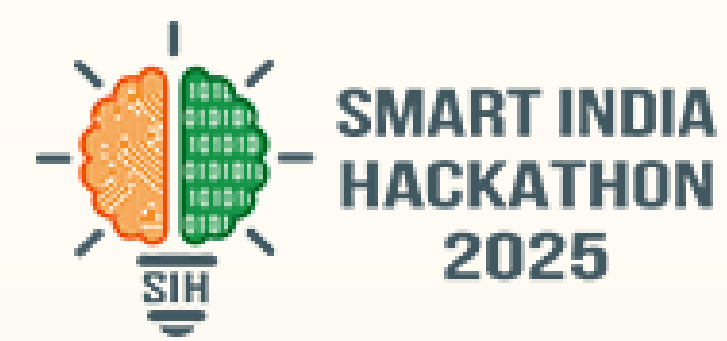
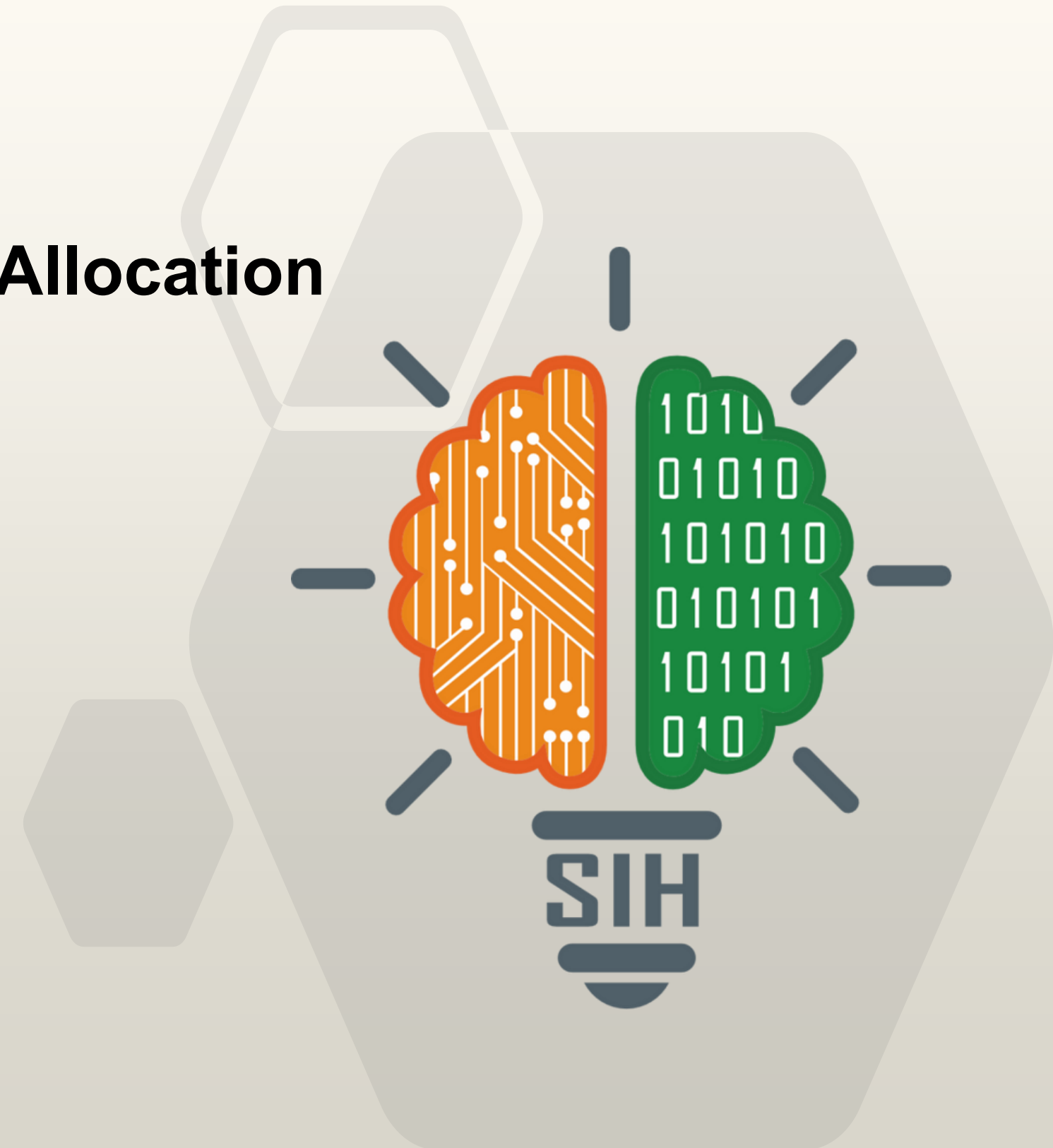


# SMART INDIA HACKATHON 2025

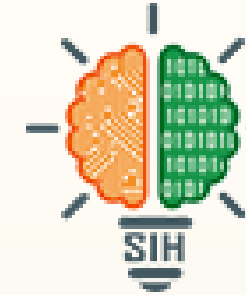


- **Problem Statement ID – 25033**
- **Problem Statement Title- AI- Based Smart Allocation Engine for PM Internship Scheme**
- **Theme- Smart Automation**
- **PS Category- Software**
- **Team ID-**
- **Team Name - Innovatrix**





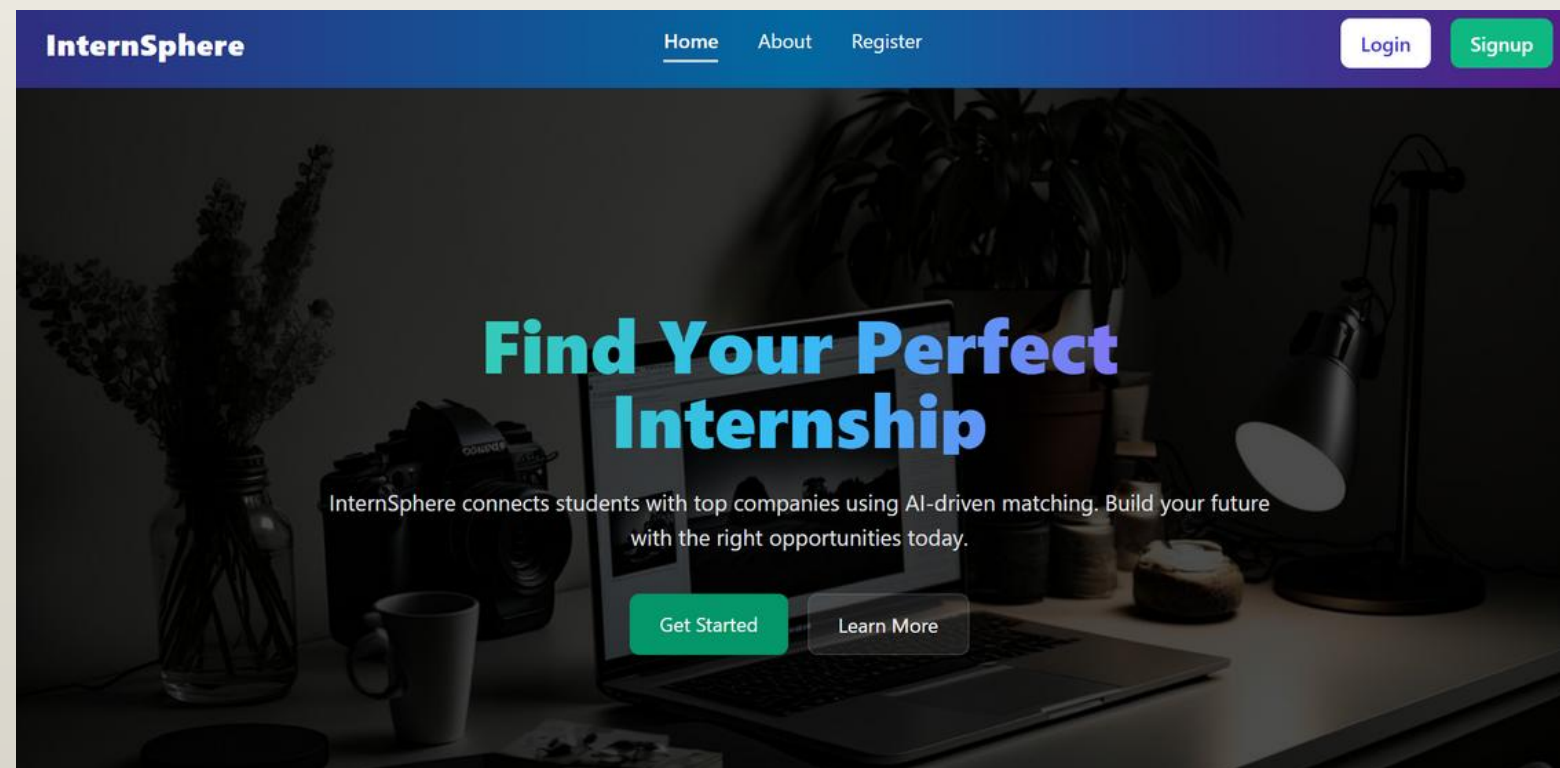
# INTERNSPHERE



SMART INDIA  
HACKATHON  
2025

## WHERE DID THE IDEA COME FROM?

Students struggle with **manual, biased internship systems**; recruiters get **irrelevant applications** and face **vacant slots**; universities/governments **run slow, unfair allocation schemes**. **INTERNSPHERE** uses the **Gale–Shapley Stable Matching Algorithm** plus modern **AI/NLP scoring** to provide a **fair, transparent, and system-wide optimal internship placement solution**.



**INTERNSPHERE** is an AI-powered internship matchmaking platform designed to **eliminate inefficiencies in the PM Internship Scheme by ensuring fair, optimal, and timely placements for all students**.

## PROPOSED SOLUTION:

**INTERNSPHERE:** a smart, automated platform that tackles delays and suboptimal selections in the PM Internship Scheme, ensuring efficient student–opportunity matching.

- Its **AI Scoring Engine** calculates a Compatibility Score for each student–internship pair based on:
  - Skill similarity (NLP & cosine similarity)
  - Academic performance (CGPA thresholds)
  - Location proximity
  - Diversity & preference bonuses
- The **Allocation Engine** then applies the **Gale–Shapley** stable matching algorithm to ensure **fair distribution, no vacant slots**, and **stable pairings** satisfying both students and recruiters.

**Benefits:** Students get AI-powered internship recommendations tailored to skills, CGPA, location, and preferences; recruiters receive automatically ranked, best-fit candidate shortlists.

### FOR STUDENTS

AI-Powered  
Recommendations

Top Match Card

Application Dashboard

Skill Gap Insights

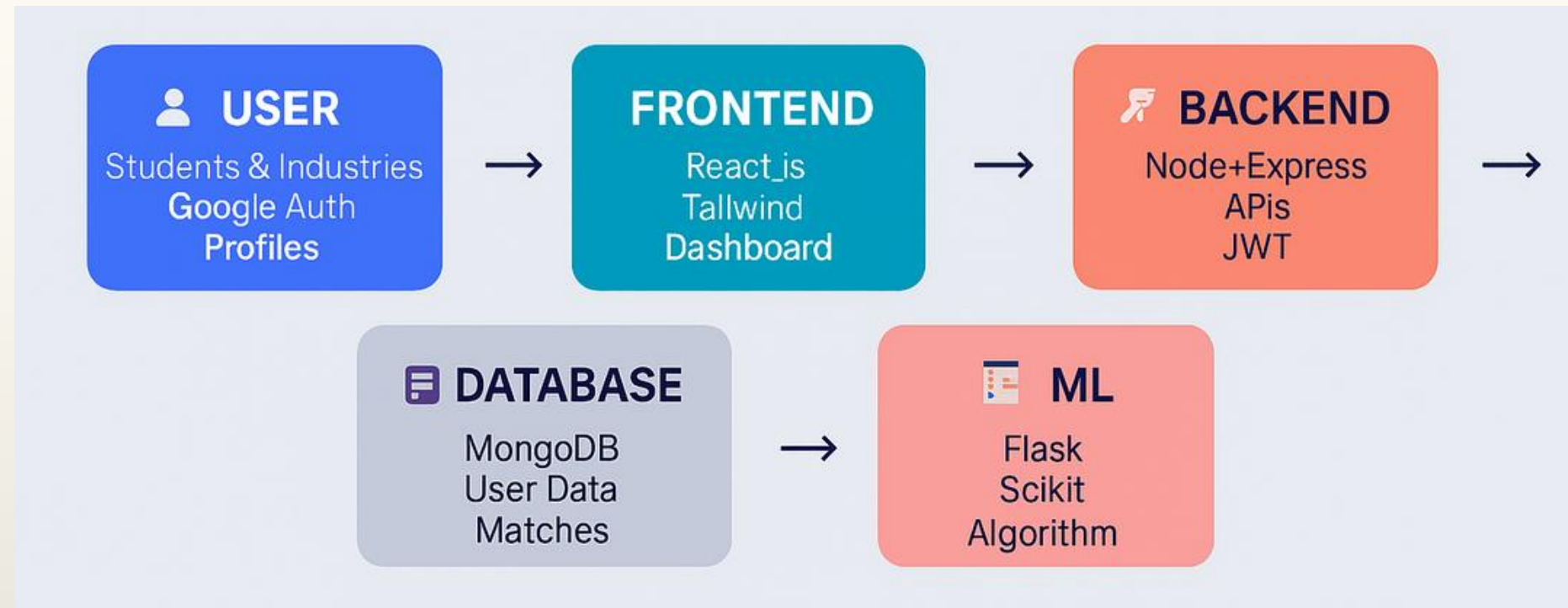
### FOR RECRUITERS

Smart Candidate Filtering

Multi Slot Allocation

Diversity Boost

Recruiter Dashboard



**⚡ Tech**

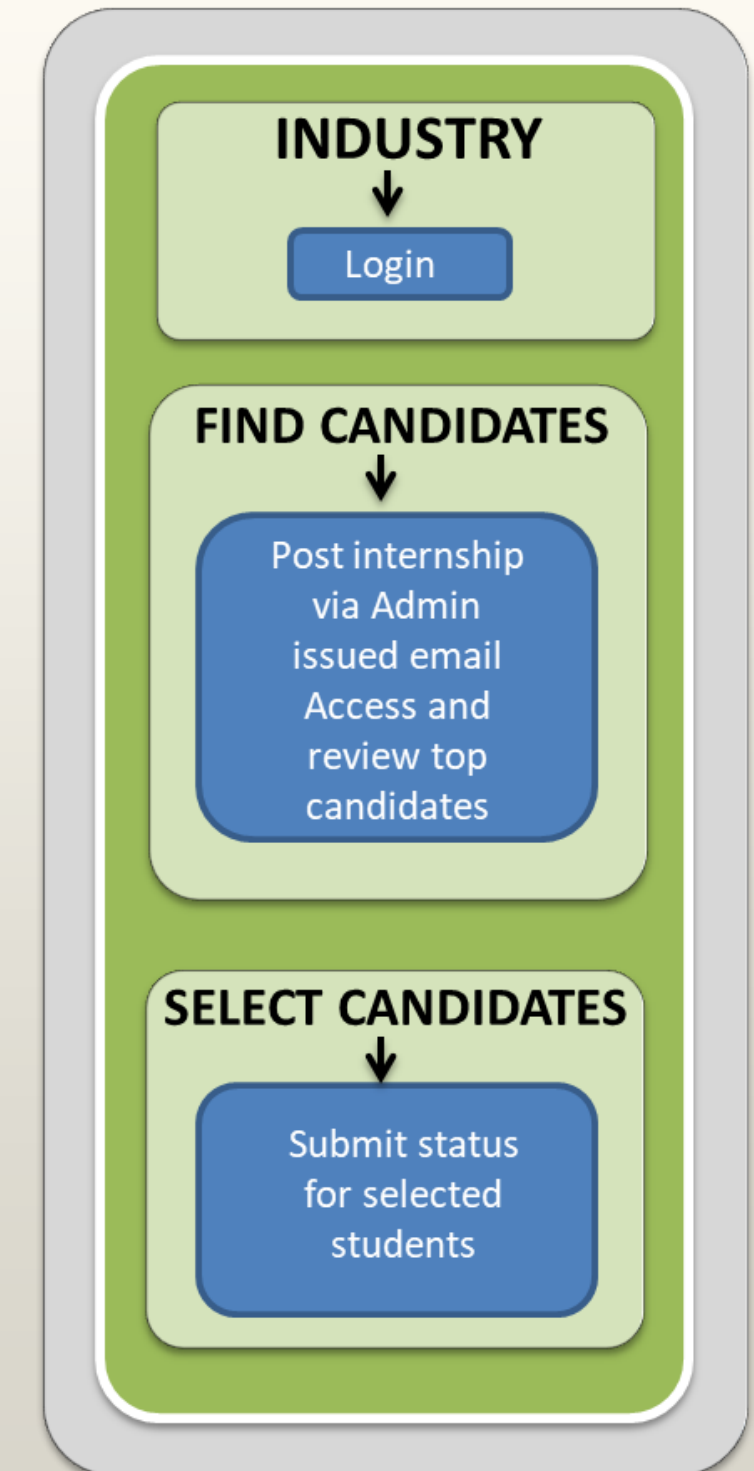
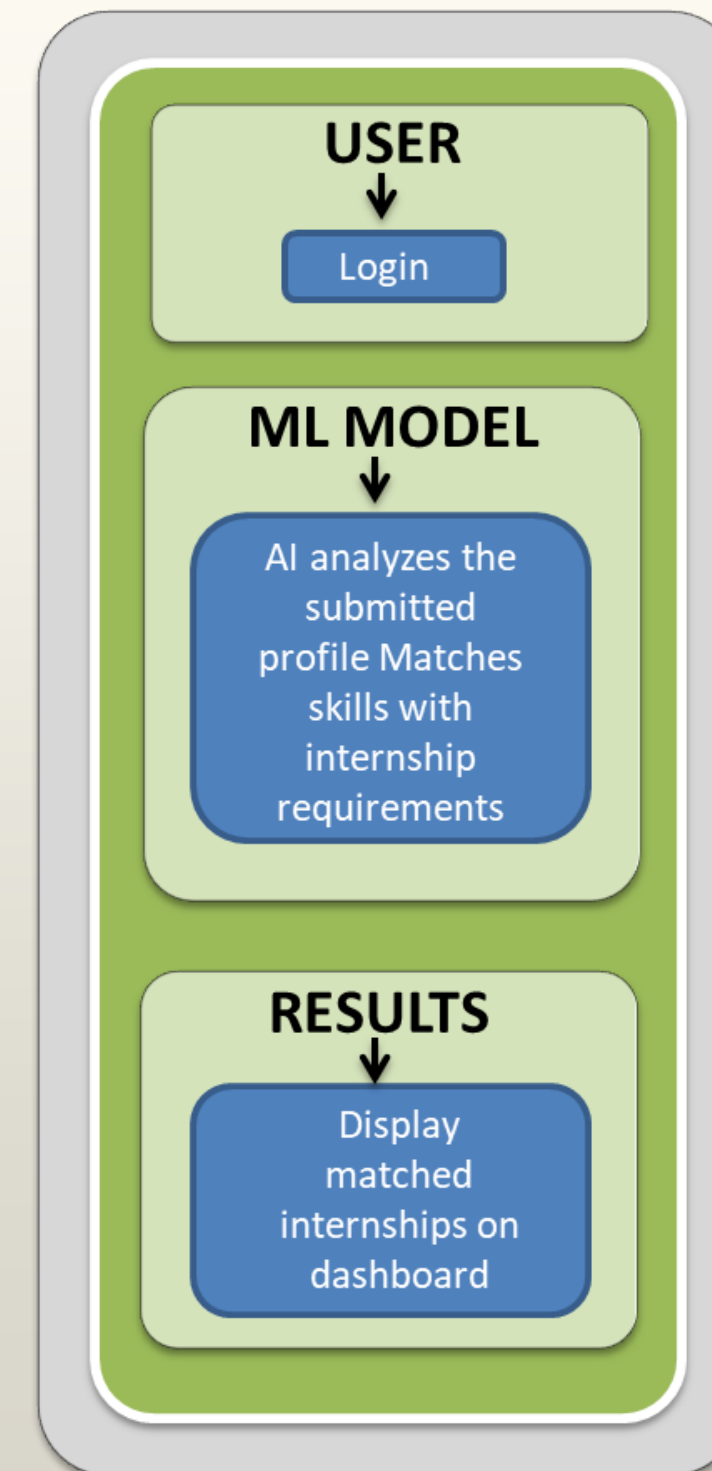
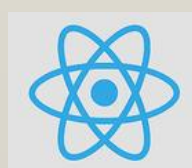
- ▶ React, Tailwind, Vite
- ▶ Node, Express
- ▶ MongoDB Atlas
- ▶ Flask, Scikit
- ▶ JWT

**⚡ Features**

- ▶ AI skill match
- ▶ Location prefs
- ▶ CGPA weight
- ▶ Realtime UI
- ▶ Secure auth
- ▶ Scalable arch

**⚡ Process**

- ▶ User signup
- ▶ Data stored
- ▶ ML matches
- ▶ Dashboard
- ▶ API updates
- ▶ Secure flow





## Feasibility



**Technical Feasibility:** MERN Stack with Python AI ensures **reliable, maintainable development**. React.js + Tailwind provide a **responsive, scalable UI**. Node.js + Express + MongoDB handle large datasets and real-time APIs. TF-IDF & Gale-Shapley simplify AI integration. Microservices enable **independent, scalable, and easy-to-maintain AI engine**.



**User-Friendly Platform & Guided Onboarding:** Step-by-step onboarding, dashboards for students and companies, **smooth profile** creation, application tracking, real-time notifications, and support.



**Efficient & Transparent Matchmaking:** Automated allocation reduces manual work and errors, while explainable AI ensures fair distributions. Analytics dashboards, role-based access, in-platform feedback, “Match Insights,” and progress trackers enhance monitoring, privacy, and user engagement.



**Proven Economic & Social Impact:** Speeds up placements, improves outcomes, ensures equity, and provides data-driven insights for policy improvement and stakeholder reporting.

## Challenges & Solutions

### Scalability

As the number of users grows to thousands, the matchmaking process could become computationally intensive  
 Solution : The micro service architecture allows us to scale the Python AI service independently on a powerful cloud server. The matchmaking can be run as a scheduled "batch job" during off-peak hours.

### Data Quality

The AI's accuracy is directly dependent on the quality and completeness of the profiles submitted by students and industries  
 Solution : Implement a "Profile Completion" score on the user dashboard to incentivize users to provide complete and accurate data

### Algorithm Tuning

The weights used in the scoring engine (skills: 0.5, sector: 0.3, etc.) may need to be adjusted over time for the best results. Solution: The scoring weights can be exposed on a secure admin panel, allowing an administrator to fine-tune the algorithm's behavior without needing to change the code.

## OUR AUDIENCE:

### STUDENTS / INTERNS



**Role:** Primary users seeking internships

**Responsibilities & Interactions:** Students create and maintain detailed profiles including skills, education, location, and sector preferences. They fill their respective form and submit the application with all relevant details, receive AI-generated top match allocations, can accept or reject allocated opportunities (if permitted), and provide feedback or ratings after completing internships.

### COMPANIES / INDUSTRY PARTNERS



**Role:** Internship providers seeking suitable candidates

**Responsibilities & Interactions:** Providers post internship opportunities with detailed requirements such as skills, duration, and location. They review AI-suggested candidate matches, accept or reject suitable candidates, and provide performance feedback to help improve the AI scoring system.

### ADMINISTRATORS/GOVT. OFFICIALS



**Role:** Administrators overseeing the PM Internship Scheme

**Responsibilities & Interactions:** Administrators monitor the overall allocation process, run batch matching using the AI allocation engine, and adjust scoring weights or criteria as needed. They analyze placement reports, diversity metrics, and success rates, while ensuring data privacy and compliance with regulations.

## BENEFITS:

### Equitable and Fair Allocation:

Internsphere's AI-driven allocation ensures that opportunities are distributed fairly across all students, preventing favoritism or bias toward a few high-profile candidates.

### For Government / Scheme Administrators:

The platform maximizes **return on investment** by ensuring a higher rate of successful placements. Efficient allocation reduces administrative overhead and improves the overall performance metrics of the PM Internship Scheme

### For Students:

Faster placement into relevant internships reduces the time and effort spent searching for opportunities. Better matches lead to a higher likelihood of meaningful work experience, improving career readiness and future employability.

### For Industries:

Companies receive a pre-vetted list of candidates, saving time and cost in the hiring process. Higher-quality matches increase intern retention and productivity, reducing turnover and onboarding costs.

## **Gale-Shapley Algorithm (Stable Marriage Problem)**

- Basis for our allocation engine.
- Guarantees a stable matching where no student-company pair would prefer each other over their assigned match.
- Widely applied in school placements, medical residency programs, and resource allocation.
- Reference: D. Gale & L.S. Shapley, "College Admissions and the Stability of Marriage", The American Mathematical Monthly, 1962. [Wikipedia: Stable Marriage Problem](#)

## **TF-IDF (Term Frequency–Inverse Document Frequency):**

- Standard NLP technique for feature extraction and text similarity.
- Used in our system for comparing student skills with internship requirements.
- Reference: Manning, Raghavan & Schütze, Introduction to Information Retrieval, Cambridge University Press, 2008. Scikit-learn Documentation: [TF-IDF Vectorizer](#)

## **Cosine Similarity**

- Measures angle-based similarity between two vectors and ensures that skill-matching remains robust even if different wording is used.
- Reference: Han, Kamber, & Pei, Data Mining: Concepts and Techniques, 2011.

## **Microservice Architecture:**

- Separation of concerns allows independent scaling of the AI allocation engine.
- Ensures modularity, maintainability, and deployment flexibility.
- Reference: Sam Newman, Building Microservices: Designing Fine-Grained Systems, O'Reilly Media, 2015.

 [Microsoft Azure Microservices Guide](#)

## **Authentication and Security (JWT & bcrypt):**

- JSON Web Tokens (JWT) ensure secure, stateless user sessions and bcrypt provides strong password hashing, preventing data breaches.
- Reference: [Auth0 Blog: Introduction to JSON Web Tokens](#)

## **PM Internship Scheme Context:**

- Government of India's ongoing initiatives focus on equitable internship opportunities for students.
- Our system aligns with this mission by using AI to ensure fairness and transparency in allocation.
- Reference: Government of India – Internship Schemes Portal.