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Smart Career Finder

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A B S T R A C T

This project addresses the issue of career guidance using an AI-driven prediction system powered by Machine Learning. Using a career dataset which includes student's academic scores, study habits, hobbies, part-time job status, and gender, we cleaned, explored and enhanced the data to understand patterns . Various machine learning models, including Random forest , Logistic Regression, KNeighbors Classifier , Naïve Bayers, and Support Vector Machine (SVM), were trained and evaluated, with Random Forest yielding the best performance. The final model was deployed with Flask web app, where students can enter their details and instantly get personalized career recommendations based on their strengths and interests.

Keywords: Career Finder, Machine learning, Random Forest, Model evaluation, Flask Web Application

1. Introduction

In today's fast-moving job world, figuring out the right career path can be tough. That's where the Smart Career Finder comes in — a helpful platform designed to guide students toward careers that truly fit their skills, passions, and what's trending in the job market.

The system uses the power of machine learning and data analytics to give each student career suggestions that feel personal and relevant. It looks at things like your academic background, any work experience, your personality, and what's currently in demand in the job market — then recommends career paths that match your strengths and dreams for the future

The system is built using Flask, a simple and powerful Python web framework, and brings together machine learning, data analytics, and a deep understanding of the user to offer career suggestions that actually make sense for each individual. This innovative approach empowers individuals to make data-driven career decisions, enhancing employability and career satisfaction in the long run.

2. Literature Review

In [1], Nagpal and Panda present a career path recommendation system that blends string matching with decision tree algorithms. Their approach focuses on mapping a student's educational background to target careers by analyzing course relevancy. While this method offers a structured suggestion path, it may not adapt well to changing career trends or non-linear profiles.

In [2], Rahman et al. introduce "ResumAI," an AI-powered tool that gives resume feedback and guidance for career development. The system uses intelligent evaluation methods but also highlights the ethical concerns and limitations involved in using AI for personal career decisions — especially regarding privacy and fairness.

In [3], Vignesh and team develop a career guidance model that combines machine learning algorithms like decision trees with a natural language processing (NLP)-based interface. Their goal is to enhance the accuracy and user-friendliness of career predictions. However, the study focuses more on algorithm performance than on deployment or scalability for real-time student use.

Despite all these advancements, most models focus either on structured mapping or isolated feedback mechanisms. There's still a gap in offering a real-time, intuitive, and personalized career suggestion system that students can interact with easily.

Our project addresses this gap by building a Smart Career Finder — an AI-powered platform that not only predicts careers based on academic and personal traits but also delivers instant results via a clean and accessible Flask web application.

3. Methodology

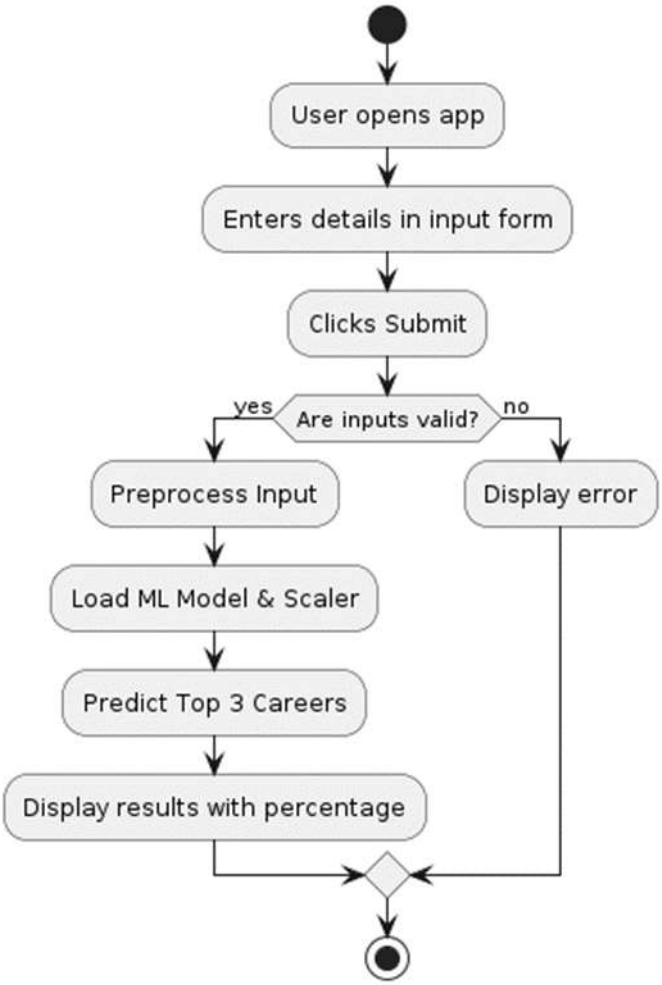

Fig. 1. Smart Career Finder Methodology

The proposed system, Smart Career Finder, utilizes machine learning to predict career and provide personalized career recommendations.

In this , the user inputs their details such as Gender, Part time job status , Weekly self study hours, Hobbies and their academic scores. This data is preprocessed to ensure the consistence within the training set. The Random Forest model evaluates the input and predict the output i.e., the top 3 careers.

On the input basis, the system predicts the top 3 careers , these recommendations helps students to find their career interests. This way of approach is data driven, efficient way for predicting the careers for students .

3.1 System Architecture

Fig. 2. Smart Finder Architecture

Smart Career Finder has been developed with a user-friendly and modular design that helps students receive accurate career recommendations through AI-driven insights. The system is organized into five key modules, each responsible for a specific part of the career prediction process.

Built using a lightweight Flask web interface, the platform is intuitive, responsive, and suitable for real-time career guidance. Whether it's collecting user input, preprocessing data, predicting suitable careers, or displaying results, each module works seamlessly to support students in making informed decisions about their future.

1)Data Collection Module

Be it the raw data from Excel, Access, text files, etc., this step (gathering past data) forms the foundation of future learning. The better the variety, density, and volume of relevant data, the better the learning prospects for the machine become.

2)Preparing the data Module

Any analytical process thrives on the quality of the data used. One needs to spend time determining the quality of data and then taking steps for fixing issues such as missing data and treatment of outliers. Exploratory analysis is perhaps one method to study the nuances of the data in details thereby burgeoning the nutritional content.

3)Training a model

This step involves choosing the appropriate algorithm and representation of data in the form of the model. The cleaned data is split into two parts – train and test28 (proportion depending on the prerequisites); the first part (training data) is used for developing the model. The second part (test data), is used as a reference.

4)Career Guidance Module

It leverages user input (academic scores, interests, skills, and personality traits) along with machine learning algorithms to generate personalized career recommendations.

4. Output Screens

Fig 3. User Interface

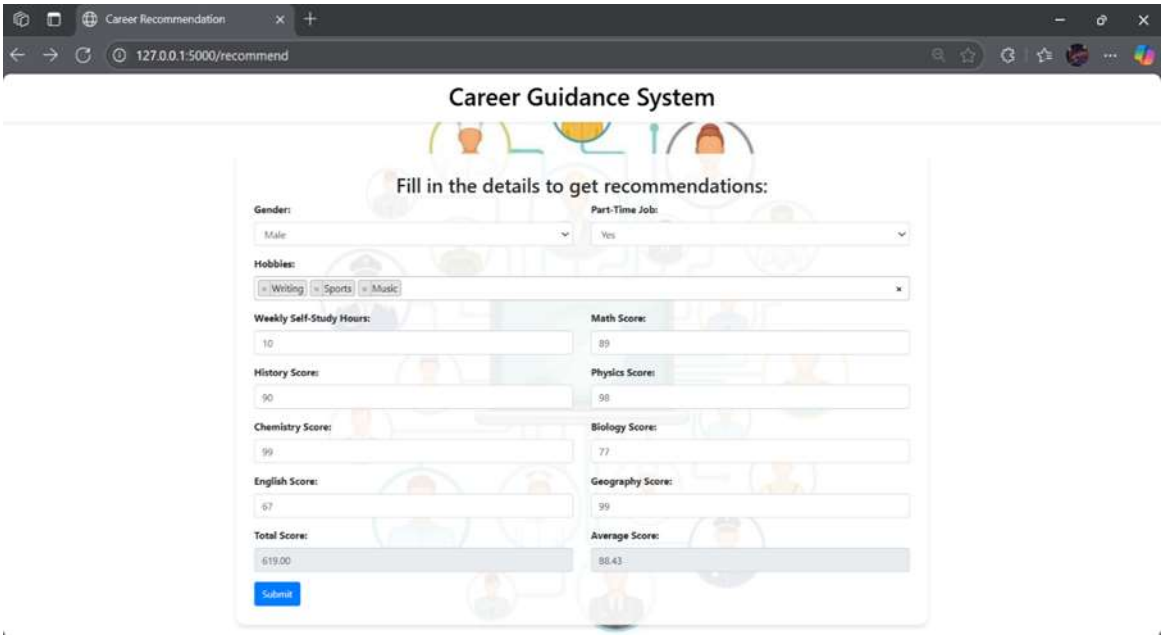

Fig 4. Login credentials given by admin

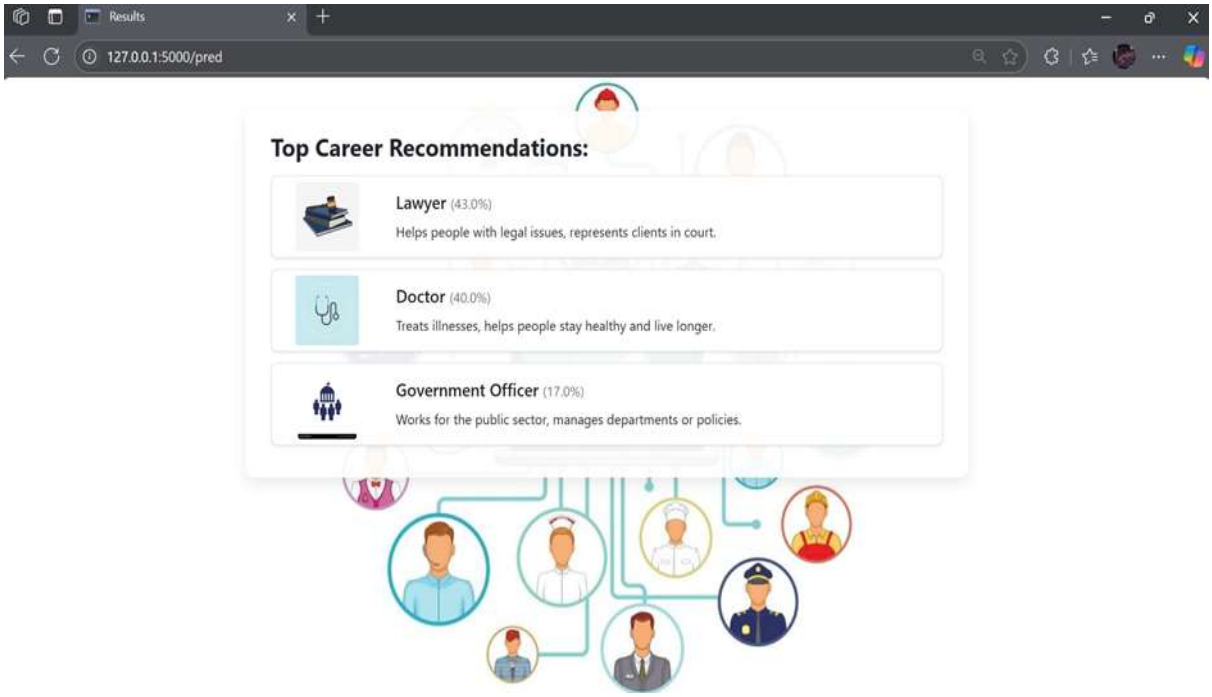

Fig 5. Result for given inputs

5. Work Flow:

Here is the work flow of our project:

Step 1: Launch the Application

The user accesses the web application running locally on localhost(http://127.0.0.1:5000/)

Step 2: Click on get recommendations

A screen where you have to give you inputs i.e, various subject scores,hobbies etc.,

Step 3: Enter Your Academic details

The user is prompted to enter specific parameters required for career prediction. Each input is provided using number input fields:

- Gender: Male or Female.
- Part-Time Job: Yes or No.
- Hobbies: Select your hobbies.
- Weekly self-study hours: Number of hours you study in a week.
- Math Score: Enter your math score out of 100.
- History Score: Enter your history score out of 100.
- Physics Score: Enter your physics score out of 100.
- Chemistry Score: Enter your chemistry score out of 100.
- Biology Score: Enter your biology score out of 100.
- English Score: Enter your english score out of 100.
- Geography Score: Enter your geography score out of 100.
- Total Score: The total score gets calculated automatically.
- Average Score: The average score gets calculated automatically.

Step 4: Click on Submit

After you click on submit, the model predicts the most suitable careers using trained Random Forest model**.**

Step 5: Display Output

The predicted careers are shown to the student via web interface with the percentage.

6. Conclusion and Future scope:

The implementation of a Smart Career Guidance System using advanced technologies such This Career Recommendation System successfully leverages user academic scores, interests, and personal attributes to predict and rank the most suitable career options. Using a machine learning model and preprocessed input features, it provides the top 3 career recommendations along with a confidence percentage, normalized to total 100% for better interpretability.

By integrating Flask for the web interface and Scikit-learn for model inference, the system offers an intuitive, real-time experience. Each recommendation is supported with career-specific descriptions and visuals, enhancing user understanding and engagement.

The system not only aids students in making informed career decisions, but also demonstrates how artificial intelligence can personalize guidance and streamline career planning. With further enhancements such as feedback loops and expanded datasets, the model can become even more accurate and impactful in real-world education and counseling contexts.

Future Scope:

A enhancement for this Career Recommendation System would be integrating real-time job market data using APIs. This means connecting the system to platforms like LinkedIn Jobs, Glassdoor, or government labor databases. By doing so, the recommendations would reflect current industry demands and hiring trends. For example, if Data Science roles are growing in demand, the system can prioritize such suggestions. It would also allow the model to show updated salary expectations and required qualifications for each career. This makes the recommendations not only more accurate but also actionable. Users can clearly see which careers are currently booming and plan accordingly. It also prepares students for the future, not just based on their interests but on real-world opportunities. This makes the system smarter, dynamic, and more industry-ready. Overall, it bridges the gap between education and employment perfectly.

7.Acknowledgement:

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