CAREER VISION: AI & ML EXPERIENCE FOR IMMERSIVE EDU. FIELD EXPLORATION

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ABSTRACT

This paper discusses the development of a digital platform designed to assist 10th and 12th-grade students in selecting suitable career paths based on their academic performance and extracurricular activities. The platform aims to provide personalized career recommendations that align with students' strengths, interests, and educational backgrounds. By inputting their educational details and involvement in extracurricular activities, students receive tailored career options, enhancing their decision-making process during a critical stage of their education. The proposed system aims to bridge the gap between academic achievements and career opportunities, ultimately fostering informed career choices. Through a user-friendly interface, students can input their educational details, and the system utilizes algorithms to match them with relevant fields and career options. The proposed solution aims to enhance decision-making among students and guide them toward fulfilling careers. or Math in Paper Title or Abstract.

Keywords: Personalized Career Path, Curriculum Based Recommendations, Student Data Processing, Data Driven Career Counselling, Academic Performance Analysis.

I.   INTRODUCTION

Choosing the right career path is one of the most critical decisions that students make during their academic journey, particularly in grades 10th and 12th. These choices often shape their future educational and professional paths. However, many students face challenges in selecting the most suitable fields, either due to a lack of guidance or limited self-awareness about their strengths and interests. To address this, the need for a data-driven platform that assists students in choosing the right career based on their academic performance . This paper reviews a platform designed to provide personalized career recommendations by analyzing students' marks and activities, ensuring that the suggested career paths align with their capabilities and interests.[2] As students approach critical stages in their education, the pressure to choose the right career path intensifies. With numerous fields and options available, many students struggle to make informed decisions. This paper explores the need for a systematic approach to career guidance, focusing on the integration of academic performance and extracurricular activities to provide tailored career options

1.1 OBJECTIVES

- **Enhance Decision-Making Capabilities:** Equip students with tools and insights that improve their ability to make informed decisions about their future careers and educational pursuits, based on a comprehensive understanding of their academic achievements and personal interests.

- **Provide Clear Educational Pathways:** Offer detailed recommendations on relevant courses, training programs, and higher education institutions that align with the identified career paths, helping students understand the steps needed to achieve their career goals.

- **Increase Awareness of Career Opportunities:** Present students with information about various career roles, industry trends, and job market demands, helping them to explore and evaluate potential career options in a structured manner.

- **Support Career Exploration and Planning:** Develop resources and guidance materials that assist students in exploring different career options and planning their academic and professional journeys, ensuring they have the necessary information to make strategic choices.

II.   METHODOLOGY

1) Collection and Preprocessing

The foundation of the proposed career guidance system involves gathering a comprehensive dataset from diverse sources. These sources include psychometric test results, academic records, student interests, socio

economic backgrounds, and existing career pathways. To ensure inclusivity, particularly for students in rural areas, data can be collected through online surveys, mobile applications, and paper-based forms distributed in schools. The dataset is then preprocessed to handle missing values, normalize data, and perform feature selection. This preprocessing step ensures that the input data is clean, consistent, and ready for analysis.

2) Psychometric and Interest-Based Assessments

The system integrates psychometric assessments to evaluate students' abilities, interests, and personality traits. These assessments include both cognitive and non cognitive measures, such as logical reasoning, verbal abilities, career interests, and personal preferences. The results from these assessments serve as input to the ensemble learning model to align students' strengths with potential career options. Special care is taken to ensure that these assessments are accessible in multiple languages and formats to accommodate diverse student populations, particularly those from rural areas with limited access to technology.

3) Ensemble Learning Model

An ensemble learning-based model is designed to recommend career options based on student profiles. The ensemble model is constructed using a combination of machine learning algorithms, including decision trees, random forests, and support vector machines (SVMs). The goal of using an ensemble approach is to combine the strengths of individual models to improve prediction accuracy and robustness. The model is trained on historical career data, psychometric test results, and student outcomes, allowing it to predict the most suitable career path for each student based on their unique profile.

a) Random Forests: This algorithm is used to generate multiple decision trees from subsets of the data. The final career recommendation is based on the majority voting across these trees.

b) Support Vector Machines (SVM): SVM is included to classify students into different career categories based on their psychometric and academic features.

c) K-Nearest Neighbors (KNN): KNN is employed to identify similar students in the dataset and suggest career paths based on their outcomes. By combining these models in an ensemble approach, the system ensures higher accuracy and flexibility when providing career recommendations, even in cases where input data may be incomplete or inconsistent.

4) User Interface and Accessibility

A key objective of the system is to create a user-friendly platform that is accessible to all students, particularly in rural areas. The platform is designed to operate on multiple devices, including smartphones, computers, and low-end mobile phones. To make the system inclusive, the interface supports local languages and voice-based interactions, enabling students with limited literacy or technological exposure to engage with the platform. Additionally, the system provides both online and offline access, allowing students in regions with limited or no internet connectivity to still use the platform. For rural schools without internet access, a dedicated mobile application or offline kiosk system can be developed.

5) Career Recommendation and Feedback

After processing the input data, the system generates personalized career recommendations for each student. These recommendations are presented in an intuitive format, showcasing different career options along with details about job prospects, required skills, and educational pathways. The system also provides feedback to students, explaining how their psychometric and aca demic results have influenced the recommended career options. This transparent feedback helps students understand their strengths and guides them to make informed career decisions.

III.   SOFTWARE REQUIREMENTS

Operating System

- **Windows 10**: Chosen for its stability, enhanced security features, and compatibility with modern AI/ML development tools.

Database

- **MySQL**: Used for storing and managing user data and career progression records. It allows for easy retrieval and manipulation of records through simple and user-friendly SQL queries.

Development Tools and Programming Languages

❖ **Frontend:**

- **HTML**: For creating structured web pages.
- **CSS**: For styling and making the interface user-friendly and visually appealing.
- **JavaScript**: For dynamic interactivity on the client side.

❖ **Backend:**

- **Python**: For implementing AI/ML algorithms due to its rich ecosystem of libraries like TensorFlow, Scikit-learn, and PyTorch.
- **PHP**: For server-side scripting and handling user requests.

❖ **AI/ML Libraries:**

- **TensorFlow/PyTorch**: For developing machine learning models.
- **Scikit-learn**: For statistical modeling and predictive analytics.
- **Pandas and NumPy**: For data manipulation and preprocessing.

❖ **Visualization Tools:**

- **Matplotlib** and **Seaborn**: For creating career trend visualizations.

❖ **IDE:**

- **PyCharm**, **Jupyter Notebook**, or **VS Code**: For development and debugging.

IV.   HARDWARE REQUIREMENTS

Processor

- **Intel Core i5 (10th Generation)**: Chosen for its speed and reliable performance, enabling smooth multitasking and prolonged system uptime, essential for training ML models and running simulations.

RAM

- **16 GB**: For faster data processing and efficient handling of machine learning tasks.

Storage

- **512 GB SSD**: Ensures quick boot times and rapid access to AI/ML datasets.

Graphics Processing Unit (GPU)

- **NVIDIA GTX 1660** or better: To accelerate AI/ML model training processes.

Monitor

- **Full HD Monitor**: For better visualization and enhanced coding/debugging experience.

V.   FUTURE SCOPE

The career roadmap serves as a helpful guide for students to explore and plan their future career paths based on their interests and skills. By using AI and machine learning, this roadmap assesses students' strengths, weaknesses, skills, and preferences while also predicting industry trends. This information helps students navigate toward careers that are likely to be in high demand. In addition to helping with immediate decisions, the roadmap offers valuable insights for long-term growth. It highlights opportunities for further education, specialization, and career advancement. By taking a data-driven approach, the career roadmap empowers students to make informed choices about their futures, ensuring their decisions align with both market needs and their personal aspirations.

VI.   CONCLUSION

The platform represents a promising solution to the challenges students face in making informed career decisions. By leveraging a combination of academic data, it offers personalized career recommendations that cater to each student's strengths and interests. The system has the potential to enhance current career counselling methods, making it more accessible, data-driven, and effective. However, careful consideration must be given to ensuring data security and improving personalization to meet the diverse needs of students across different contexts.

VII.   REFERENCES

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