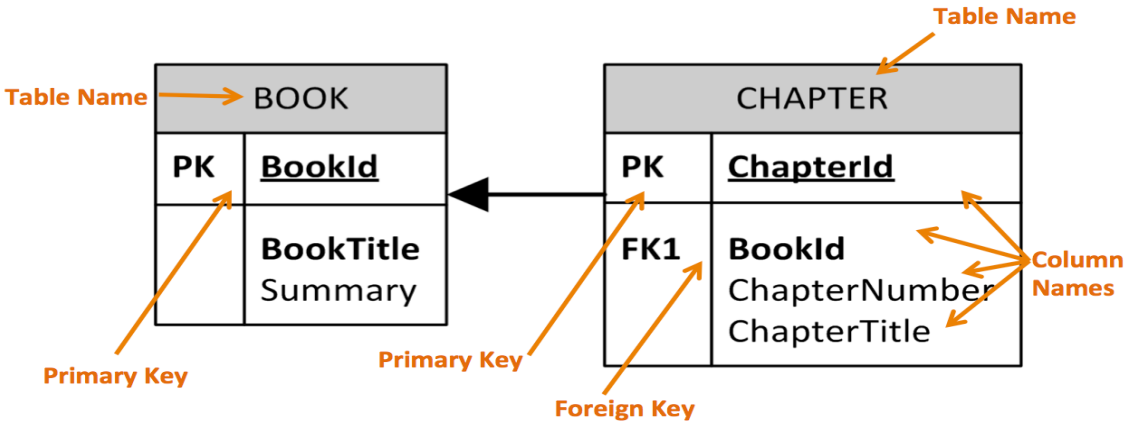

Figure 6.4 Database ER Representation

VII. PROJECT REQUIREMENTS

7.1 Software:

- Visual Studio 2022 for Frontend
- Ms SQL 2022 for Backend
- SQL Server Management Studio 20.2
- Chrome browser
- Libraries:
  - Bootstrap Framework
  - Fontawesome Icons
  - Data tables

7.2 Hardware:

- CPU: Intel Core i5-10400 or higher
- GPU: NVIDIA GeForce GTX 1660 Super or higher
- RAM: 16GB or higher
- Storage: 500GB NVMe SSD or higher.

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