**CAREER GUIDNANCE PROJECT**

**A PROJECT REPORT**

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***in partial fulfillment for the award of the degree***

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**IN**

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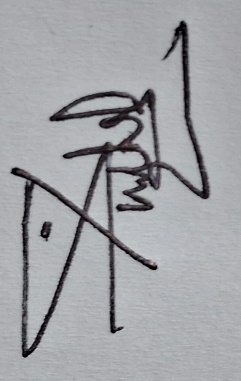
**BONAFIDE CERTIFICATE**

Certified that this project report **“……CAREER GUIDNANCE AI MODEL…………”**

is the bonafide work of “**…Subesh Upadhyay, Jatin, Aditya Raj Dixit………...”**

who carried out the project work under my supervision.

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**APPENDIX III**

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**Abstract**

The AI-Based Career Guidance System is a machine learning solution designed to provide precise career recommendations based on personality traits and skill-based ratings. Our model uses features like communication skills, openness, emotional range, and technical competencies such as programming and project management to predict the best-fit career. We used an extended dataset and applied preprocessing techniques like label encoding and feature scaling. An XGBoost classifier was selected for its superior accuracy (98.28%) in career role classification. The trained model was integrated into an interactive Streamlit web application with a user-friendly UI. Users can input their skills and personality ratings via sliders and receive AI-generated career recommendations, including top 3 probable roles. This system enhances traditional career counseling by offering a personalized, scalable, and engaging digital platform.

1. **Introduction**

The rapid evolution of the job market demands innovative solutions to guide individuals in making informed career decisions. Traditional career counseling methods often lack personalization and fail to account for dynamic market trends. The AI-Based Career Guidance System addresses these challenges by leveraging machine learning to analyze aptitude test scores and recommend suitable career paths. This project aims to empower individuals with precise career guidance, enabling them to align their skills with market demands. The scope of this study includes developing a robust machine learning model, integrating it into a user-friendly interface, and evaluating its performance using real-world data.

1. **Problem Statement**

The primary challenge addressed by this project is the lack of personalized and data-driven career guidance tools. Many individuals struggle to identify suitable career paths due to insufficient insights into their strengths and the job market's evolving demands. Existing systems often rely on static datasets and outdated methodologies, leading to suboptimal recommendations. This project seeks to overcome these limitations by developing an AI-driven solution that combines aptitude assessments with real-time market trends

1. **Objectives**

The objectives of this project are:  
- To assess users' analytical, logical, problem-solving, mathematical, and verbal skills.  
- To incorporate market demand trends for precise career recommendations.  
- To provide a guided pathway for career progression.  
- To develop an interactive and user-friendly platform for accessing career guidance.

1. **Literature Review**

Previous research has explored various approaches to career guidance, including rule-based systems, statistical models, and machine learning algorithms. Rule-based systems rely on predefined criteria, which limits their adaptability. Statistical models, while more flexible, often fail to capture complex relationships between aptitude scores and career outcomes. Recent advancements in machine learning have enabled the development of predictive models that offer personalized recommendations. However, existing solutions often lack integration with real-time job market data. This project builds on prior work by combining machine learning with market trend analysis to deliver a comprehensive career guidance tool.

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1. **Proposed Methodology**

- Trained using XGBoost Classifier (98.28% accuracy).  
- Evaluated using accuracy metrics.  
- Chosen for its performance over RandomForest, SVM, KNN, and Logistic Regression.

**9 .Implementation Plan**

- Python for backend processing.  
- Scikit-learn and XGBoost for machine learning.  
- Streamlit for frontend development with rich UI components.

1. High accuracy (98.28%) in career prediction.  
   Personalized recommendations based on user input and personality traits.  
   Modern, responsive Streamlit-based UI with top 3 role suggestions.

High accuracy in career prediction.  
Personalized recommendations based on aptitude scores and market trends.  
Improved user satisfaction through an interactive and intuitive interface.

1. **. Project Timeline**

The project was carried out in multiple phases to ensure systematic development and testing. Below is a structured breakdown of tasks and their respective timelines:

* **Week 1-2**: Research and data collection, identifying suitable datasets and career aptitude frameworks.
* **Week 3-4**: Data preprocessing, cleaning, and applying feature engineering techniques.
* Week 5-6: Model selection, training, and evaluation using XGBoost Classifier (accuracy: 98.28%).
* **Week 7**: Integration of the trained model into a Streamlit web application.
* **Week 8**: Testing, evaluation, and performance measurement using accuracy, precision, recall, and F1-score.
* **Week 9**: Refinements based on testing feedback and real-world validation.
* **Week 10**: Documentation, final report preparation, and deployment of the career guidance system.

1. **Limitations & Challenges**

Limited availability of diverse datasets.  
Integration of real-time job market data poses technical challenges.  
Potential biases in aptitude assessments

1. **Conclusion**

The AI-Based Career Guidance System effectively bridges the gap between aptitude assessments and career decision-making. By leveraging machine learning and market trend analysis, the system provides personalized and actionable career recommendations. Future enhancements include expanding the dataset, integrating real-time job market analysis, and improving model performance using advanced techniques.

1. **References**

Below are some of the key references used in the project:

* James, G., Witten, D., Hastie, T., & Tibshirani, R. (2013). *An Introduction to Statistical Learning*. Springer.
* Breiman, L. (2001). *Random Forests*. Machine Learning, 45(1), 5-32.
* Scikit-learn: Machine Learning in Python. Available at: https://scikit-learn.org/
* TensorFlow: End-to-End OpenSource Machine Learning Platform. Available at: https://www.tensorflow.org/
* Streamlit Documentation: https://docs.streamlit.io/
* Publicly available aptitude test datasets from Kaggle and UCI Machine Learning Repository.

These references provided theoretical and technical insights into model development and deployment.

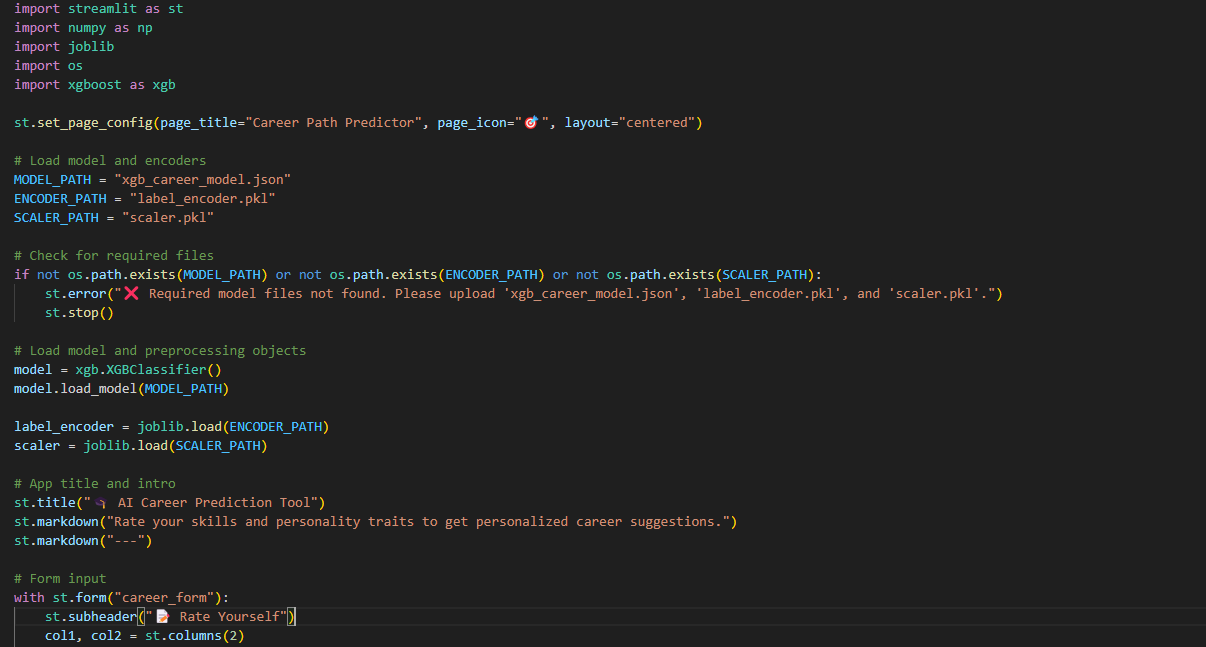
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* 1. **Appendices**

This section includes additional supporting materials that complement the project:

* **Code Snippets**: Key portions of the Python code used in data preprocessing, model training, and integration with Streamlit.
* **Figures & Graphs**: Accuracy vs. Loss graphs, confusion matrices, and feature importance visualizations.

These appendices serve as a comprehensive reference for further exploration and validation of the project's methodology and implementation.



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