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COURSE EVALUATION USING MACHINE LEARNING

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ABSTRACT

In the dynamic realm of education, evaluating courses and instructors through student feedback is vital. The surge in data volume presents analytical challenges. To address this, we employ cutting-edge Supervised Machine Learning techniques, specializing in Classification and Regression, to revolutionize course and instructor assessment

Keywords: Supervised Machine Learning, Artificial Intelligence, Classification, Regression, Natural Language Processing (NLP), Computer Vision.

I. INTRODUCTION

Ensuring a high-quality learning experience relies on evaluating course effectiveness and identifying areas for enhancement. Student feedback is a valuable information source for this purpose. However, manually analyzing extensive feedback data can be time-consuming and challenging. We have developed a project that leverages machine learning (ML) techniques to automate student feedback analysis, enabling us to gain valuable insights into course performance. This project includes a course performance analysis system that employs ML algorithms to process and interpret student feedback. Through ML analysis of feedback data, we extract meaningful patterns, assess course effectiveness, and provide actionable improvement recommendations.

II. METHODOLOGY

In the development and implementation of our "Course Evaluation Using Machine Learning" project, a comprehensive array of tools and technologies were strategically employed to ensure the creation of a robust and user-friendly web application.

These tools and technologies were thoughtfully selected to facilitate various aspects of the project, including data collection, preprocessing, machine learning model deployment, and the development of an intuitive user interface. Below is an overview of the primary tools and technologies used in our project:

Techniques and Tools Used:

Data Preparation and Analysis

- **Pandas and NumPy:** These essential Python libraries were instrumental in preparing and refining student feedback data for machine learning integration.

Web Application Development

- **Django Framework:** Django, a high-level Python web framework, served as the project's foundation, handling routing, database interactions, and user authentication.
- **HTML, CSS, and JavaScript:** Core web technologies were utilized for structuring content, styling, and improving user interactions.
- **Bootstrap**: The Bootstrap framework streamlined web design, ensuring a responsive, visually appealing, and user-friendly interface across various devices.

Machine Learning Integration

- **Scikit-Learn:** This Python library, specializing in machine learning, provided a wide range of algorithms and tools for building, training, and evaluating machine learning models to predict course evaluations based on student feedback.

Database Management

- **PostgreSQL Database:** PostgreSQL, an open-source relational database management system, served as the backbone for storing, managing, and retrieving student feedback data, ratings, and model outputs.

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Version Control and Collaboration

- **Git and GitHub:** Git, a distributed version control system, and GitHub, a web-based platform for code collaboration and version control, played pivotal roles in tracking code changes, ensuring version control, and facilitating collaboration among project contributors.

Languages Used:

- **Python:** Python language is used in the system due to its unique characteristics like simple to use, free and open source, object oriented, extensive libraries.

III. MODELING AND ANALYSIS

The solution aims to analyze course evaluations using feedback provided in the form of ratings from various students. After analyzing the student feedback, the solution should predict the course's effectiveness, areas for improvement, and overall success of the course. In developing web application, we are following the Rapid Application Development model (RAD).

RAD involves following steps:

1. Business Modeling:

During this phase, we establish the information flow across various business functions by addressing essential questions such as the data driving the business processes, the data generation sources, responsible data generators, information pathways, processing entities, and related aspects.

2. Data Modelling:

The information gathered during business modeling is streamlined into vital data entities that serve the business. We identify key attributes for each entity and establish clear connections between them.

3. Process Modelling:

We convert the information objects defined during the data modeling phase to establish the required data flow for implementing a business function. This includes creating processing descriptions for tasks such as adding, modifying, deleting, or retrieving data objects.

4. Application Generation:

We employ automated tools to streamline the software development process

5. Testing & Turnover:

Several programming components undergo testing due to RAD's focus on reusability, which significantly decreases the overall testing duration. However, it's essential to thoroughly test any new elements, ensuring full exercise of all interfaces.

We will implement the RAD model for developing all software modules.

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Block Diagram:

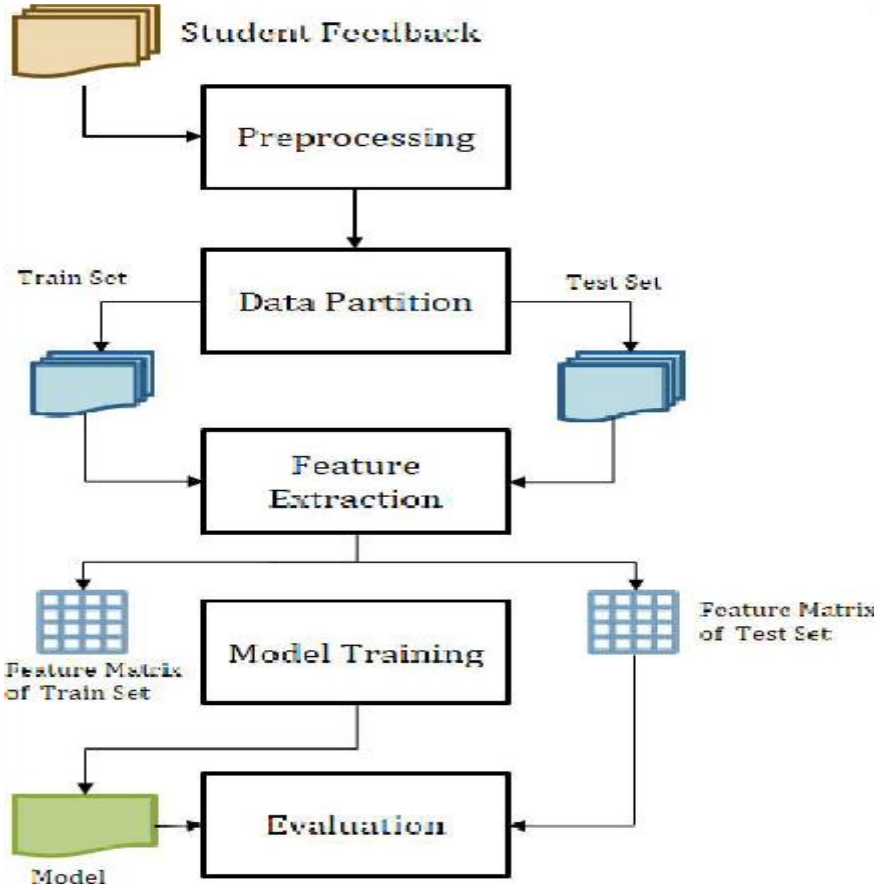

Fig.1 Steps involved in Course Evaluation System

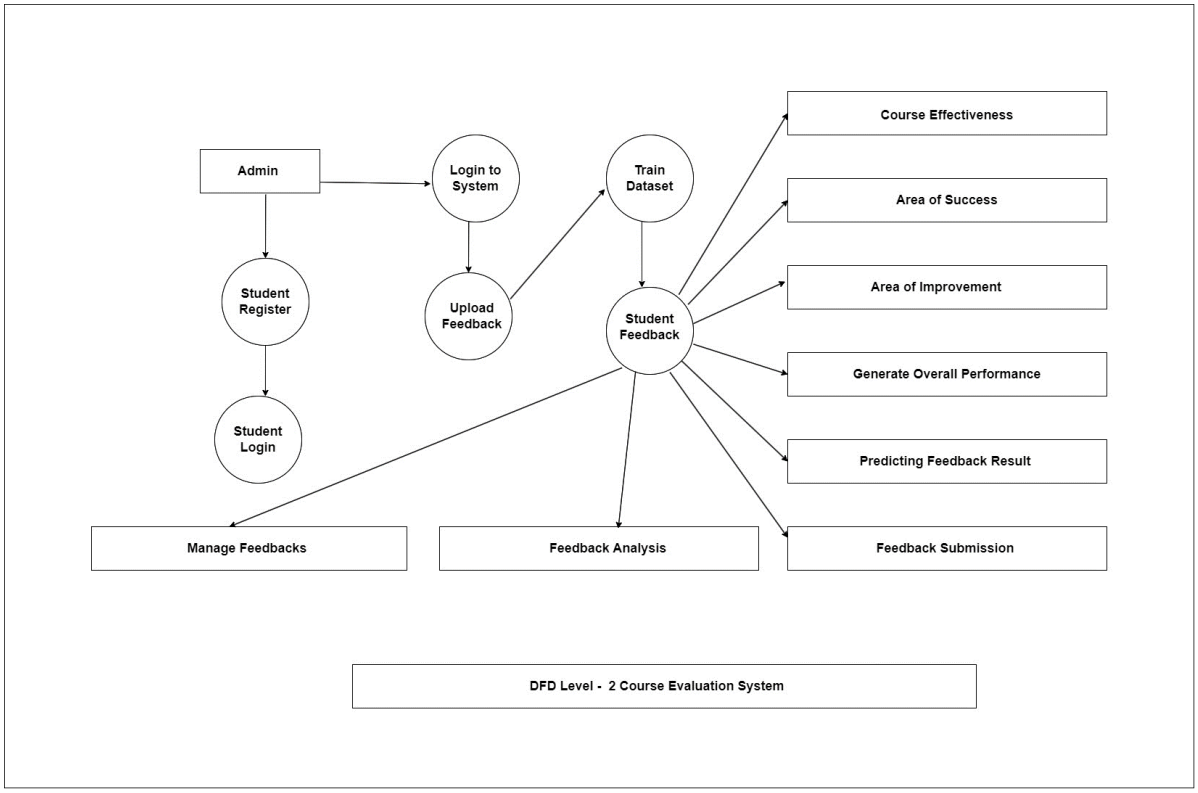

Fig.2 DFD level 2 for Course Evaluation System

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IV. RESULTS AND DISCUSSION

The application of supervised machine learning techniques, specifically classification and regression, demonstrated effective automation in processing extensive student feedback data for course evaluation. It led to the efficient extraction of meaningful patterns, empowering the assessment of course effectiveness and providing actionable improvement recommendations. Despite promising outcomes, scalability for larger institutions, privacy, and bias considerations present challenges, suggesting opportunities for future research and development in refining machine learning models, incorporating diverse data sources, ensuring fairness, and expanding the system's applicability to enhance education quality and learning outcomes.

V. CONCLUSION

In conclusion, ML-driven course performance analysis, utilizing student feedback, provides an effective approach for evaluating and enhancing course quality. Through automation, ML simplifies the analysis of extensive feedback data, generating valuable insights for educators and course designers. As technology and ML continue to advance, this field is expected to evolve, offering more precise, scalable, and user-friendly systems. Future efforts should address limitations, integrate diverse data sources, ensure fairness, transparency, and enhance ML models to provide superior insights and recommendations.

Ultimately, ML-based course performance analysis and instructor assessment holds significant promise for enhancing education quality and improving learning outcomes.

VI. REFERENCES

[1] Baker, R. S. (2019). Educational data mining: An advance for intelligent systems in education. IEEE Transactions on Learning Technologies, 12(1), 2-4. https://learninganalytics.upenn.edu/ryanbaker/publications.html

[2] Crossley, S. A., Louwerse, M. M., McCarthy, P. M., & McNamara, D. S. (2007). A linguistic analysis of student writing in a computer adaptive test. Language Testing, 24(2), 169-200. https://innovationinteaching.org/free-tools/autonomy-bibliography

[3] Romero, C., & Ventura, S. (2010). Educational data mining: A review of the state of the art. IEEE Transactions on Systems, Man, and Cybernetics, Part C (Applications and Reviews), 40(6), 601-618. https://ieeexplore.ieee.org/document/5524021

[4] Hastie, T., Tibshirani, R., & Friedman, J. (2009). The elements of statistical learning: Data mining, inference, and prediction. Springer. https://www.researchgate.net/publication/319770542_The_Elements_of_Statistical_Learning_Data_Mining_Inference_and_Prediction_Second_Edition_Springer_Series_in_Statistics

[5] Kumar, A. (2019). Machine learning in education: The role of a mentor in a virtual school environment. In International Conference on Learning and Collaboration Technologies (pp. 105-118). Springer.