Project Synopsis

# AI-Based Internship Recommendation Engine for PM Internship Scheme

## 1. Objective

The objective of this project is to design and develop an AI-powered recommendation engine that connects students with the most suitable internships under the PM Internship Scheme. The system will analyze student profiles, skills, academic records, and preferences to recommend internships that align with their career aspirations, thereby enhancing employability and bridging the gap between students and industry opportunities.

## 2. About the Project

The PM Internship Scheme aims to provide opportunities for students to gain real-world industry experience. However, students often face difficulties in finding internships that match their skills and career goals.  
This project proposes an AI-based Recommendation Engine that:  
- Automates the matching process.  
- Uses machine learning and NLP to understand both student profiles and internship descriptions.  
- Provides a personalized internship recommendation system to students and ensures fair opportunities.

## 3. Key Features

- Student Profile Management – Students can create and update their academic & skill profiles.  
- Internship Database – Collection of internships from verified organizations under the PM scheme.  
- AI-Based Recommendations – Personalized suggestions using ML & NLP.  
- Search & Filter – Advanced search by domain, location, duration, stipend.  
- Feedback & Ratings – Continuous improvement of recommendations through user feedback.  
- Admin Dashboard – For government/college authorities to monitor student engagement.

## 4. Technology Stack

- Frontend: React.js, Tailwind CSS, Bootstrap  
- Backend: Django (Python) / Node.js with Express.js  
- Database: PostgreSQL (structured data), MongoDB (unstructured data)  
- AI/ML: Scikit-learn, TensorFlow/PyTorch, Hugging Face Transformers (NLP)  
- Authentication & Security: OAuth 2.0, JWT, SSL/HTTPS  
- Deployment: AWS / Azure Cloud, Docker, Kubernetes  
- Search Optimization: Elasticsearch

## 5. Methodology

1. Data Collection – Student details, skills, academic records, internship listings.  
2. Data Preprocessing – Cleaning, standardization, and encoding of data.  
3. Model Development –   
 - Content-Based Filtering: Matching skills with internship requirements.  
 - Collaborative Filtering: Recommendations based on similar students’ preferences.  
 - Hybrid Model: Combination of both approaches for higher accuracy.  
4. NLP Integration – Analyze resumes and internship descriptions.  
5. System Development – Building frontend, backend, and API connections.  
6. Deployment & Testing – Deploy on cloud and test with real student data.

## 6. Flow Chart

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 │ Student Profile │  
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 ┌───────▼─────────┐  
 │ Data Preprocess │  
 └───────┬─────────┘  
 │  
 ┌───────▼─────────┐  
 │ AI Model (ML + │  
 │ NLP Engine) │  
 └───────┬─────────┘  
 │  
 ┌───────▼─────────┐  
 │ Recommendation │  
 │ Engine │  
 └───────┬─────────┘  
 │  
 ┌───────▼─────────┐  
 │ Internship List │  
 │ + Ranking Score │  
 └───────┬─────────┘  
 │  
 ┌───────▼─────────┐  
 │ Student Selects │  
 │ & Applies │  
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## 7. Uniqueness and Difference

- Unlike traditional job portals, this system is tailored for the PM Internship Scheme.  
- Uses AI-driven personalized recommendations rather than generic listings.  
- Hybrid Recommendation Engine ensures accuracy and fairness.  
- Government/college integration makes it more authentic and trustworthy.

## 8. Expected Outcomes

- Efficient and fair allocation of internships to eligible students.  
- Reduced manual effort for authorities and students.  
- Increased student employability through skill-matched internships.  
- Transparent system for tracking internship applications and outcomes.

## 9. Future Scope

- Integration with National Career Service (NCS) portal.  
- Mobile application for wider accessibility.  
- AI-based career guidance and skill gap analysis.  
- Expansion to include international internship opportunities.  
- Integration of Blockchain for verified certification of internships.

## 10. References

- Research papers on AI-based recommendation systems (IEEE, Springer).  
- Official PM Internship Scheme guidelines.  
- Documentation of Scikit-learn, TensorFlow, Hugging Face.  
- Government of India education & skill development initiatives.