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# Smart Career Advisor Using Machine Learning

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***Abstract: Determining the ideal career path is a significant milestone in a student's life. Unfortunately, students often face a lack of proper career counselling and awareness about options that align with their individual talents and preferences. This paper introduces a Smart Career Advisor built on machine learning principles to address these gaps. Leveraging models like Random Forest and XGBoost, the system analyses user-specific data such as academic records, interests, and skillsets to provide accurate, customized career suggestions for different education levels, including 10th, 12th, Diploma, Graduation, and Post-Graduation. The objective is to empower students with data-driven insights to make informed decisions about their careers.***

## I. INTRODUCTION

In the present competitive and diversified career situation that we are experiencing, students generally experience enormous hardships while choosing the right path for their careers and future opportunities. The traditional modes of career guidance are extremely generic in nature, or in mostcases, simply not available to most students who may need it. However**,** machine learning technology can offeranintelligent and scalable solution by effectively analysing several different parameters and then selecting the most suitable professions for individuals. This specific project utilizes the functionality of Random Forest and XGBoost algorithms to develop a recommendation system that takes into account user input. It encompasses several factors like academic performance, technical and communication skills, logical reasoning skills, and personal interests, allowing the system to make personalized career recommendations. Further, the system classifies students according to their respective qualification levels whether they have completed school after the 10th grade, after the 12th grade, after a diploma, after graduation, or after a post-graduate course and offers corresponding career opportunities along with recommendationsfor skill development according to their respective needs.

## II. LITERATURE SURVEY

*1)* K. N. Chimalakonda et al. (2017) used a Decision Tree algorithm to classify students into suitable career paths based on academic performance and interests.
*2)* Sharma et al. (2019) proposed a Random Forest-based model for suggesting career paths, showing improved accuracy over basic classifiers.
*3)* M. Patel et al. (2020) applied Support Vector Machines (SVM) and Naive Bayes classifiers to predict the most appropriate job sector for an individual based on soft skills, academic records, and personality traits.

## III. EXISTING SYSTEM

In the current career recommendation systems, Support Vector Machines (SVM) are widely used due to their effectiveness in classification tasks and ability to handle high-dimensional data.

These systems typically analyse user input data, such as academic scores, skill sets, and interests, to classify individuals into predefined career categories.

While SVMs can achieve good accuracy in simple classification tasks, they have several limitations when applied to complex and dynamic domains like career advising

## IV. PROPOSED SYSTEM

The proposed system, "Smart Career Advisor," utilizes a approach combining Random Forest (RF) and Xgboost algorithms to provide personalized and accurate career recommendations.

This advanced machine learning framework overcomes the limitations of traditional methods like Support Vector Machines (SVM) by effectively processing diverse data inputs and capturing complex patterns in user profiles.

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## V. IMPLEMENTATION

The implementation of the Smart Career Advisor system involves multiple stages, starting with data collection, preprocessing, model training, and finally integrating the predictive engine into a user-friendly interface. The system uses supervised machine learning algorithmsprimarily Random Forest and XGBoostdue to their high accuracy and ability to handle complex, non-linear datasets.

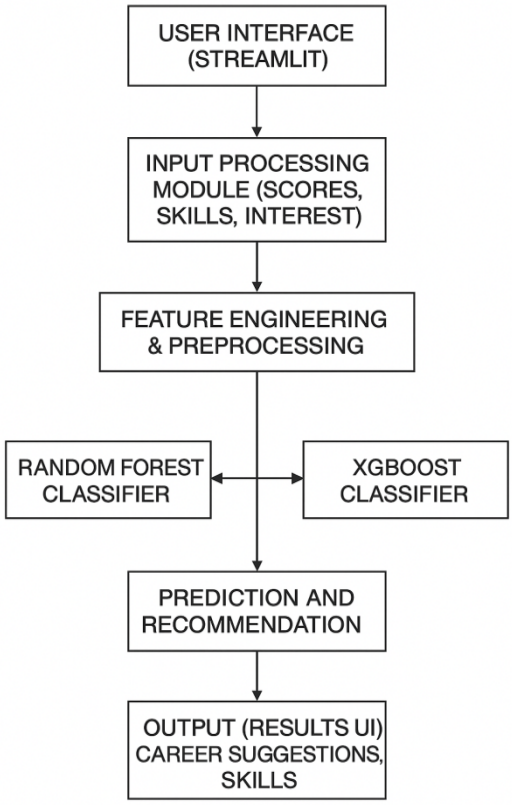
## VI. MODULES

1) *User Interface (UI) Module:* Provides a user-friendly web interface with input forms and visual dashboards to collect user data and display career recommendations interactively.
2) *Data Collection & PreprocessingModule:* Gathers career-related data from various sources and preprocesses it for use in machine learning models.
3) *Career Path Recommendation Module (AI/ML-Based):* Utilizes machine learning algorithms to suggest suitable career paths based on user inputs like education, skills, and interests.
4) *User Profiling & Skill Matching Module:* Analyzes user inputs to extract and match skills with career requirements, highlighting gaps and suggesting skill improvements.
5) *Predictive Analysis Module:* Forecasts future job demand and career success using regression models based on education, skills, and industry trends.

## VII. ALGORITHMS

1) Scrapy:for job data extraction
2) Random Forest: For better accuracy through ensemble learning
3) XGBoost: For high-performance gradient boosting.
4) Gap Analysis: Rule-based or threshold-based comparison between required vs. existing skills

## VIII. SYSTEM ARCHITECTURE



## IX. RESULT AND ANALYSIS

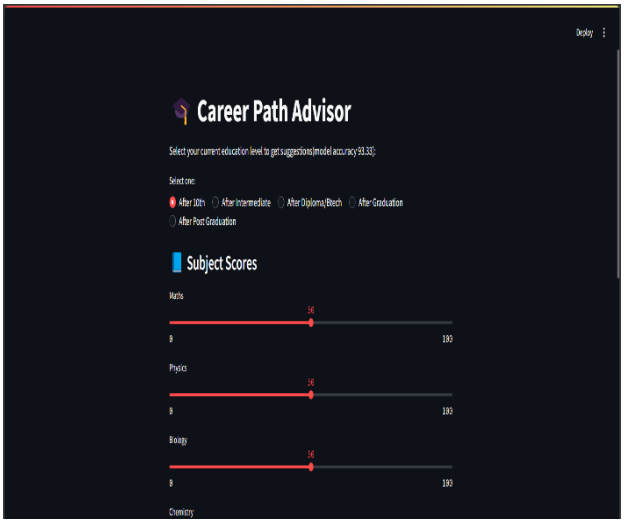



Fig 1: Home Page

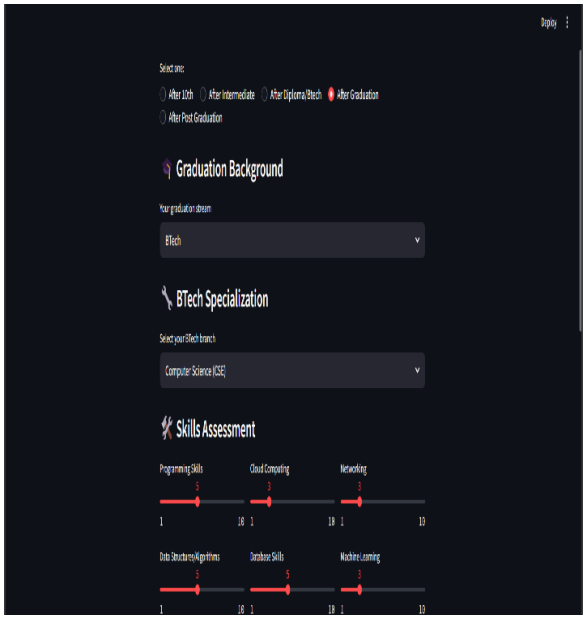



Fig 2: Input Specifications

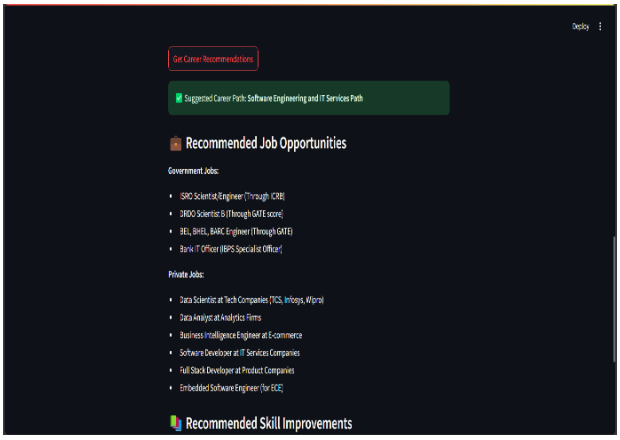



Fig 3: Career Recommendations

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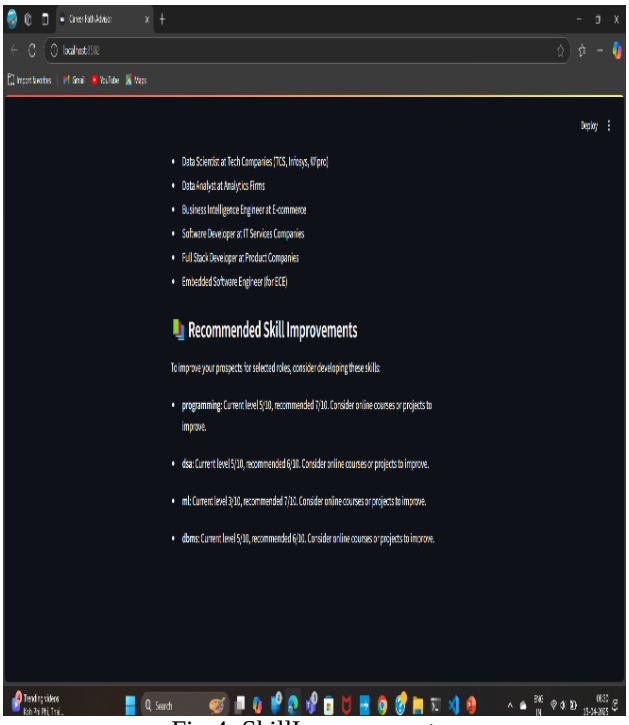


Fig 4: SkillImprovements

## X. CONCLUSION

The Smart Career Advisor effectively combines Machine Learning (Random Forest, Xgboost) to provide accurate and personalized career recommendations. It helps students make informed decisions based on their interests, skills, and academic strengths. This system is a step toward smarter, data-driven career guidance in the digital age.

## XI. FUTURE SCOPE

The Smart Career Advisor can be further enhanced by integrating real-time job market data to offer more updated career suggestions. Features like voice-based interaction and multilingual capabilities can make the system more user-friendly and accessible. Additionally, analysing user resumes or personal statements using advanced NLP and deep learning techniques can improve the accuracy of recommendations

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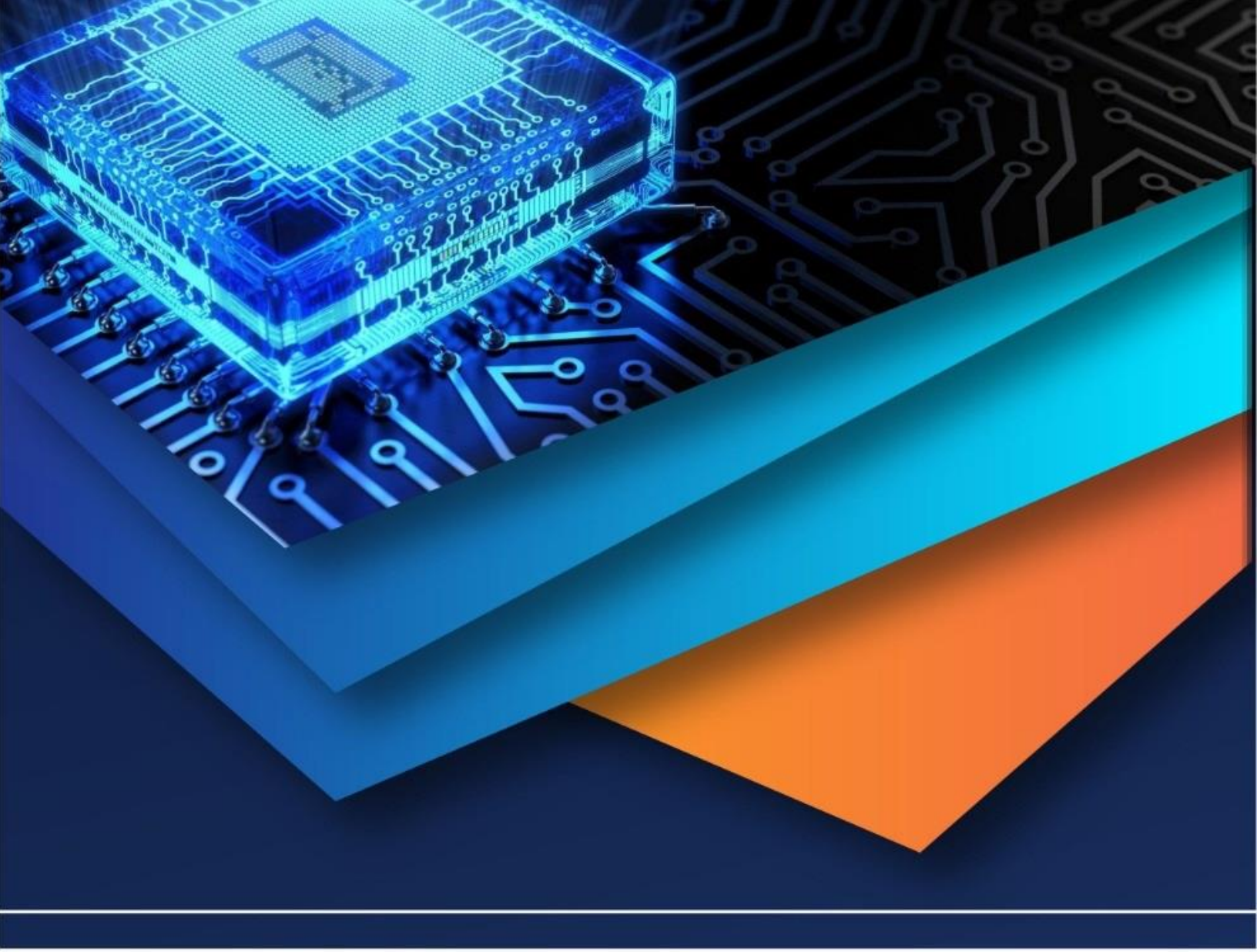


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