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AI-Based Career and Financial Decision Support System for Students and Employees

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ABSTRACT: Choosing a suitable career path is an important decision for students and employees, as individual skills, interests, and abilities may differ significantly. Traditional career guidance methods generally depend on manual assessment, personal opinions, and limited information, which may not always provide personalized recommendations. This paper presents an AI-based career guidance system that uses machine learning to recommend suitable career paths based on an individual's skill profile. The proposed system evaluates seven skill dimensions: Logical Thinking, Coding Skill, Communication Skill, Problem Solving, Data Analysis, Writing Skill, and Teamwork. Users provide their skill scores through an interactive interface, after which the input data is scaled and supplied to a trained machine learning model. The predicted class is converted into a meaningful career recommendation using a label encoder. The system is implemented using Python and provides desktop and web-based interfaces. The web application also incorporates user authentication and associates predicted career categories with relevant companies to provide additional career-oriented information. The proposed system aims to provide an accessible and personalized approach to career exploration and assist users in making more informed career decisions.

KEYWORDS: Artificial Intelligence, Machine Learning, Career Guidance, Career Prediction, Skill Assessment, Streamlit, Python, Personalized Recommendation.

I. INTRODUCTION

Career selection is one of the major decisions faced by students and working professionals. Selecting an appropriate career requires an understanding of an individual's skills, strengths, interests, and capabilities. However, many students depend on conventional guidance methods, personal opinions, or limited career information while making such decisions. This can make it difficult to identify career opportunities that align with their individual strengths.

The development of Artificial Intelligence (AI) and Machine Learning (ML) has provided opportunities to develop intelligent systems capable of analyzing user-related information and generating personalized recommendations. Machine learning techniques can identify relationships between input characteristics and previously learned outcomes, making them useful for prediction and recommendation-based applications.

The proposed system provides technology-assisted career guidance. The implemented career guidance component accepts seven skill parameters from the user and processes these values through a trained machine learning prediction pipeline. The system first scales the input features and then predicts the corresponding career category. The predicted class is converted into a human-readable career recommendation using a label encoder.

The system provides an interactive interface through which users can enter their skill levels without requiring technical knowledge. The web-based implementation additionally provides authentication and displays companies associated with the predicted career category. The paper describes the implemented prediction workflow, interfaces, and functional outcomes.

Paper is organized as follows. Section II presents the literature survey. Section III describes the proposed methodology and prediction workflow. Section IV presents experimental results and screenshots of the implemented system. Finally, Section V presents the conclusion.

II. LITERATURE SURVEY

Career guidance systems have traditionally relied on questionnaires, counselling sessions, aptitude tests, and expert recommendations. These approaches can provide useful guidance, but their effectiveness may depend on the availability of qualified counsellors and the interpretation of assessment results.

With the growth of machine learning, researchers have explored predictive approaches for educational and career-related applications. Machine learning models can process multiple attributes and identify patterns that can be used for prediction. Such systems can reduce the dependency on purely manual analysis and provide recommendations based on predefined datasets and learned relationships.

Skill-based recommendation systems are useful because career requirements can vary according to different professional domains. Parameters such as logical reasoning, programming ability, communication, problem-solving ability, data analysis, writing, and teamwork can provide useful information about an individual's strengths.

Web-based machine learning applications have also made intelligent prediction systems more accessible. Frameworks such as Streamlit allow machine learning models to be integrated with interactive user interfaces, enabling users to enter data and obtain predictions without directly interacting with the underlying machine learning implementation.

The proposed work combines skill assessment, feature scaling, machine learning prediction, label decoding, and career-oriented company information in an interactive application.

III. METHODOLOGY

The proposed system is designed to recommend career paths according to a user's skill profile. The implemented system consists of user authentication, skill assessment, input preprocessing, machine learning prediction, career recommendation, company recommendation, and interactive interfaces.

The seven implemented skill parameters are Logical Thinking, Coding Skill, Communication Skill, Problem Solving, Data Analysis, Writing Skill, and Teamwork. Each skill is represented by a score from 0 to 100, with the implemented interface providing values in increments of 5.

The prediction workflow is: User Skill Input $\rightarrow$ Numerical Feature Vector $\rightarrow$ Feature Scaling $\rightarrow$ ML Model $\rightarrow$ Predicted Class $\rightarrow$ Label Decoding $\rightarrow$ Career Recommendation. The application loads the trained model bundle `career_guidance.pkl`, which contains the model, scaler, and label encoder. The raw values are converted into a NumPy array, transformed using the trained scaler, passed to the model, and then decoded into a career label.

For a feature vector X , the trained scaler produces a transformed vector $X_s = S(X)$. The trained prediction model produces a class $C = M(X_s)$, and the label encoder converts the predicted class into the final recommendation $R = L(C)$. The web implementation uses Streamlit and provides Home, About, Predict, and Contact areas along with basic account authentication. The desktop implementation uses Tkinter for the career prediction interface. After prediction, the web application displays a predefined company list associated with the predicted career category. These lists are application data and do not represent real-time job vacancies.

Career Prediction System Flow

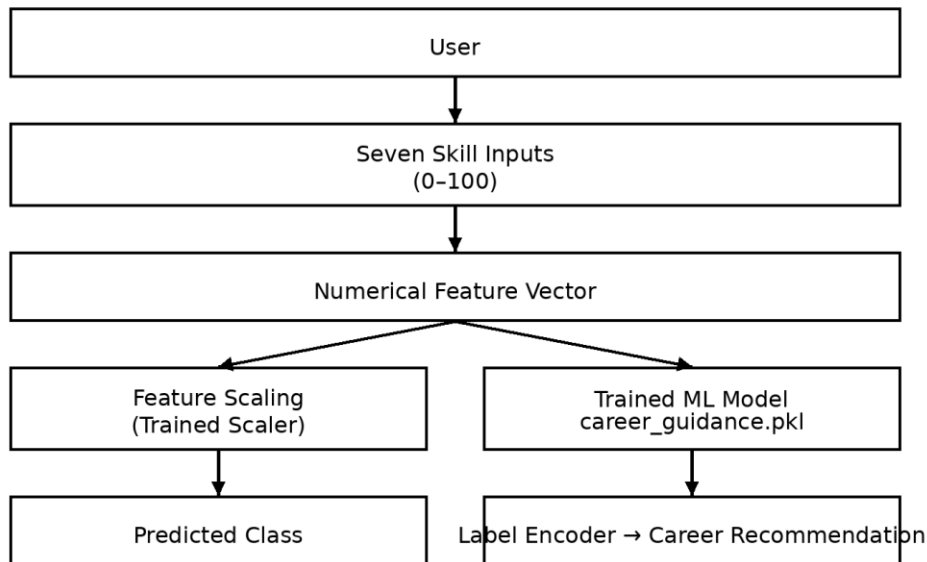
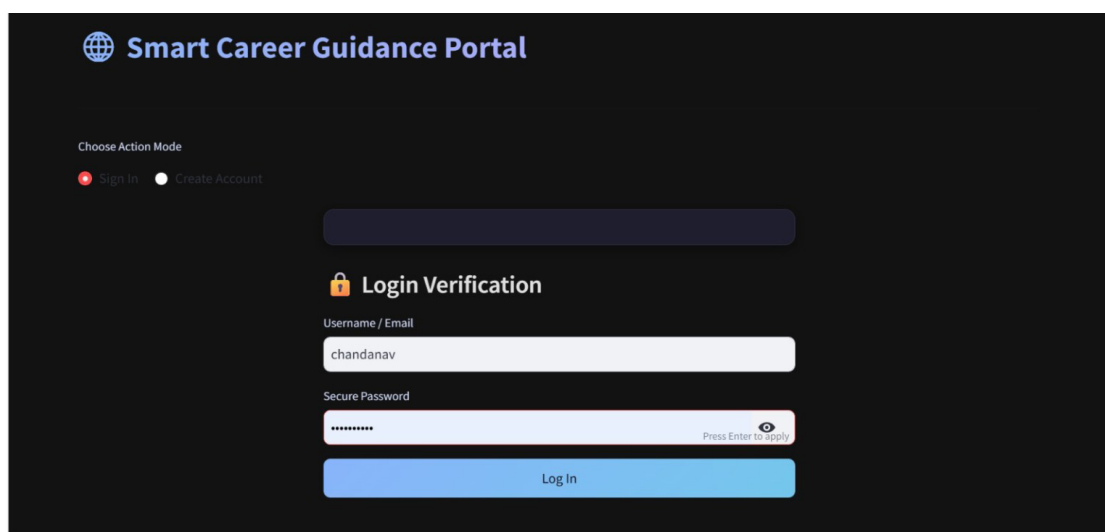


Fig.1. Flow of the implemented career prediction system.

IV. EXPERIMENTAL RESULTS

The developed system provides an interactive mechanism for entering skill information and generating career recommendations. The prediction interface accepts seven skill parameters and processes them through the trained machine learning pipeline. The resulting prediction is displayed as a human-readable career recommendation.



Smart Career Guidance Portal

Choose Action Mode

☒ Sign In ☐ Create Account

Login Verification

Username / Email

Secure Password

Press Enter to apply

Fig.2.Login verification interface

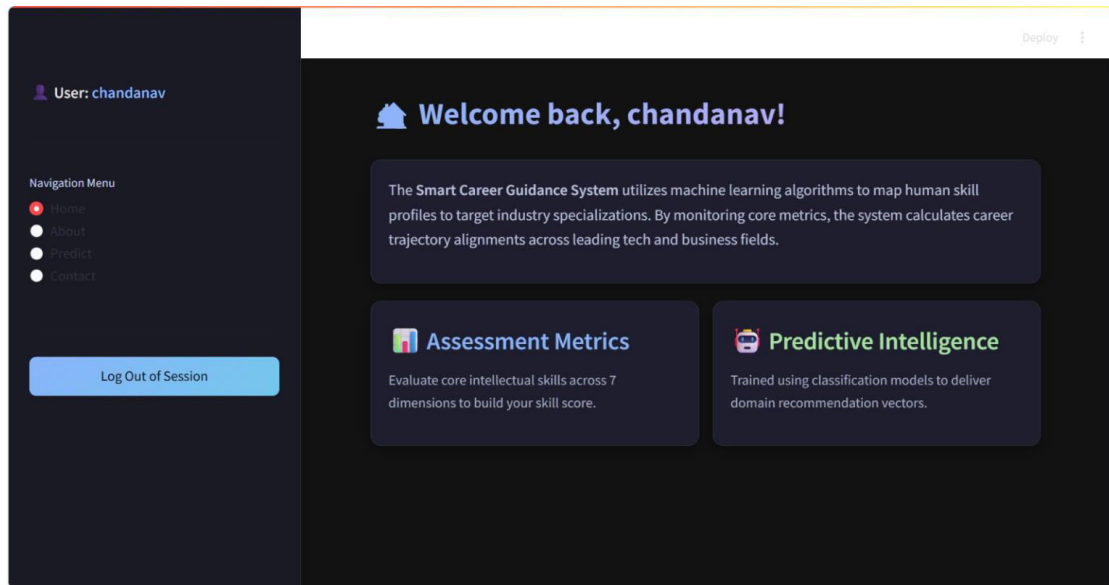


Fig.3.Home page of the Smart Career Guidance Portal

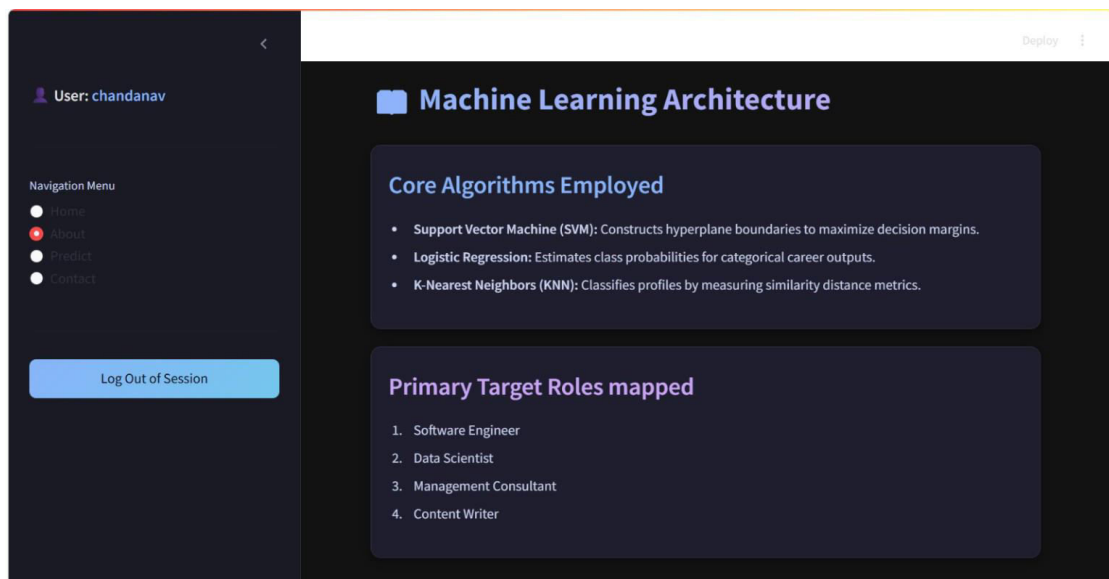
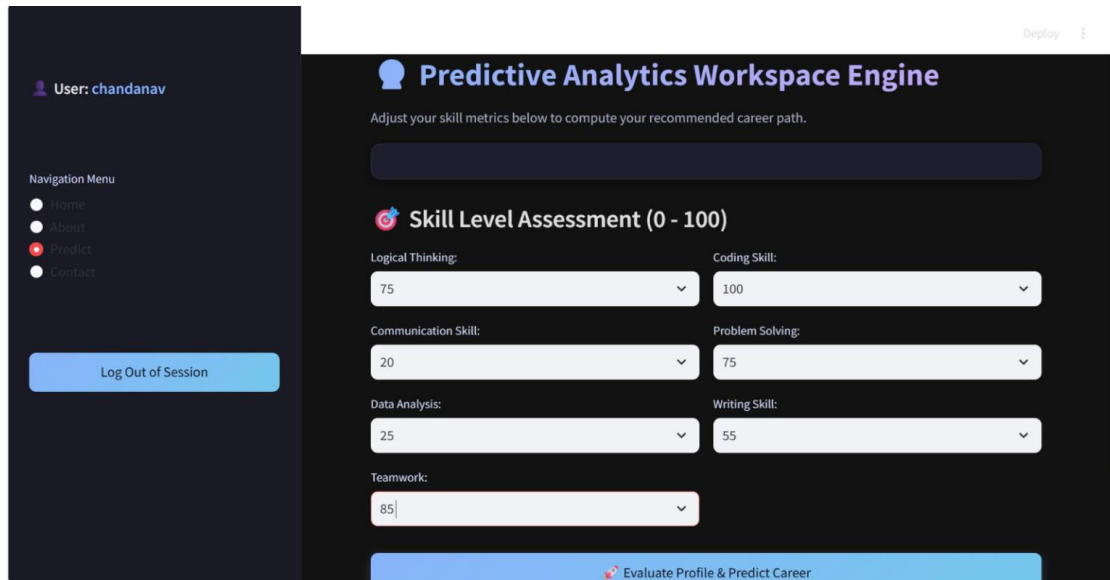


Fig.4.About page showing machine learning architecture and target roles



Predictive Analytics Workspace Engine

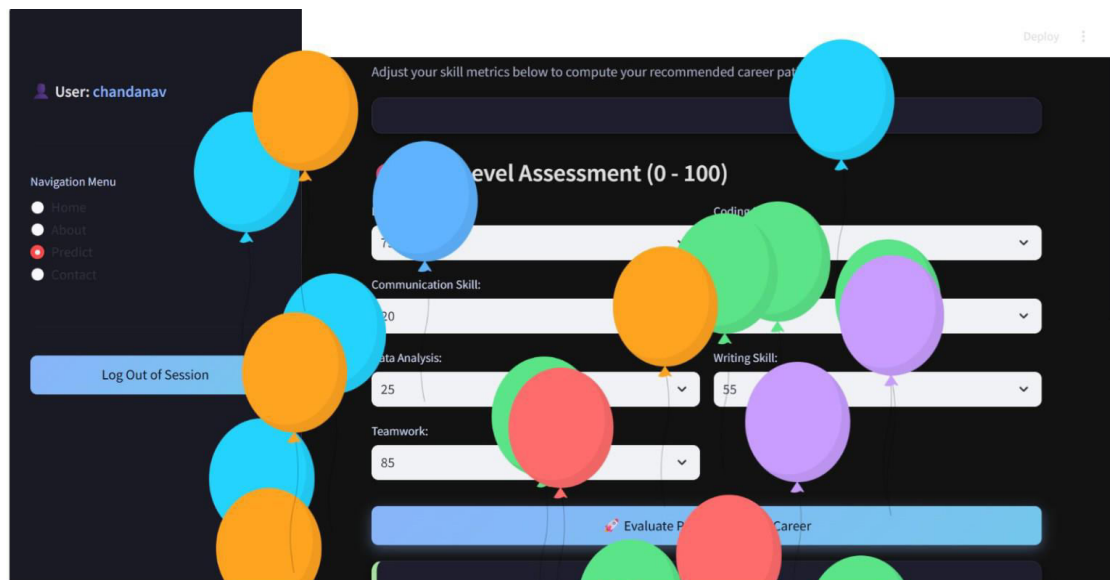
Adjust your skill metrics below to compute your recommended career path.

Skill Level Assessment (0 - 100)

Logical Thinking: 75	Coding Skill: 100
Communication Skill: 20	Problem Solving: 75
Data Analysis: 25	Writing Skill: 55
Teamwork: 85	

[Evaluate Profile & Predict Career](#)

Fig.5. Skill assessment interface with seven skill parameters.



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Data Analysis: 25	Writing Skill: 55
Teamwork: 85	

[Evaluate Profile & Predict Career](#)

Fig.6. Prediction interface after evaluation, with visual effects displayed by the application.

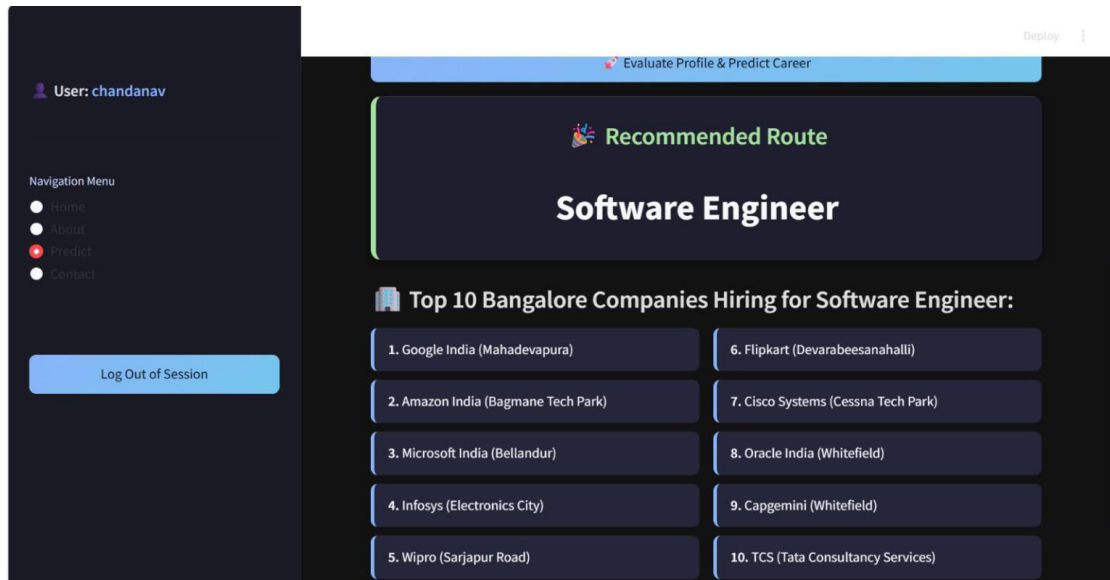


Fig.7. Recommended career route and associated companies.

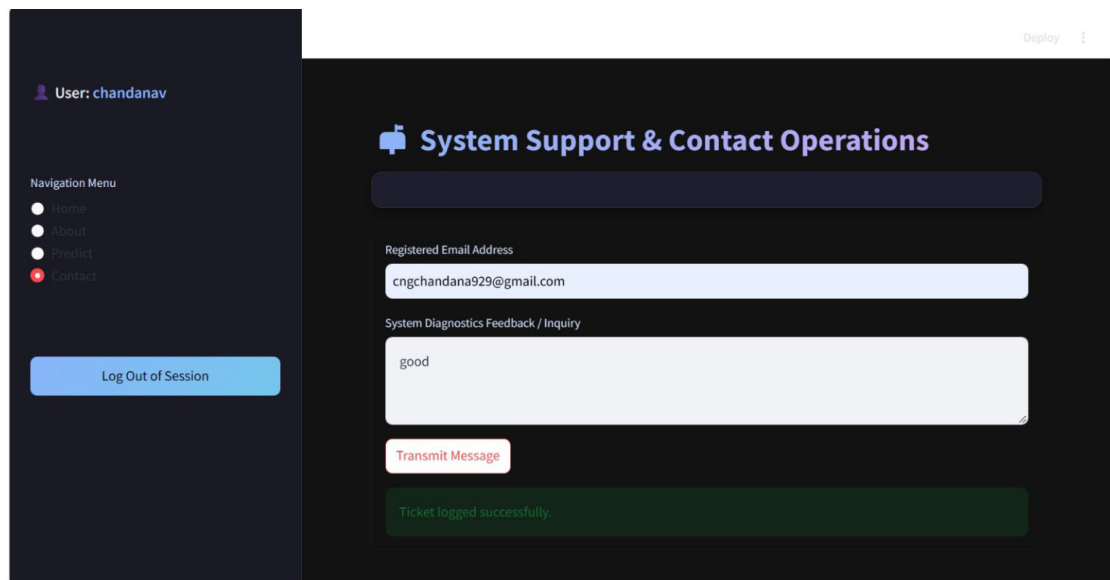


Fig.8. Contact and system feedback interface.

The system also integrates the prediction pipeline with the web interface. User authentication, skill input, feature scaling, model prediction, label decoding, and career/company recommendation are implemented as functional components of the application.

The supplied implementation does not provide verified numerical model-evaluation metrics in the available source code. Therefore, accuracy, precision, recall, F1-score, and confusion-matrix values are not reported here rather than introducing unsupported results.

V. CONCLUSION

The proposed AI-Based Career and Financial Decision Support System demonstrates the application of machine learning for personalized career guidance. The implemented system evaluates seven skill parameters and processes them through a trained machine learning prediction pipeline consisting of feature scaling, model prediction, and label decoding.

The system provides interactive desktop and web-based environments through which users can enter skill profiles and obtain career recommendations. The Streamlit implementation additionally provides authentication functionality and predefined company recommendations associated with different career categories.

The current implementation provides a foundation for future expansion. Future work can incorporate additional user attributes, larger and more diverse training data, formal model evaluation, real-time employment information, secure database-based authentication, and a dedicated financial decision-support module.

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