

SAP Stocks - AI-Driven Stock Market Sentiment Analysis

1. Project Overview

SAP Stocks is an advanced AI-powered platform designed to support stock market traders by delivering real-time sentiment analysis of financial news. The stock market is highly dynamic, with news and social media influencing trading decisions. However, traders often face challenges such as information overload, delayed decision-making, and misinterpretation of financial data.

To address these challenges, SAP Stocks integrates cutting-edge AI models, blockchain-based news verification, and a dummy trading platform to help traders make informed decisions while mitigating emotional biases. This fintech innovation ensures that traders receive actionable insights, real-time sentiment classification, and fraud-resistant news validation.

2. Team Members

SAP Stocks is developed by a dedicated team with expertise in AI, finance, and blockchain:

- Yash Mhaskar
- Parth Magar
- Aaryan Palve
- Uday Bhole

Domain: Fintech

3. Problem Statement

Challenges Faced by Stock Traders

- **Information Overload:** Thousands of financial news articles flood the market daily, making it difficult for traders to extract key insights efficiently.
- **Delayed Decision-Making:** Manual analysis of market sentiment takes time, leading to missed trading opportunities.
- **Lack of Contextual Analysis:** Existing tools rely on keyword-based sentiment analysis, often misunderstanding financial nuances.
- **Emotional Bias in Trading:** Traders make impulsive decisions based on emotions, lacking data-driven decision-making.

- **Fake News & Market Manipulation:** Unverified news can mislead investors, with a lack of transparency in financial media sources.

4. Solution

SAP Stocks offers a robust AI-powered solution to overcome these challenges.

Key Features & Implementation

1. Real-Time Sentiment Analysis

- Utilizes a fine-tuned FinBERT model designed for financial markets.
- Classifies news into Bullish, Bearish, or Neutral sentiment with high accuracy.
- Provides actionable insights from financial news.

2. Instant Market Insights

- A dummy trading platform where users can test trading strategies with integrated sentiment analysis.

3. AI-Powered Chatbot

- Langchain-powered chatbot dynamically answers stock-related queries.
- ChromaDB enables efficient retrieval of relevant market data.

4. Personalized Finance Tools

- Expense tracker for budgeting and investment tracking.
- IPO Calendar & Market Insights to provide up-to-date financial data.

5. Blockchain-Based Fake News Detection

- Implements blockchain technology for verifying financial news sources.
- Users can report and validate suspicious news articles to prevent misinformation.
- Uses IPFS for decentralized storage, ensuring tamper-proof records.
- Ensures transparency in financial reporting and credibility verification.

5. Architecture & Tech Stack

Architecture Diagram

A structured architecture ensuring real-time AI insights, blockchain security, and seamless user experience.

Tech Stack

Frontend:

- React.js / Next.js
- Tailwind CSS / Bootstrap
- Chart.js for market visualization

Backend & AI/ML:

- Flask / FastAPI
- Python (Pandas, NumPy, NLTK, Transformers)
- FinBERT Model (Fine-Tuned for Finance)
- Langchain for AI chatbot
- ChromaDB for data retrieval

Blockchain & Security:

- Ethereum Smart Contracts
- IPFS for decentralized news verification
- Smart contract-based fake news reporting system

Hosting & Deployment:

- AWS / Google Cloud
- Render / Vercel for frontend deployment
- Docker for containerization

6. Competitor Analysis & Unique Selling Propositions (USPs)

Existing Solutions & Limitations

Platform	Features	Limitations
Yahoo Finance	Stock prices, news, basic sentiment analysis	No advanced AI, no blockchain security
TradingView	Technical indicators, stock screening	No AI-based real-time sentiment insights
Bloomberg Terminal	High-quality financial news & analytics	Expensive, no decentralized fake news detection

AlphaSense	AI-powered financial search engine	Enterprise-only, not trader-friendly
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Why SAP Stocks is Different?

- **AI + Blockchain Integration:** First-of-its-kind fake news reporting system powered by blockchain.
- **Real-Time Sentiment Insights:** Uses FinBERT and deep NLP instead of simple keyword-based sentiment analysis.
- **Explainability & Transparency:** Provides interpretable sentiment classifications using attention scores.
- **Dummy Trading Platform:** Allows traders to test their strategies with AI-assisted decision-making.
- **Decentralized Verification:** Stores financial reports on IPFS + Ethereum, ensuring authenticity and security.

7. Use Cases & Historic Events

Use Cases

- **Retail Traders:** Helps individual investors make informed decisions by analyzing stock sentiment in real time.
- **Institutional Investors:** Provides a systematic way to filter market news, reducing reliance on human analysis.
- **Regulatory Bodies:** Helps financial authorities monitor and identify potential market manipulation through sentiment tracking.
- **News Organizations:** Enables financial news publishers to cross-verify sources and ensure content authenticity.

Historic Events Proving Relevance

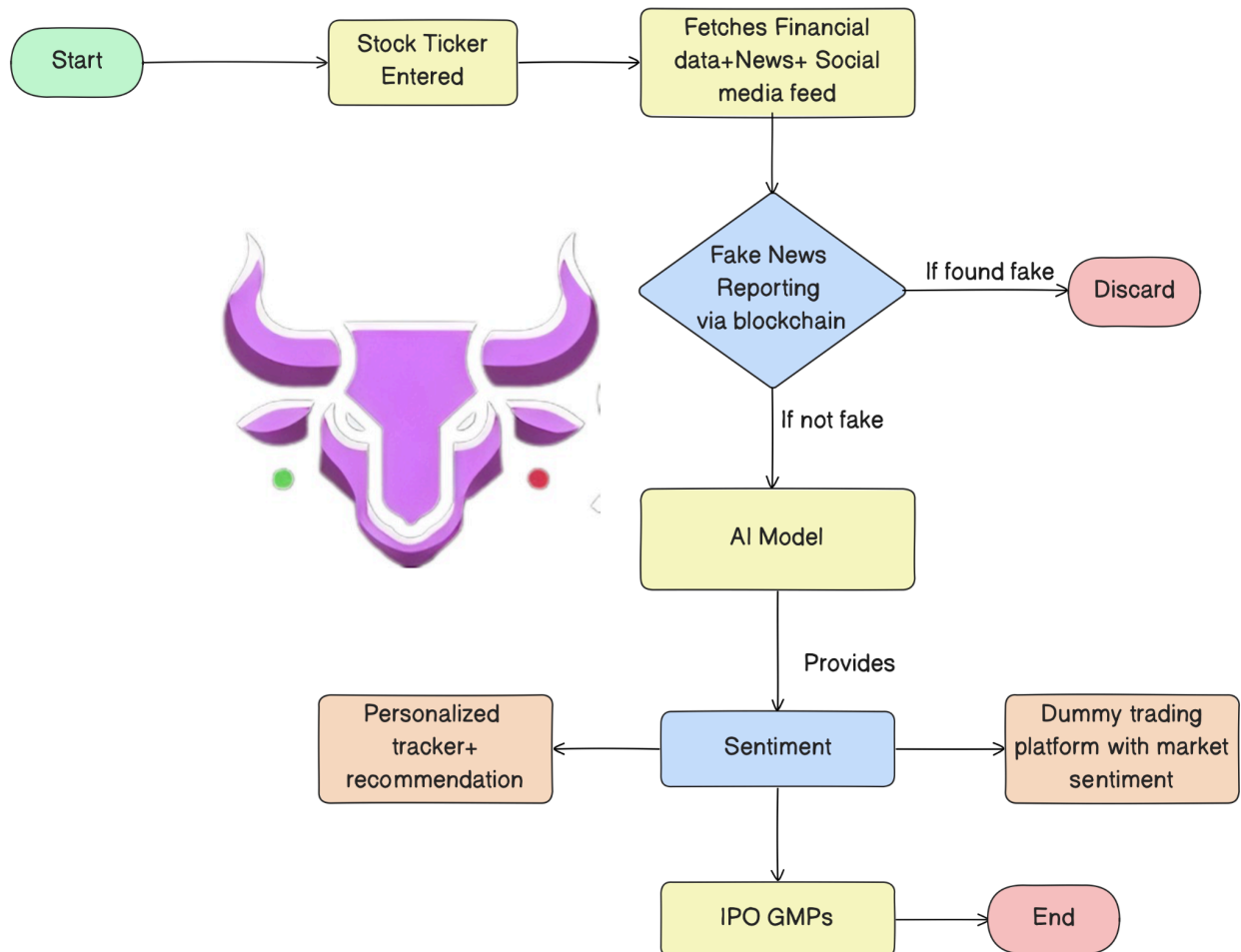
- **2010 Flash Crash:** AI-driven sentiment tracking could have flagged the extreme negative sentiment in real-time, allowing traders to react faster.
- **Elon Musk's Tweets Impacting Tesla Stock (2021):** Our AI-powered sentiment analysis can track social media impact and provide early warnings on sentiment shifts.
- **GameStop Short Squeeze (2021):** SAP Stocks would have detected bullish sentiment surges early.
- **COVID-19 Market Crash (2020):** A blockchain-backed fake news detection system could have helped filter misinformation and provide reliable insights.

8. Research & References

Research Papers Supporting Our Approach

1. **Sentiment Analysis for Financial Markets Using Deep Learning** - [Read Here](#)
 - **Summary:** Explores how deep learning techniques improve sentiment analysis in financial markets.
 - **Inference:** Demonstrates that transformer-based models like FinBERT outperform traditional methods.
 - **Implementation in SAP Stocks:** We fine-tuned FinBERT on financial news data to classify stock sentiments.
2. **Blockchain for Fake News Detection** - [Read Here](#)
 - **Summary:** Examines how blockchain can store and verify news authenticity.
 - **Inference:** Shows that decentralized verification prevents news tampering.
 - **Implementation in SAP Stocks:** We implemented Ethereum smart contracts and IPFS storage for news validation.
3. **Social Media Impact on Stock Prices** - [Read Here](#)
 - **Summary:** Highlights how social media sentiment influences stock price fluctuations.
 - **Inference:** Demonstrates that tracking social media can predict stock market trends.
 - **Implementation in SAP Stocks:** Our AI analyzes news and social media sentiment to provide real-time stock insights.

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9. Conclusion

SAP Stocks aims to revolutionize stock trading by providing AI-driven sentiment analysis, financial insights, and blockchain-based news validation. This project bridges the gap between traditional financial analysis and cutting-edge AI, ensuring that traders can make informed, data-driven decisions.