# **PathFinder AI - Project Documentation**

PathFinder AI is a web-based career guidance application designed to help Masters students decide between pursuing a PhD or entering industry. The application uses AI-powered analysis through the Hugging Face API to provide personalized recommendations based on user responses to a comprehensive assessment.

## **Problem Statement**

Masters students often face uncertainty when choosing between continuing in academia (PhD) or transitioning to industry careers. This decision involves multiple factors including academic performance, research experience, personal motivations, and career goals. PathFinder AI addresses this challenge by providing data-driven, personalized recommendations.

## **Solution Overview**

The application consists of:

* **Frontend:** React-based single-page application with 6-step assessment form
* **Backend:** FastAPI REST API server with AI integration
* **AI Integration:** Hugging Face Transformers API for natural language processing

## **Technical Architecture**

### **Technology Stack**

**Backend:**

* Python 3.8+
* FastAPI (web framework)
* Pydantic (data validation)
* Requests (HTTP client)
* Hugging Face API (AI service)

**Frontend:**

* React 18
* Axios (HTTP client)
* CSS3 (styling)

### **System Components**

1. **Assessment Module:** Collects user data through structured forms
2. **API Layer:** RESTful endpoints for data processing
3. **AI Integration:** Connects to Hugging Face for recommendation generation
4. **Results Display:** Shows and allows editing of AI recommendations

## **Implementation Details**

### **Backend Structure**

The backend (main.py) provides three main endpoints:

GET / # API information

GET /health # Health check

POST /api/v1/analyze # Process assessment and return AI recommendation

Key data models:

* Academic Profile: GPA, research papers, thesis status
* Experience Profile: Internships, research, teaching
* Motivations: Reasons for PhD/Industry preference
* Workstyle: Environment and project preferences

### **Frontend Flow**

The React application (app.js) for the logic and (app.css) for the styling of the UI.

### **AI Integration**

The application creates contextual prompts for the Hugging Face API:

def create\_ai\_prompt(assessment: CareerAssessmentRequest) -> str:

# Builds detailed prompt with user profile

# Returns formatted string for AI model

The AI response is parsed into:

* Primary recommendation (PhD/Industry/Both)
* Detailed analysis with actionable insights

### **ADDITIONAL KEY POINTS**

### **No Authentication**

Reduces friction for users, enables quick access

### **Simplified Results**

Cleaner interface, easier to understand

### **Fallback Mechanism**

Generic recommendations if AI fails and application remains functional even with API issues

## **Testing Approach**

### **Unit Testing :** Backend endpoints tested with test\_main.py

### **Integration Testing :** End-to-end flow from form submission to AI response and Error handling for network failures

### **Manual Testing:** UI/UX testing across different browsers

## **Conclusion**

PathFinder AI successfully demonstrates an MVP approach to AI-powered career guidance. The application provides immediate value to users while maintaining simplicity in design and implementation.