Financial Modelling Tool

SENTIVIZ

Introduction

This is sentiviz. An AI-assisted **market sentiment** and **options analytics** platform built to help retail traders make more informed decisions.
Retail investors often rely on **fragmented tools** for sentiment tracking, options pricing, market news, and research, which makes **decision-making** inefficient.
Sentiviz solves this by combining **real-time** StockTwits sentiment analysis, **FinBERT NLP** classification, **Black-Scholes** pricing, implied volatility analysis, and an AI market assistant into one unified platform.
I also built a demo mode that uses **mock** options chains generated with **real** Black-Scholes math, making the platform accessible without paid financial APIs.
This poster highlights the system architecture, key features, and technical implementation behind the platform.

Problem Statement

Retail traders increasingly rely on social sentiment & options activity, but most available tools are either fragmented, expensive, or difficult for non-professionals to interpret.

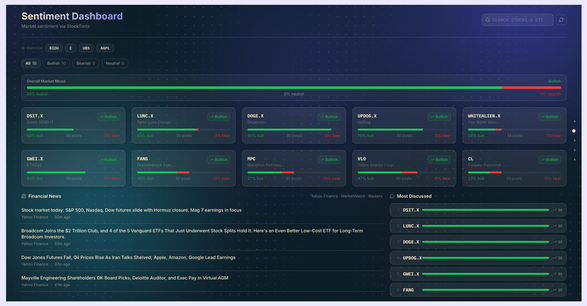
System Workflow

1. **Collect** *(StockTwits posts, market prices, news data)*
↓
2. **Classify** *(FinBERT labels bullish/bearish/neutral sentiment)*
↓
3. **Compute** *(Black-Scholes pricing, Greeks, IV calculations)*
↓
4. **Generate** *(Confidence scoring + AI analysis output)*

Features

Sentiment Dashboard

- Pulls real-time StockTwits posts and applies FinBERT NLP classification to label bullish, bearish, and neutral sentiment.
- Why it matters: converts noisy retail sentiment into structured signals that can be quantified. Comes with confidence scorer



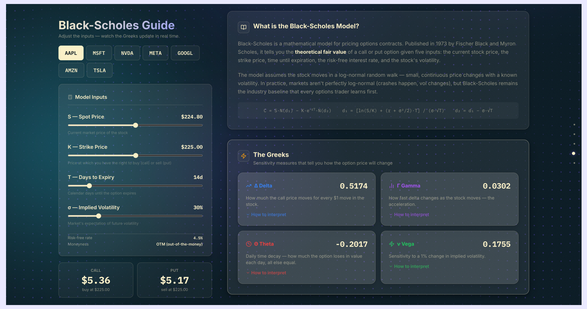
The Confidence Scoring Engine

- combines multiple market signals—including sentiment score, sentiment volume, sentiment dispersion, sentiment change, recent 5-day returns, realized volatility, market regime, at-the-money implied volatility, implied move percentage, and volatility risk premium—to estimate directional conviction for a given stock.

```
p = sigmoid( 3 × Σ(weight × feature) )
```

Black-Scholes Sandbox

- Provides a mock options chain and interactive Black-Scholes teaching tool with sliders and payoff visualization.
- Why it matters: makes the platform educational, not just transactional.



System Evaluation

- 218 unit tests
- GitHub Actions CI/CD validation
- Successful API integrations (StockTwits, Yahoo Finance, FMP, Groq, Tavily)
- Demo mode reliability
- Black-Scholes pricing validation
- deployment on Vercel + Render

Future Improvements

- Live brokerage integrations
- Personalized portfolios
- Improved confidence model with larger datasets
- Real-time streaming sentiment
- Mobile version
- Include more advanced options strategies

Technical Stack

Frontend:

Backend :

Repository: https://github.com/Joachim-Chuah/senior_project