



# Product Requirements & Specification Document

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## Project Name

TrendPilot - AI Market Sentiment Explorer

## Description

TrendPilot is a platform leveraging generative AI to analyze and summarize market sentiment from news, social media, and financial reports. It enables finance professionals and researchers to explore trends, generate custom insights, and visualize sentiment shifts over time. The platform features real-time data ingestion, interactive dashboards, and secure user profiles.

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## 1. Goals & Objectives

Goal	Description
Market Sentiment Analysis	Aggregate and analyze sentiment from multiple data sources
Custom Insights Generation	Allow users to generate AI-driven, tailored market insights
Trend Visualization	Visualize sentiment trends and shifts over time
Real-Time Data Processing	Ingest and process data streams in near real-time
Secure User Management	Provide secure, role-based user profiles

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## 2. Target Users

User Type	Needs/Use Cases
Finance Professionals	Market monitoring, risk assessment, investment ideas
Researchers	Data exploration, trend analysis, reporting

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## 3. Core Features

Feature	Description
Data Ingestion	Real-time collection from news, social media, financial reports
Sentiment Analysis (AI)	Generative AI models for summarization and sentiment scoring
Custom Insight Generation	User prompts to generate tailored market insights
Interactive Dashboards	Visualizations: sentiment over time, source breakdown, trend highlights
User Profiles & Security	Registration, authentication, role-based access, data privacy
Search & Filtering	Query by asset, sector, date, sentiment, source



Export & Sharing	Export insights and visualizations (PDF, CSV, image)
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## 4. Functional Requirements

ID	Requirement	Priority
FR1	Ingest data from APIs (news, social, financial reports) in real-time	High
FR2	Store and index data in Elasticsearch for fast retrieval	High
FR3	Apply generative AI models (Python) for sentiment analysis and summarization	High
FR4	Provide React-based dashboards for interactive exploration and visualization	High
FR5	Enable user registration, login, and role-based access control	High
FR6	Allow users to generate custom insights via prompt-based AI interaction	Medium
FR7	Implement search, filtering, and sorting on all data	High
FR8	Support export of insights and visualizations	Medium
FR9	Ensure secure data handling and compliance with privacy standards	High

## 5. Non-Functional Requirements

ID	Requirement	Specification
NFR1	Performance	<2s response time for dashboard load
NFR2	Scalability	Handle 10k+ concurrent users
NFR3	Security	OAuth2, encrypted data at rest
NFR4	Availability	99.5% uptime
NFR5	Containerization	Dockerized deployment
NFR6	Cross-browser Compatibility	Chrome, Firefox, Edge, Safari

## 6. Technical Architecture

Layer	Technology	Description
Frontend	React	Interactive UI, dashboards, user management
Backend	Python (FastAPI)	API, AI processing, business logic
AI/ML	Generative AI (LLMs)	Sentiment analysis, summarization, insights
Data Store	Elasticsearch	Indexing, search, analytics
Containerization	Docker	Deployment, scalability
Auth/Security	OAuth2, JWT	Secure authentication, role management



## 7. Data Flow Overview

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graph TD
  A[Data Sources] --> B[Ingestion Service]
  B --> C[Elasticsearch]
  C --> D[AI Processing (Python)]
  D --> E[API (FastAPI)]
  E --> F[React Frontend]
  F --> G[User]
```

## 8. User Interface (UI) Overview

Page/Component	Key Elements
Dashboard	Sentiment charts, trend lines, filters
Insight Generator	Prompt input, AI-generated summaries
Data Explorer	Search, filter, detailed views
User Profile	Account settings, access management
Export Modal	Export options (PDF, CSV, image)

## 9. Milestones & Timeline

Milestone	Target Date
Requirements & Design Complete	Week 2
Data Ingestion & Storage	Week 4
AI Model Integration	Week 6
Frontend Dashboard MVP	Week 8
User Management & Security	Week 9
Beta Release	Week 10

## 10. Risks & Mitigations

Risk	Mitigation
Data source API changes	Modular ingestion, monitoring, fallback sources
AI model inaccuracies	Human-in-the-loop review, model retraining
Security vulnerabilities	Regular audits, up-to-date dependencies
Scalability bottlenecks	Load testing, auto-scaling, Docker orchestration



## 11. Acceptance Criteria

- Real-time sentiment data available from all sources
  - Accurate, relevant AI-generated summaries and insights
  - Responsive, interactive dashboards with trend visualizations
  - Secure, role-based user access and data privacy
  - Export and sharing functionality operational
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## 12. Out of Scope

- Direct trading or portfolio management features
  - Mobile native applications (web responsive only)
  - Manual data entry by users
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**End of Document**