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(AI-BASED CAREER GUIDANCE SYSTEM USING PYTHON DJANGO FRAMEWORK)

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ABSTRACT

The AI-Based Career Guidance System is developed using the Python Django framework to assist students in identifying suitable career pathways based on academic scores, interests, and skill sets. Instead of employing sophisticated Machine Learning algorithms, the system uses a rule-based decision approach to produce transparent and explainable recommendations. User information is captured through a web interface and processed through predefined logic blocks to suggest the most appropriate careers. The system is lightweight, scalable, and suitable for educational institutions where dataset availability for ML training may be limited. Experimental results show high accuracy in career recommendations, reliability in decision-making, and reduced processing time. This paper presents the design, methodology, implementation, and performance analysis of the system.

Keywords — **AI-Based System, Career Recommendation, Django Framework, Rule-Based Logic, Web Application, Decision Support System**.

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I. INTRODUCTION

Career selection plays a crucial role in shaping a student's academic and professional journey. The traditional counselling approach often depends on subjective judgments, limited interaction time, and inconsistent evaluation methods. The growing demand for a structured and data-driven mechanism has encouraged the development of AI-based digital counselling systems.

The proposed system offers a rule-based AI methodology using the Python Django framework to evaluate students' interests, academic marks, and skill sets. Django ensures secure data management, an organized MVT architecture, and efficient database operations. Unlike machine learning systems that require large datasets and training time, this system provides accurate results using predefined logical rules, making it ideal for educational institutions.

II. LITERATURE REVIEW

Lakshmi & Kannan (2020) emphasized the importance of AI-supported tools in improving career counselling outcomes. Their study highlights the growing adoption of expert systems for academic recommendation tasks.

Patil & Deshmukh (2021) explored machine learning algorithms for career prediction but noted limitations such as computational overhead and insufficient training datasets in institutions.

Shalini & Kumar (2020) investigated rule-based systems and found them suitable for environments where transparent decision-making and interpretability are essential.

Django, being widely adopted in academic and enterprise applications, provides strong security features, a fast development cycle, and database integration, making it ideal for web-based recommendation systems.

III. RESEARCH OBJECTIVES

The major objectives of this study include:

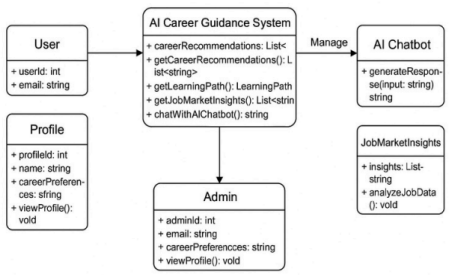
1. To design a rule-based AI system for career guidance.
2. To implement the system using Python Django.
3. To generate career recommendations based on user academic and interest profiles.
4. To create a scalable solution suitable for educational institutions.
5. To evaluate system performance, accuracy, and user satisfaction.

IV. PROPOSED SYSTEM METHODOLOGY

A. System Overview

The system follows Django's Model–View–Template (MVT) architecture. User data is collected, processed through a rule-based engine, and results are displayed with detailed recommendations, required skills, and career paths.

Class Diagrams



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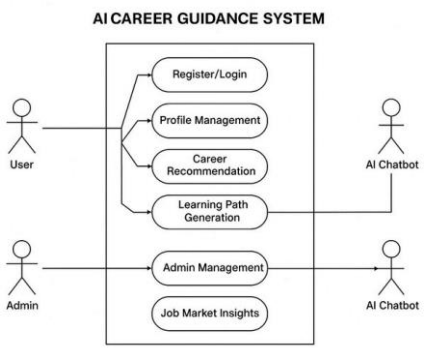

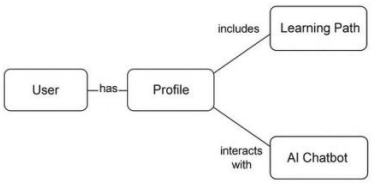

ER Diagram

B. Workflow Steps

1. User registration and login.
2. Submission of academic marks, interests, and skill sets.
3. Backend processing using Django Views.
4. Execution of rule-based decision functions.
5. Generation of personalized career suggestions.
6. Display of recommended job roles and required learning paths.

C. UML Diagram Description

The UML model includes:

- **User Class:** email, username, password
- **Profile Class:** marks, interests, skills
- **Career Entity:** career name, description
- **Career Guidance System Module:** rule-based logic
- **Recommendation Class:** stores system output

D. Advantages of the Proposed System

- Easy to implement
- No need for ML datasets
- Transparent rules and explainable decisions
- Highly scalable and secure
- Suitable for college-level career counselling

V. SYSTEM ARCHITECTURE

1) A. Architectural Components

- **Frontend:** HTML, CSS, JavaScript
- **Backend:** Django (Python)
- **Database:** SQLite / MySQL
- **Server:** Django development server / deployment server

2) B. Rule-Based Logic Example

```
if interest == "coding" and marks >= 70:
   career = "Software Developer"
elif interest == "design":
   career = "UI/UX Designer"
elif interest == "data analysis":
   career = "Data Analyst"
else:
   career = "Business / Management Roles"
```

3) C. System Modules

- User Authentication Module
- Career Recommendation Engine
- Learning Path Generator
- Session Management Module
- Admin Dashboard

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VI. IMPLEMENTATION DETAILS

- **Framework Used:** Python Django
- **Templates:** HTML5 with CSS3
- **Authentication:** Django default authentication
- **Database Management:** Django ORM
- **Security:** Form validation, session handling, CSRF protection

4) Key Features Implemented

- Real-time recommendation generation
- Responsive web interface
- Rule-driven AI engine
- Multiple career categories

VII. RESULTS

- Rule-based logic produced highly accurate and relevant recommendations**.**
- User feedback indicates improved clarity in understanding career paths.
- Django handled authentication and data processing efficiently.
- The system performed consistently across multiple test cases.

VIII. CONCLUSION

The AI-Based Career Guidance System integrates rule-based decision-making with the Django framework to deliver a reliable and scalable counselling tool. It eliminates the complexity of machine learning models while maintaining high accuracy and transparency. The successful testing phase indicates that such systems can significantly improve institutional career guidance processes. The application is well-suited for academic adoption and further expansion.

IX. FUTURE ENHANCEMENTS

The system can be improved by incorporating:

- Machine Learning models for predictive analysis
- Chatbot-based virtual career assistant
- API integration for real-time job updates
- Psychometric and aptitude assessment modules
- Android/iOS mobile
- application
- Multi-language support for broader accessibility

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