

# MoneyFyi: Agentic Personalized Financial Engine

## 1. Introduction

In India, many individuals especially gig workers and informal sector employees face challenges in managing savings and investments due to irregular income and lack of personalized financial advice.

Generic recommendations do not account for unique financial behaviors, spending patterns, or regional preferences.

To solve this, we propose **MoneyFyi**, an **agent based financial engine** that continuously learns from user data (income, spending, savings, preferences) and dynamically recommends moderate-risk investments such as stocks and mutual funds.

It integrates **financial market data**, **news sentiment analysis**, and **user-specific financial habits** to deliver context-aware, explainable, and adaptive financial recommendations.

## 2. Objectives

- Provide **personalized investment guidance** suited to user income, savings, and risk profile.
- Utilize **AI and NLP models (FinBERT, IndicBERT, RoBERTa)** to analyze market sentiment and news trends.
- Recommend **moderate-risk portfolios** that balance safety and returns.
- Continuously learn from user interactions and feedback to refine future suggestions.
- Offer multilingual interaction and support regional financial contexts across India.

## 3. System Overview

The system integrates multiple data sources user's financial data, market data, and real-time news into a unified architecture.

AI-driven layers process, analyze, and generate recommendations, while a continuous feedback loop ensures self-improvement and personalization over time.

## 4. System Architecture (Layer-wise)

### 4.1 User Interaction Layer

### **Inputs:**

- Age, income, savings, risk tolerance, investment goals.
- Portfolio details (existing investments, allocation).
- User preferences (language, notification type).

### **Functionality:**

- Collects user input securely via a mobile/web interface.
- Supports both English and regional languages (via IndicBERT).
- Output: Structured user profile and financial behavior dataset.

## **4.2 Data Collection Layer**

### **Sources:**

- User Portfolio Data: Asset allocation, transaction logs.
- Market Data: Stock prices, mutual fund NAVs, historical trends.
- News & Social Data: Financial headlines, social media sentiment.
- Macro-economic Data: GDP, inflation rates, RBI policy updates.

**Goal:** Aggregate all data sources into a unified, structured dataset ready for processing by- AI Agents.

## **4.3 Data Preprocessing Layer**

### **Tasks:**

- Data cleaning and normalization.
- Encoding categorical values (risk category, investment type).
- Text preprocessing: tokenization, stopword removal, lemmatization.

**Output:** Clean, model-ready numerical and textual data pipeline for all downstream Agents.

## **4.4 Feature Engineering Layer**

### **Financial Features:**

- Savings,risk profile, transaction frequency, portfolio diversification.

## Market Features:

- Sector trends, stock performance, volatility measures.

## Text Features:

- Sentiment scores (FinBERT, IndicBERT).
- Key entity extraction (company names, economic keywords).

**Purpose:** Build a unified feature set combining numerical, temporal, and linguistic insights.

## 4.5 Agentic Sentiment Analysis Layer

Agent	Description
FinAgent (powered by FinBERT)	Extracts English financial news sentiment, market tone, and contextual triggers.
IndicAgent (powered by IndicBERT)	Analyzes multilingual Indian news and regional-language feedback for financial sentiment.
InsightAgent (powered by RoBERTa)	Handles user intent, general NLP tasks, and contextual understanding in chat interactions.
VoxAgent (powered by VoxMind ASR)	Converts vernacular voice input to text, enabling inclusive, speech-based interaction.

**Output:** Sentiment and context scores that influence portfolio rankings and recommendations.

## 4.6 Predictive Modeling Layer

### Agents used:

**TrendAgent (LSTM/Transformer):** Forecasts stock and mutual fund price patterns.

**ARIMAAgent :** Predicts market volatility and seasonal changes.

**FusionAgent:** Merges numeric forecasts with sentiment scores and user risk data.

**Function:** Combine predictions and behavioral inputs to identify moderate-risk investment opportunities aligned with affordability and sentiment trends.

## 4.7 Recommendation Engine

**Core Role:** Generate and prioritize personalized investment recommendations.

**Inputs:** Model predictions, sentiment scores, user savings, and affordability.

**Outputs:**

- Stock and mutual fund suggestions.
- Explanations: “Suggested due to positive news trend and stable price movement.”
- Portfolio optimization: risk-balanced diversification.

**Logic:** Reinforced by feedback adapts based on user decisions and success rate.

## 4.8 Output Layer

**Dashboard Insights:**

- Personalized recommendations, risk score, and financial health overview.
- Trending stocks/funds suitable for the user’s profile.

**Alerts:**

- Price triggers and news-based alerts.

**Reports:**

- Historical portfolio comparison, predicted returns, and growth analysis.

## 4.9 Feedback Loop Layer

**Functionality:**

- Tracks user interactions (accept, reject, ignore recommendations).
- Measures investment outcomes to assess success.
- Retrains models periodically for improved personalization.

**Learning Process:**

- Reinforcement learning approach adjusts weights based on behavioral data.
- Updates both predictive and recommendation models regularly.

## 4.10 Technology & Security Layer

- **Backend:** Python (FastAPI / Flask).
- **Frontend:** React.js / Next.js dashboard.
- **Database:** MongoDB or Supabase.
- **Security:** AES-256 encryption, JWT authentication for user data protection.
- **Scalability:** Modular microservices architecture separate models, APIs, and dashboards for efficiency.

## 5. Key AI Agents Used

Agent	Core Function
<b>FinAgent (FinBERT)</b>	Extracts English financial sentiment and market signals.
<b>IndicAgent (IndicBERT)</b>	Understands regional languages and multilingual finance sentiment.
<b>InsightAgent (RoBERTa)</b>	Handles NLP comprehension and dialogue understanding.
<b>TrendAgent (LSTM/Transformer)</b>	Predicts stock and mutual fund trends.
<b>VoxAgent (VoxMind ASR)</b>	Converts vernacular voice input into text with high accuracy.
<b>FusionAgent (Reinforcement Learning)</b>	Merges predictions, user behavior, and sentiment for adaptive recommendations.

## 6. Example Recommendation Scenarios

User Context	Agent Insight	Recommendation
Monthly savings ₹10,000	TrendAgent detects moderate income flow	Suggest SIPs in balanced mutual funds
Positive sentiment in IT sector (FinAgent)	Bullish news and strong returns	Allocate small share to Infosys/HCL
Negative regional sentiment in banking (IndicAgent)	Downtrend risk	Reduce exposure to banking stocks
User rejects risky picks repeatedly	FusionAgent adapts	Shift to stable, low-volatility funds

## 7. Expected Outcomes

- Smarter, explainable, and adaptive financial advice.
- Better user engagement through personalized dashboards.

- Increased investment literacy in regional language users.
- Dynamic, real-time updates based on financial headlines and sentiment.

## ***8. Future Enhancements***

- *Voice-based AI assistant in Indian languages.*
- *Integration with UPI, Paytm Money, Zerodha, and mutual fund APIs.*
- *Advanced risk-profiling using psychological and behavioral data.*
- *Inclusion of crypto or ESG funds for diversified portfolios.*

## ***9. Conclusion***

**MoneyFyi** brings a significant transformation towards financial decision making through **Agentic-AI** collaboration where each specialized agent (language, sentiment, forecasting, or reinforcement) contributes to a unified, personalized financial advisor ecosystem.

By leveraging agents like **FinAgent**, **IndicAgent**, and **VoxAgent**, the system provides multilingual, explainable, and adaptive recommendations that help users even with limited financial literacy or irregular income and hence invest confidently, safely, and smartly.

# Architecture Diagram

