A Project report on

STUDENT PERFORMANCE IN TRAININGS

A Dissertation submitted to JNTU Hyderabad in partial fulfillment of the academic requirements for the award of the degree.

Bachelor of Technology

in

Computer Science and Engineering

Submitted by

D.SAI KIRAN
(20H51A05G7)

B.NIKHIL
(20H51A05B7)

A.HARI PRIYA
(20H51A0582)

Under the esteemed guidance of

Dr.Vijaya Kumar Koppula
(Professor of CSE & DEAN)

Department of Computer Science and Engineering

CMR COLLEGE OF ENGINEERING& TECHNOLOGY

(UGC Autonomous)

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KANDLAKOYA, MEDCHAL ROAD, HYDERABAD - 501401.

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY

KANDLAKOYA, MEDCHAL ROAD, HYDERABAD – 501401

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

CERTIFICATE

This is to certify that the Major Project Phase I report entitled **"STUDENT PERFORMANCE IN TRAINING"** being submitted by **D. SAIKIRAN (20H51A05G7), B. NIKHIL (20H51A05B7), A.HARI PRIYA (20H51A0582)** in partial fulfillment for the award of **Bachelor of Technology in Computer Science and Engineering** is a record of bonafide work carried out his/her under my guidance and supervision.

The results embodies in this project report have not been submitted to any other University or Institute for the award of any Degree.

Dr.Vijaya Kumar Koppula
Professor of CSE &DEAN
Dept.ofCSE

Dr. Siva Skandha Sanagala
Associate Professor andHOD
Dept. ofCSE

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D.Sai Kiran 20H51A05G7
B. Nikhil 20H51A05B7
A. Hari Priya 20H51A0582

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ABSTRACT

The project aims to analyses the performance of the student in training that include the no of trainings he/she attended, filtering and separation of students based on their performance. We can able to understand training performance of students or particular his/her training and the particular data is analyzed represented in the form graphs. In these project the particular student can also gave feedback to the trainings that he/she attended and can able to know the type of trainings, when it starts and the training and placement department can share the materials through these website. It is web application constitute on MERN stack these technologies include Mongo dB, Express, Reacts, Nodejs

Student performance in training programs is a critical area of concern in education and professional development. This study investigates the multifaceted factors influencing student performance and explores effective strategies to enhance learning outcomes in various training contexts. A comprehensive literature review reveals the interplay of individual and environmental factors, including prior knowledge, motivation, teaching methods, resources, and support systems.

CHAPTER 1
INTRODUCTION

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INTRODUCTION

1.1. Problem Statement

The primary objective of this study is to delve into the root causes of the challenges and issues faced by students during their assessment process and training sessions. By identifying and understanding these issues, the research aims to assess their impact on students' overall performance within the training program. This problem statement serves as the foundation for conducting a comprehensive investigation, which will ultimately lead to the development of effective strategies to enhance the effectiveness of the training program.

In order to achieve these goals, the research adopts a mixed-methods approach that combines both quantitative and qualitative analyses. The quantitative analysis focuses on objective data and performance metrics, such as aptitude scores, to provide a numerical assessment of student capabilities. Additionally, it examines verbal learning skills, enabling the research to gauge linguistic and language-related aptitude that might influence performance.

By integrating both quantitative and qualitative data, the research aims to provide a holistic view of the challenges faced by students and how these challenges impact their performance. This comprehensive assessment will enable the development of targeted strategies and interventions to improve the training program's overall effectiveness. The ultimate goal is to create a learning environment that supports student success and addresses their unique needs, resulting in enhanced performance and outcomes..

1.2. Research Objective

By using the student performance in trainings we can detect the number of students they can participate in the trainings, attendance of the students , number of students attended for the assessments etc.… Adequate resources and support systems provided during training will enhance student performance

1. **Individual Student Performance in Training Programs:**

   Individual student performance data is a fundamental component of the research. This data includes records of how each student is faring in the training programs. It may encompass various performance metrics, such as test scores, project completion, attendance, and participation.

2. **Grades, Scores, or Assessments Related to Different Training Modules:**

   This category of data pertains to the specific evaluation of student performance in various training modules or courses within the program. It includes grades, scores on assignments and exams, and assessments that measure a student's understanding and mastery of the subject matter. By analyzing these scores, you can assess how students are progressing in different areas and pinpoint the modules where they may be struggling.

3. **Information on Resources Provided During Training:**

   -The data related to the resources provided during training is essential for understanding the learning environment. This includes details about the materials, equipment, and technology made available to students. It's vital to evaluate whether students have access to the necessary tools and resources to support their learning. Any limitations or disparities in resource access can be identified and addressed to enhance the overall training experience

4. **Reports from Course Evaluations, Instructor Feedback, or Program Assessment**:

   - Reports from course evaluation, feedback from instructors, and program assessments provide a qualitative perspective on the training program. These reports Collectively, these data types offer a comprehensive view of student performance, their ultimately leading to the development of strategies to enhance the quality and outcomes of the training program.

CHAPTER 2
BACKGROUND WORK

CHAPTER 2
BACKGROUND WORK

Start by conducting a comprehensive literature review. Search academic databases, journals, and books for relevant studies on student performance in training programs. Pay attention to key theories, models, and frameworks that have been used to analyze and understand this topic. Examine the factors that have been identified as influencing student performance in training, such as prior knowledge, motivation, teaching methods, and learning environments. Look for trends and patterns in the literature, including any emerging research areas or evolving theories. Explore the historical development of training and education systems. Understand how training programs have evolved over time and the impact of changing educational philosophies and technologies on student performance.

Theoretical Frameworks:

Identify theoretical frameworks that have been applied to the study of student performance. Common frameworks may include cognitive learning theories, constructivism, and motivation theories.

Key Concepts and Terminology:

Familiarize yourself with key concepts and terminology used in the field. This might include terms related to pedagogy, andragogy, instructional design, assessment, and instructional technology.

Factors Affecting Student Performance:

Investigate the various factors that can affect student performance in training programs, such as: Individual factors (e.g., cognitive abilities, learning styles, prior knowledge, motivation). Environmental factors (e.g., teaching methods, resources, support systems). Curriculum and program design (e.g., content relevance, assessment methods).Technological advancements and their impact on training. Look for examples of best practices and effective strategies for improving student performance in training.

2.1 Online Coding Platform (Hacker Rank)

Introduction

In this context, it Introduces the MERN Stack and its relevance to contemporary web development. It may describe the MERN Stack components (MongoDB, Express.js, React.js, Node.js) and their individual roles in building modern web applications. The described application is a comprehensive platform for coding skills and increasing their problem-solving abilities. It offers users a wealth of coding challenges, categorized by data structures like linked lists, trees, and graphs, enabling them to refine their coding skills. These problems span various difficulty levels, making it an ideal space for both novices and seasoned programmers to practice and expand their coding horizons. Additionally, the platform hosts global coding contests where users can compete against participants from around the world.

These contests not only simulate real-world programming challenges but also provide an excellent opportunity to gain recognition and test one's skills under time constraints. The application also fosters a knowledge-sharing community through forums and discussions, allowing users to collaborate, seek help, and learn different problem-solving approaches

Merits, Demerits, and Challenges

Merits

The MERN Stack offers several significant advantages that make it a popular choice among developers for building modern web applications

1. Problem Solving and Practice:

The application offers a wide range of coding problems, categorized by data structures and algorithms. Users can choose problems of varying difficulty levels to challenge themselves Users can practice problem-solving, sharpen their coding skills, and gain confidence in tackling real-world coding challenges

.

2. Learning and Improvement

. By providing problems related to different data structures, the application helps users learn and understand how to apply these structures effectively. Users can experiment with different algorithms and approaches to solve problems, gaining a deeper understanding of computer science concepts. The application hosts coding contests on a regular basis. Users can participate in these contests and compete with coders from all over the world, Competing in contests offers users a chance to test their skills under time constraints, replicate real-world programming competitions, and gain recognition for their abilities.

3. Skill Diversification & knowledge sharing:

Users have the opportunity to explore a wide range of coding problems, which helps them diversify their skill set They can move from problems related to basic data structures to more advanced topics like dynamic programming, graph algorithms, and more.- The application often includes discussions, forums, or chat features where users can collaborate, ask questions, and share insights about solving problems Users can learn from each other and discover different approaches to problem-solving Users can monitor their progress over time, keep track of problems they've solved, and identify areas where they may be struggling. Progress tracking helps users set goals and focus on areas that need improvement.

4. **Worldwide Community & Career Development**:

The global coding community provides users with a sense of belonging and an opportunity to connect with like-minded individuals Users can get exposure to different coding styles, cultures, and perspectives from participants worldwide. - Improving coding skills through consistent practice and participation in coding contests can open up new career opportunities and enhance a user's employability in the tech industry. Resource for those looking to excel in the field of software development and computer

Demerits and Challenges

While the MERN Stack offers many advantages, it is not without its drawbacks and challenges. One key limitation is that it may not be the most suitable choice for small, simple projects. The full stack is feature-rich and may introduce complexity that is unnecessary for smaller applications, potentially leading to longer development times. Additionally, the stack might not be the best fit for applications that require specific database features or extensive transaction support, as NoSQL databases like MongoDB may not cover all relational database use cases.the main disadvantage of the original website it does not show the performance of his/her training in a pictorial or in graph representation of their progress

Implementation of Online Coding Platform (Hacker Rank)

it develops into the practical application of the MERN Stack to address specific challenges or requirements. It may provide case studies, code examples, or best practices for implementing the MERN Stack in real-world projects. Existing System Hacker Rank Platform Implemented by MERN Stack and it is developed for gaining knowledge by practicing coding

React is frontend Technology it contains components and props and Hooks

1. **Components:**

In React, the user interface is broken down into smaller, reusable pieces called components. Each component is responsible for rendering a part of the user interface. For example, in the HackerRank platform, you might have components for user authentication, problem statements, code editors

2**. Props (Properties)**:

Props are a mechanism for passing data from a parent component to its child components. They are used to customize and configure how a component behaves or what it renders. In the context of the HackerRank platform, props might be used to pass information like problem descriptions, user profiles, or contest details to various UI components

3. State:

React components can have state, which is used to store and manage data that can change over time. State is typically used to handle user interactions and dynamic content For example, in coding practice sections, React might use state to manage code input, track user progress, and update the user interface in real-time as the user solves problems. React introduced hooks, such as `useState` and `use Effect`, to manage component state and side effects in functional components.

4. Virtual DOM:

- React utilizes a virtual DOM (Document Object Model) to optimize updates and improve rendering performance. Instead of directly updating the actual DOM, React creates a virtual representation of the DOM in memory and compares it to the previous state to identify the minimal changes needed to update the actual DOM. This process significantly reduces the amount of DOM manipulation and enhances application performance.

- Backend Like Node.js is used to create a backend environment to run the server helpful in creating Http request and response from the server and also developing API
- The Existing System uses Mango DB for data access like Authentication, features like problem solving and express is a framework helps Nodejs to Work on API(Application Programming Interface)
- MongoDB is a NoSQL database used in the MERN Stack for data storage and access. It differs from traditional relational databases by providing a flexible, schema-less structure, which is particularly advantageous for applications where data schemas evolve over time.
- MongoDB is employed in the Existing System for a variety of purposes, including user authentication, storing problem-solving data, and managing user profiles. Its ability to handle large and unstructured datasets makes it a valuable asset for applications that require scalability and adaptability.

2.2 Full-Stack Development using the MERN Stack

Introduction:

Full-stack development using the MERN Stack is a powerful and popular approach to building modern web applications. The MERN Stack combines four key technologies: MongoDB, Express.js, React.js, and Node.js. It is essential in contemporary web development due to its ability to address various challenges, React.js provides an interactive and responsive user interface, and Node.js facilitates server-side scripting in JavaScript. This stack is significant in providing a unified and consistent technology foundation for developers

Merits:

The MERN Stack is laden with several notable merits that make it a compelling choice for modern web application development. One of its primary advantages is its ability to streamline the development process by promoting the use of a single language, JavaScript, for both the frontend and backend components. This unification of programming languages simplifies development and reduces the cognitive overhead for developers. They can seamlessly switch between frontend and backend tasks, making it easier to collaborate and share code, and it helps prevent context-switching challenges.

Furthermore, the MERN Stack is open-source, benefiting from a vast and active community of developers and contributors. This community support translates into continuous updates, bug fixes, and improvements, ensuring the stack's reliability and security. Developers can tap into a rich ecosystem of libraries, frameworks, and resources that significantly accelerate development.

Another key advantage of the MERN Stack is its exceptional performance in real-time applications and data-intensive projects. This is particularly relevant in the context of contemporary web development

Demerits & Challenges

However, there are also demerits and challenges. For smaller, simpler projects, the MERN Stack might introduce unnecessary complexity, potentially leading to longer development times. It may not be the best choice for applications requiring specific database features or extensive transaction support. The learning curve can be steep, particularly for beginners. The stack's open-source nature means that developers must manage dependencies and stay vigilant with updates and security patches. Native support for search engine optimization (SEO) in React-based single-page applications can be challenging to implement.

Implementation of Full-Stack Development using the MERN Stack:

The practical implementation of full-stack development using the MERN Stack involves leveraging the strengths of each component to address specific challenges or requirements. MongoDB, as the database, allows for efficient and flexible data storage. Express.js handles server-side logic and provides a foundation for building APIs. React.js, with its component-based architecture, creates interactive user interfaces. Node.js powers the server-side, enabling real-time features and handling asynchronous operations.

For example, in an e-commerce application, MongoDB can efficiently store product data, Express.js can manage user authentication and order processing, React.js can create a user-friendly shopping interface, and Node.js can handle real-time inventory updates. The stack's real power lies in its versatility and the ability to adapt to the specific needs of the project, whether it's a social media platform, an e-commerce site, or a content management system. It offers developers the tools they need to create robust and scalable applications that meet modern challenges and demands.

CHAPTER 3
RESULTS AND DISCUSSION

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Result:

The implementation of a student training portal that empowers students to track their progress has introduced significant benefits. This system enables students to gain a clear overview of their performance throughout the training program. It allows them to access and review their grades, scores, and assessment results, providing a real-time understanding of their academic achievements and areas where they may need improvement. This not only enhances students' awareness of their own progress but also fosters a sense of accountability and self-directed learning. It encourages students to take ownership of their education and set personal goals for improvement. This feature is particularly useful for self-assessment and for students to tailor their study strategies to address their individual strengths and weaknesses.

Additionally, MongoDB's flexibility for storing and analyzing user data has been instrumental in facilitating graphical analysis of user behavior within the training portal. The database's ability to handle unstructured and evolving data makes it well-suited for this purpose. With graphical analysis, the system can generate visual representations of how students interact with the platform. This includes tracking which training modules they engage with the most, the duration of their sessions, and patterns of access to learning materials. By leveraging these insights, the system can make data-driven recommendationsIn essence, this data-driven analysis helps tailor the training program to better suit the needs and preferences of the students.

Roles

TPO

HOD

Students

Admin

TPO

In the context of a comprehensive training program, several key responsibilities come into play. The schedule for training planning, coordination, and execution is a fundamental element that ensures the program runs smoothly, guiding the sequence of activities and maintaining deadlines. Finally, gathering feedback from students is an indispensable process that helps evaluate the program's efficacy. It provides valuable insights into the student experience, enabling program organizers to make informed improvements, thus ensuring the program's continued success and relevance.

HOD

Assessing individual performance allows educators to tailor their approach, recognizing high-achieving students and providing assistance to those who may be struggling. Meanwhile, the overall departmental graph offers a bird's-eye view of department-wide progress, enabling administrators to make strategic decisions, allocate resources efficiently, and drive improvements in the training program. This comprehensive suite of features empowers educational institutions to enhance both student engagement and the overall quality of their training programs.

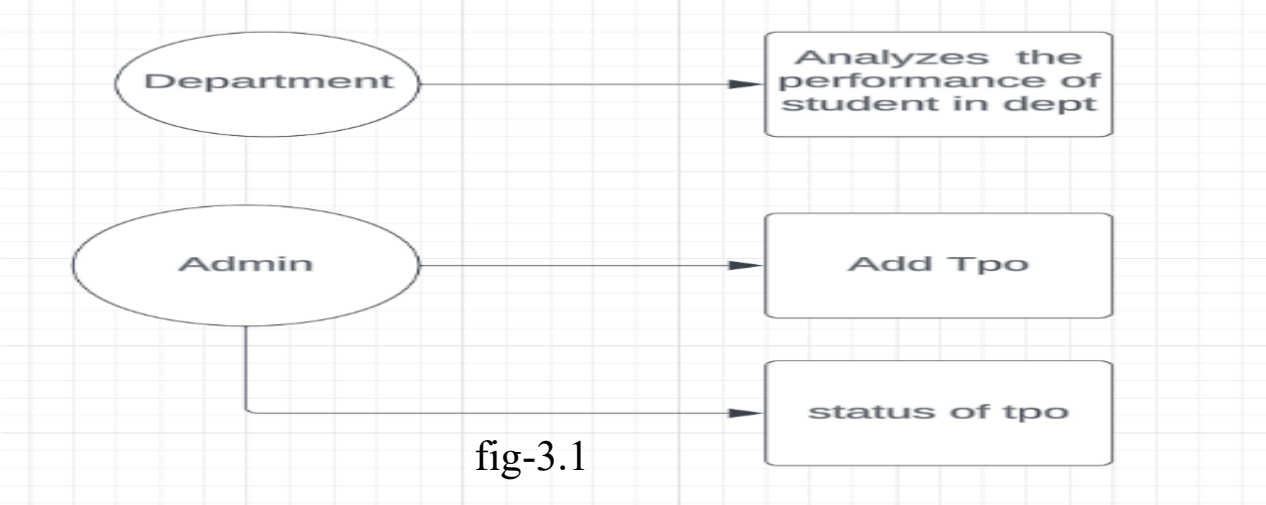
Students

his feature allows students to monitor their progress, identify areas where they excel, and pinpoint those in need of improvement. It fosters a sense of ownership over their educational outcomes, encouraging them to set personal goals and track their achievements Furthermore, students can leverage the system for seeking improvements in their academic pursuits.

Admin

The role of an administrator in the educational system is multifaceted, and it involves crucial responsibilities that ensure the smooth operation and management of various aspects. Administrators play a pivotal role in maintaining student data, overseeing the integrity and security of records, and managing the information that underpins the educational process. Overall, administrators are central figures in the educational ecosystem, wielding the power to facilitate student success and career advancement.

Uml diagrams



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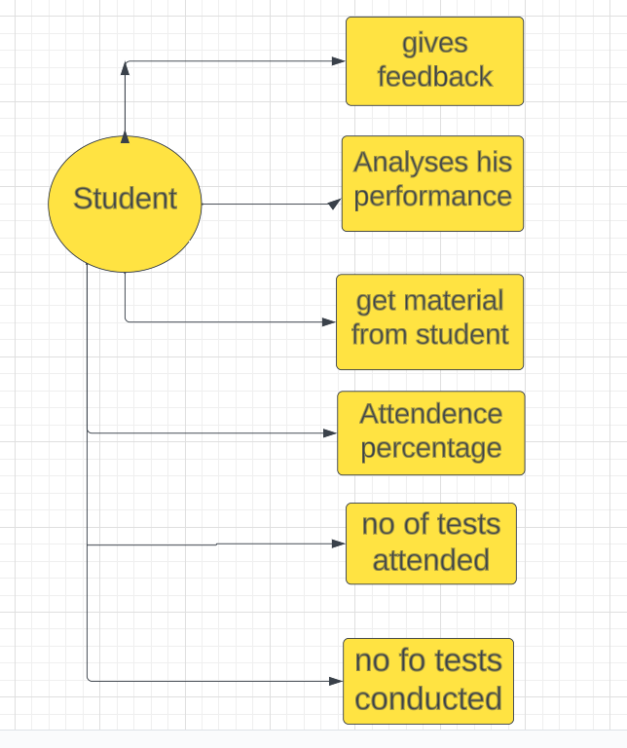

fig-3.2

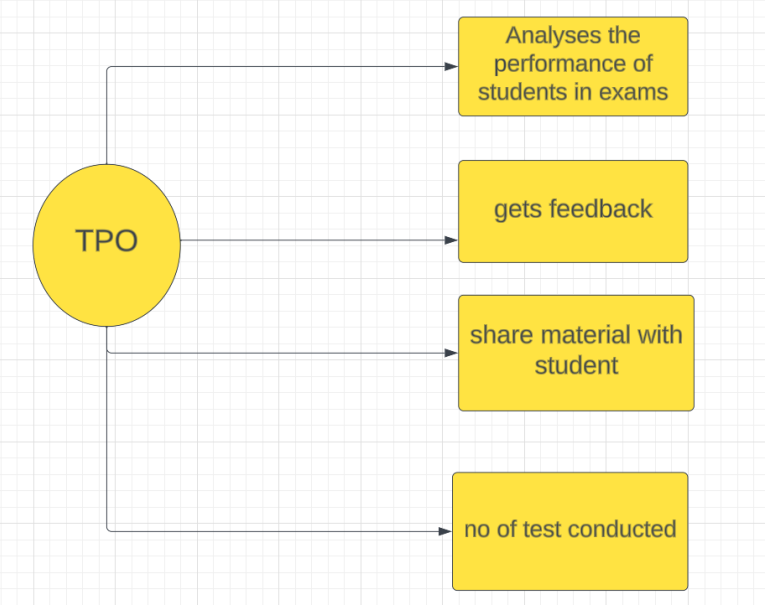

fig-3.3

Flow chart

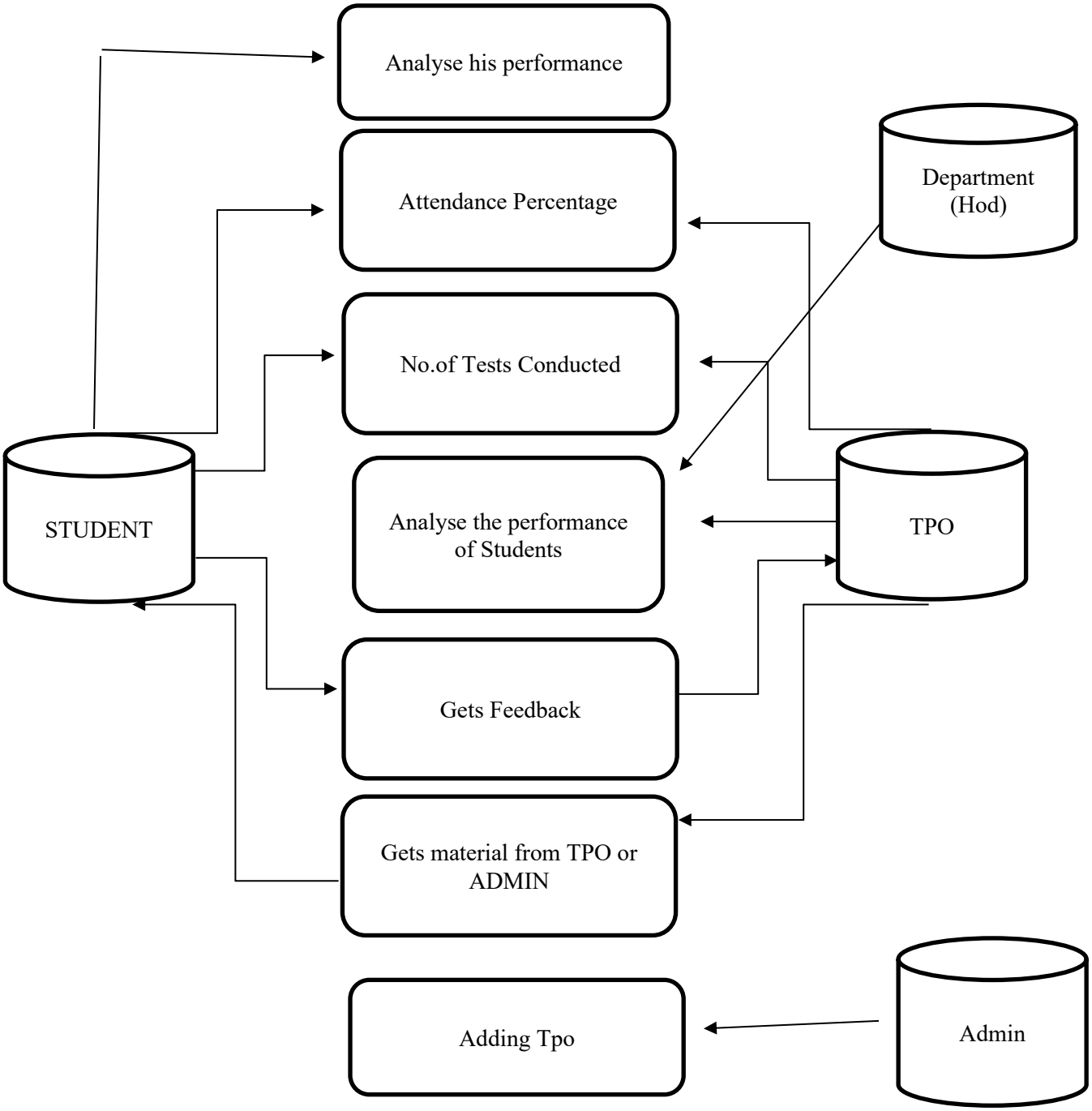

Fig 3.4

Discussion:

MERN stack allows for easy scalability. As your user base grows, you can seamlessly expand your system to handle more traffic and users This scalability ensures that your system remains responsive and can handle a growing number of concurrent users without sacrificing user experience.

This feedback loop facilitates continuous improvement by identifying areas where trainers excel and where there's room for enhancement, ultimately contributing to a better learning experience. MongoDB's NoSQL database is known for its flexibility in handling and storing vast amounts of user data. It is particularly suitable for applications where data schemas may evolve over time.

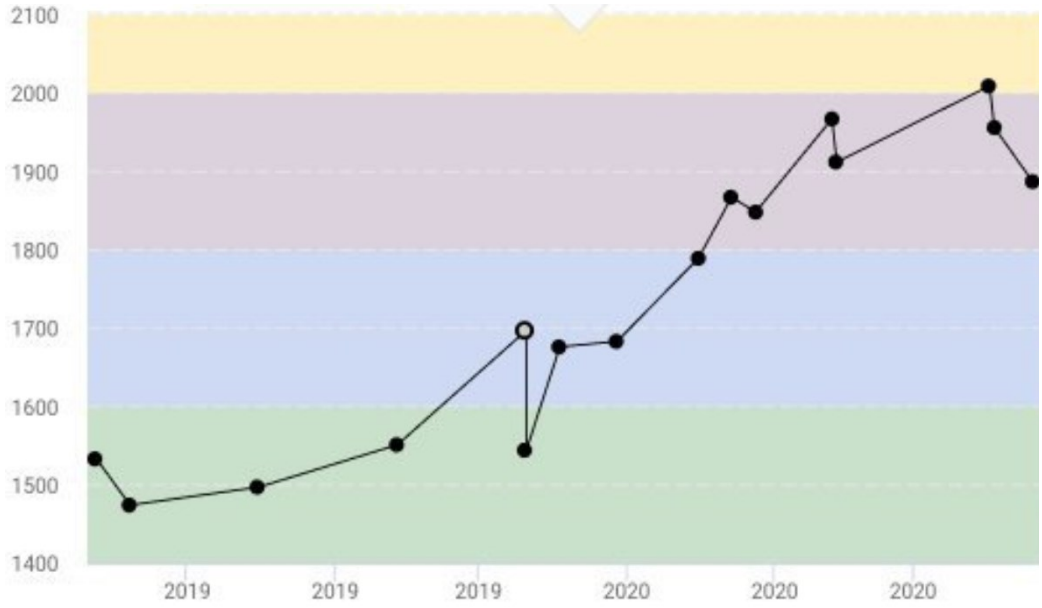

Fig 3. 5 (Student graph analysis)

This graph offers a detailed view of how students' progress through their educational journey. It provides insights into their development, highlights areas where they excel, and pinpoints those that need additional attention. By tracking student growth at specific stages and conducting a thorough analysis of their performance in tests and assignment

. It provides insights into their development, highlights areas where they excel, and pinpoints those that need additional attention. By tracking student growth at specific stages and conducting a thorough analysis of their performance in tests and assignments, educators can tailor their teaching strategies and support to meet the unique needs of each student, ultimately fostering a culture of continuous improvement

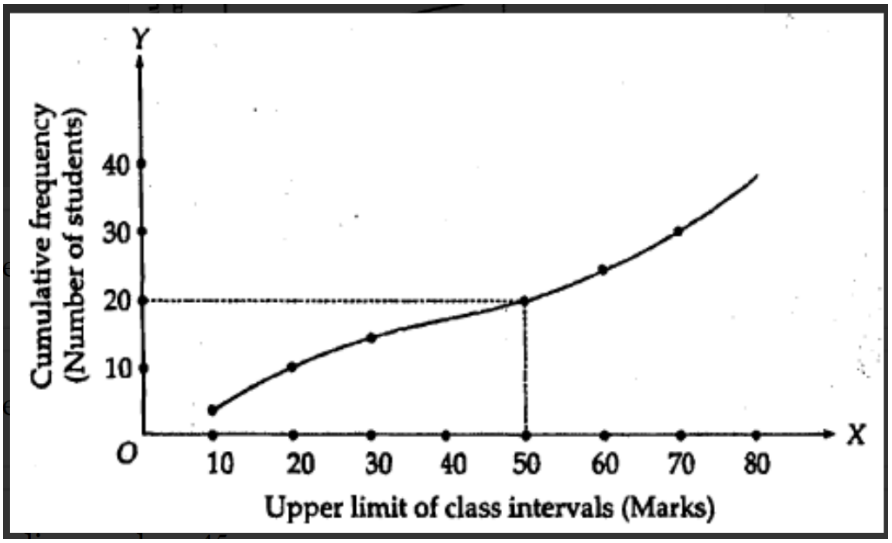

Fig 3.6 (Tpo graph analysis)

In the second graph, the system enables the presentation of students' overall performance in training. This data is accessible to higher authorities, including Heads of Departments (HODs), Deans, and Principals of respective institutes. This information empowers top-level decision-makers to gain a comprehensive overview of the training program's effectiveness and the achievements of the students. By having access to this data, the higher authorities can make informed decisions, allocate resources strategically, and shape the future of the educational institution. It promotes transparency and accountability in educational management, facilitating a data-driven approach to enhance the overall quality of education.

Indexing Algorithm(B-Tree):

B-tree (Balanced Tree) indexing is a widely adopted indexing structure in the field of databases, prominently featured in database management systems like MongoDB. This indexing mechanism plays a pivotal role in enhancing the efficiency of data retrieval and query operations. Its fundamental design ensures that data remains organized, permitting the database to handle insertions, deletions, and data searches efficiently. By providing a balanced and hierarchical structure, B-tree indexing is well-suited for applications where you need to support various types of queries, including range queries, sorting operations, and equality checks. Its effectiveness in maintaining data integrity and facilitating complex database operations makes it a prevalent choice for indexing in MongoDB, making it the default indexing algorithm for numerous database applications.

In MongoDB, B-tree indexing has become the de facto indexing method for fields where advanced query capabilities are required. These fields often encompass a wide range of data types, and the ability to efficiently support range queries, perform data sorting, and verify equality conditions is essential. B-tree indexing's well-balanced and hierarchical structure empowers MongoDB to manage these operations seamlessly, ensuring that database performance remains consistently high.

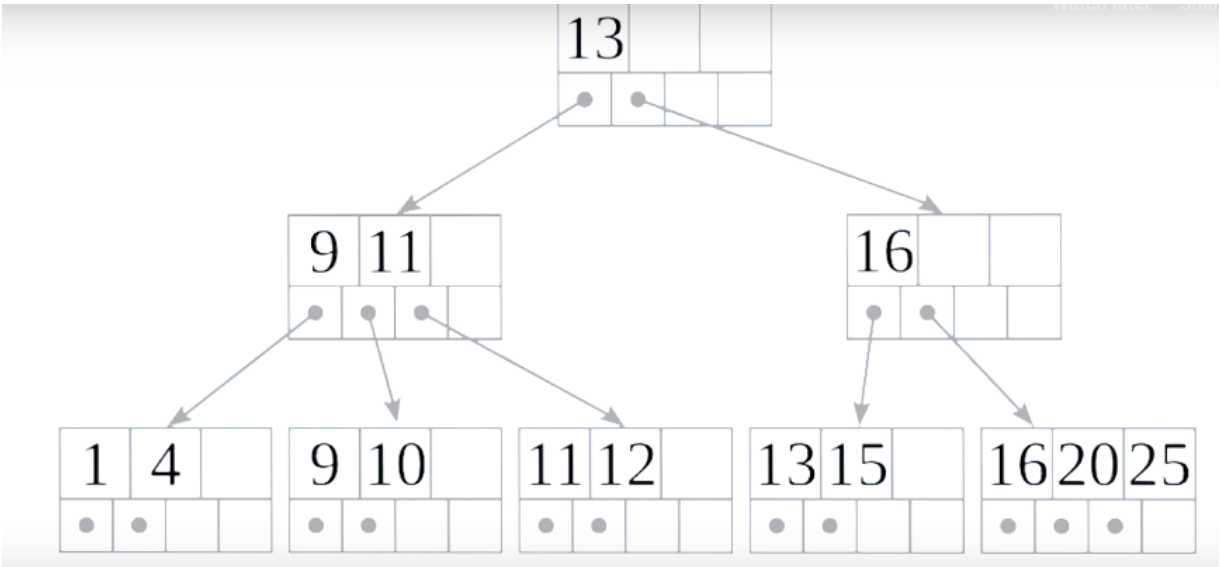

Fig-3.7

CHAPTER 4
CONCLUSION

CHAPTER 4
CONCLUSION

In this project it analyses the performance of students in training based on the tests attended, classes attended. The research extensively examines the factors influencing student outcomes, including their engagement with tests and attendance in classes. This multifaceted approach allows for a comprehensive understanding of how students fare in different assessments, offering valuable insights into their strengths and areas for improvement. By systematically gathering and evaluating this data, the project aims to uncover trends, patterns, and factors that impact student success, ultimately leading to data-driven strategies for enhancing the quality of education.

To efficiently manage the wealth of student data generated by these assessments, MongoDB, a robust NoSQL database, is employed. MongoDB's unique capabilities, including scalability and flexibility in data storage, make it an ideal choice for handling large volumes of student records. This data management solution ensures that educators and administrators have easy access to the information required for informed decision-making. Moreover, the implementation of the MERN stack, composed of MongoDB, Express, React, and Node.js, ensures that the platform is not only responsive and user-friendly but also highly adaptable and scalable. This versatile technology stack guarantees that the web application can grow alongside the evolving needs of the educational institution, offering a seamless and effective tool for enhancing the overall educational experience.

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