### **Project Brief: Robo Advisor for Portfolio and Tax Management**

#### **Project Title**

Building an Intelligent Robo Advisor for Investment Portfolio Analysis and Tax Law Consultation

#### **Project Description**

This project involves developing a multi-functional Robo Advisor capable of:

1. Managing and analyzing user investment portfolios using financial metrics and modern portfolio theory.
2. Providing actionable investment insights using AI-powered analysis.
3. Consulting on tax-related queries by integrating retrieval and generative AI techniques.

The system integrates user-friendly interfaces for portfolio updates, comprehensive portfolio evaluations, and AI-driven tax advisory services. It leverages cutting-edge libraries like yfinance, langchain, and OpenAI’s GPT-4 for seamless functionality.

#### **Objectives**

1. **Portfolio Management and Analysis**:  
   * Allow users to save and update their portfolios with asset details, including stock names, units, and average cost.
   * Analyze historical stock performance and calculate metrics like expected returns, covariance, and asset-specific statistics.
   * Generate comprehensive portfolio reports with actionable investment recommendations using LLMs.
2. **Tax Consultation**:  
   * Enable users to query specific tax-related concerns using an ensemble of retrieval-based and generative models.
   * Provide concise, legally grounded answers by processing documents such as tax law PDFs.
3. **User-Centric Design**:  
   * Ensure the system is intuitive and interactive, catering to users with minimal financial or technical expertise.

#### **Features**

1. **Portfolio Management**:  
   * Store user-specific portfolios securely in a structured format.
   * Support CRUD operations for user assets.
   * Fetch live market data using yfinance to track stock performance.
2. **Portfolio Analysis**:  
   * Calculate metrics such as earnings per share (EPS), dividend yield, market cap, and more.
   * Perform risk-return analysis using historical stock prices.
   * Apply Modern Portfolio Theory to recommend optimized portfolios.
3. **Tax Advisor**:  
   * Load and preprocess tax law documents for semantic search.
   * Use ensemble retrieval (BM25 and FAISS) to find relevant sections in the documents.
   * Generate detailed and actionable responses to user queries.
4. **AI Integration**:  
   * Use OpenAI GPT-4o to generate professional insights for investment and legal advisory.

#### **Workflow**

**Step 1: User Inputs Portfolio Data**

* Users provide stock names, units, and average cost through an interactive interface.
* The data is securely stored in JSON files for personalized recommendations.

**Step 2: Portfolio Analysis**

* Fetch historical stock prices and compute key metrics.
* Analyze the portfolio to calculate overall value, gain/loss, expected returns, and risk metrics.
* Use GPT-4 to provide detailed, actionable insights based on user data.

**Step 3: Tax Law Consultation**

* Users ask tax-related questions.
* The system retrieves relevant information from a preloaded tax law document using ensemble retrieval techniques.
* GPT-4 formulates a clear, concise response based on the retrieved content.

#### **Expected Outcomes**

* A functional, user-friendly Robo Advisor that blends finance and AI technologies.
* A portfolio management tool that simplifies complex investment decisions.
* A tax advisory system that delivers accurate and actionable insights.

This project showcases the power of combining retrieval and generative AI, providing a robust solution for financial and legal challenges.