Economic Narratives Dashboard

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BACKGROUND

The context: When you're a wealth manager, timing is everything — whether you're maximizing gains or protecting assets. Recessions are disruptive, but predictable.

The question: Using data and AI, how can we empower our audience to make better decisions when planning around recessions, even if they are new to wealth management?

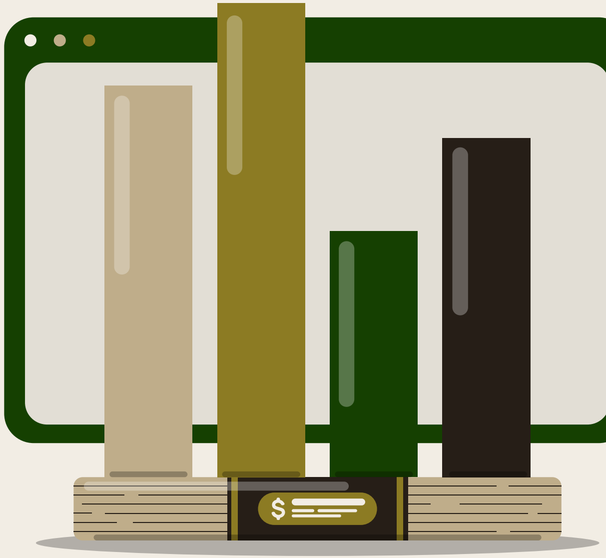
The targeted audience: Wealth Managers of all experience levels over age 18 who are managing US-based assets and have access to the internet.

Our Project Goal

This project transforms complex economic indicators into approachable natural language narratives for adult wealth managers of all skill levels, using machine learning to classify economic sentiment and GPT-2 to generate readable insights that help individuals make timely decisions that can grow or save their clients' wealth.

01

Economic Indicators



Consumer Confidence

When consumers are confident, they are more likely to spend money.

Leading Economic Index

A composite index that is designed to predict future economic activity.

Consumer Price Index

Average change over time in the prices paid by consumers for a basket of goods

GDP Growth

How much more value is being produced in the economy compared to a previous period.

Unemployment Rate

The percentage of the labor force that is unemployed and actively seeking employment.

Recession Probabilities

The likelihood or chance that an economy will enter a recession

Federal Funds Rate

The interest rate set by Federal Reserve

Yield Spread

It's the yields between two different debt instruments, qualities and maturities.

Currency Strength

Here, it is the value of the US Dollar relative to other currencies.

Housing Starts

The number of new residential construction projects in a specified period.

Personal Consumption Expenditures

The measure of the value of goods and services consumed by households.

Producer Price Index

It's the yields between two different debt instruments, qualities and maturities.

S&P 500

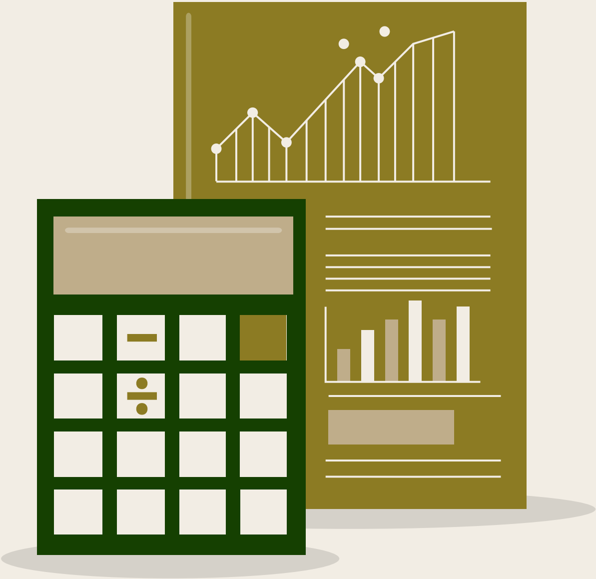
The stock market index that measures the performance of 500 largest publicly traded companies in the U.S.

Industrial Productivity

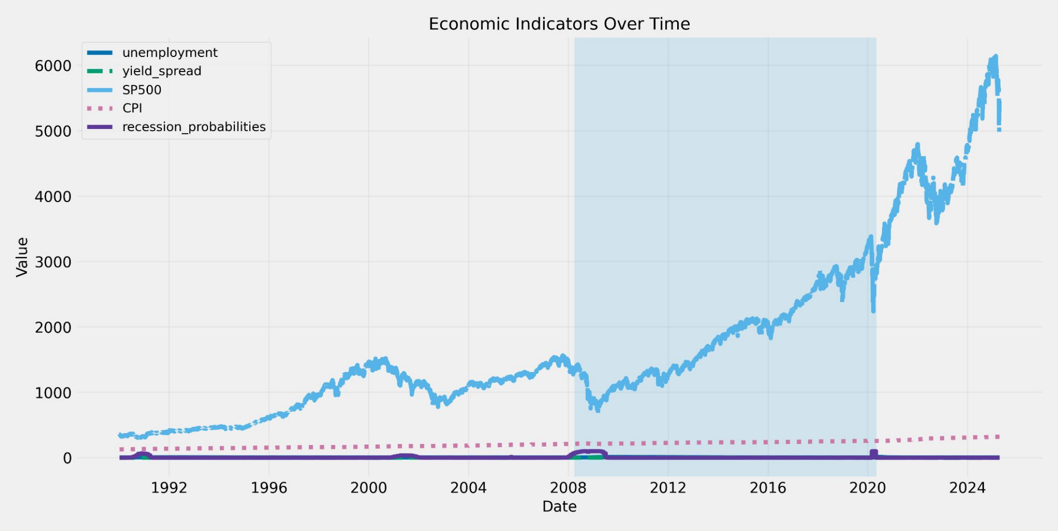
The output of the industrial sector of the economy, including manufacturing, mining, and utilities.

02

Exploratory Data Analysis



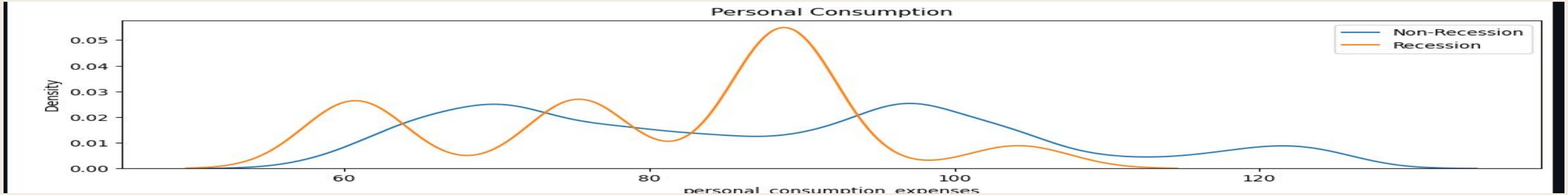
- S&P 500 reflects forward-looking investor sentiment — major drops anticipate economic slowdowns and recessions.
    - We used it to observe market confidence before and during downturns.
- Yield spread (10Y-2Y) is a proven leading indicator — inversions often precede recessions by 6–18 months.
    - Our plot confirmed this signal before 2001, 2008, and 2020.

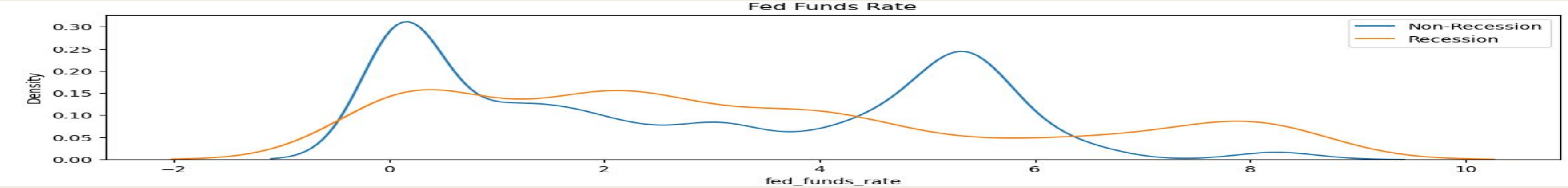


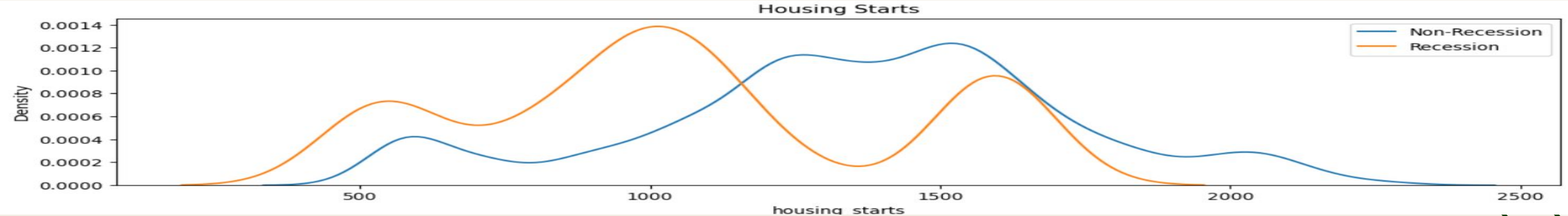
- Unemployment is a lagging indicator — it spikes after recessions begin, reflecting labor market damage.
    - We included it to understand recession severity, not predict timing.
- CPI tracks consumer inflation — it rises steadily over time, with subtle cooling during recessions.
    - While not a direct predictor, it’s essential for understanding Fed policy context.
- Recession probabilities serve as a reference label — aligning closely with real recession periods for supervised learning.
    - These spikes validate ground truth for model training and evaluation.

How Economic Indicators React During Recessions

- During recessions, consumer confidence fades, spending slows, and industrial production contracts. Housing starts decline as caution rises, while the Fed cuts interest rates in response. Personal consumption softens, inflation cools gradually, and currency strength shifts subtly without clear signals.



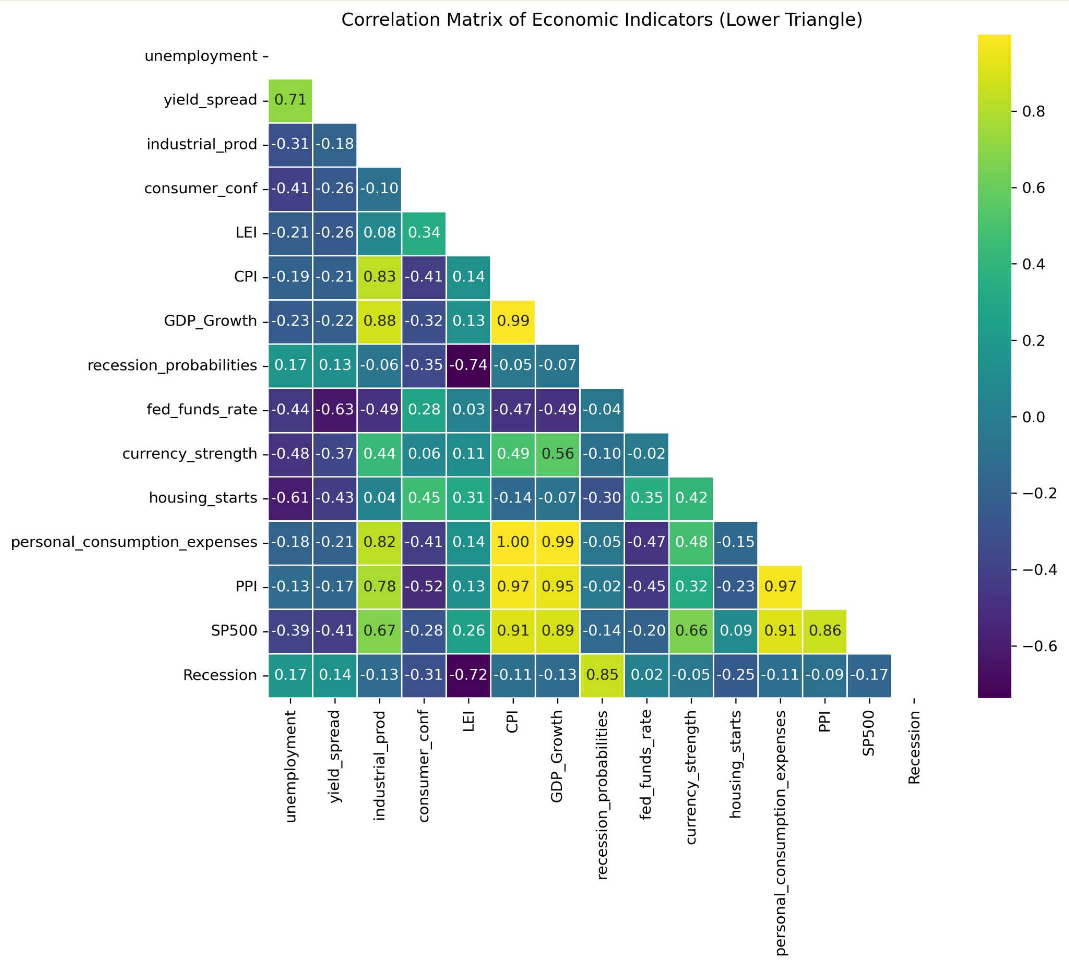




Interrelationships Between Economic Indicators

We analyzed how indicators move together.

- Yield spread and unemployment showed a strong negative link — when one drops, the other rises.
- GDP growth and industrial production moved closely together, reflecting real economic output.
- Recession risk rose as forward-looking signals like the Leading Index and consumer confidence fell.
- These patterns helped us choose the most important features for our model.



TRAINING ML MODEL

Random Forest

We chose Random Forest because we are tackling a classification problem, and it's pretty fast.

Accuracy

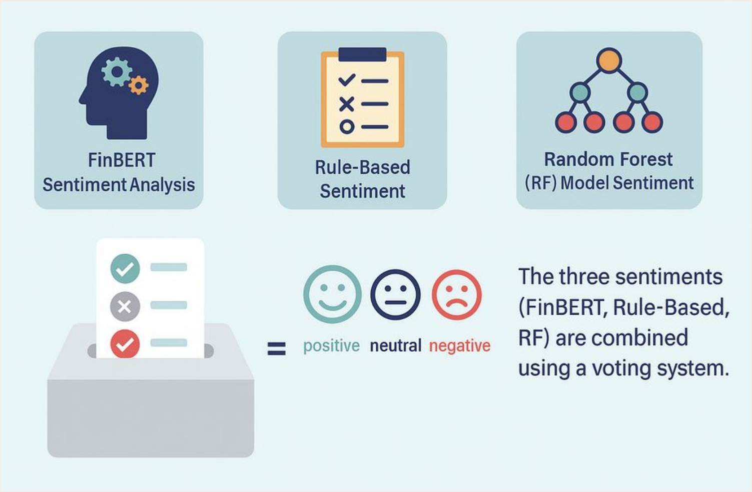
We measured the performance of the model’s sentiment classifier on accuracy.

ML Modeling Techniques

The sentiment of the economy is determined through a combination of three methods

- FinBERT Sentiment Analysis
- Rule-Based Sentiment
- Random Forest (RF) Model Sentiment

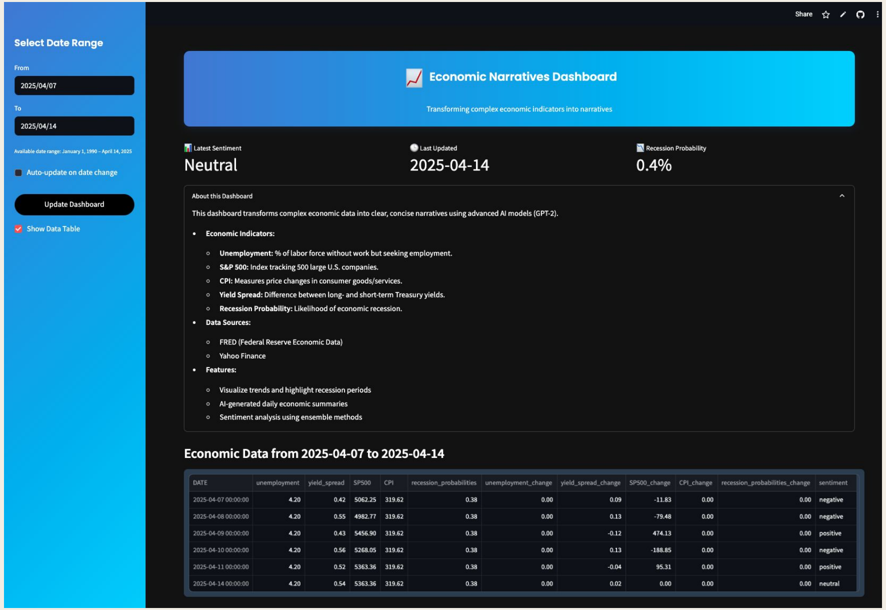
→ **Majority Vote** determines final sentiment.



03

GPT-2

AGENT DEMO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Select Date Range

From

2025/04/07

To

2025/04/14

Available date range: January 1, 1990 – April 14, 2025

Auto-update on date change

Update Dashboard

Show Data Table

📈 Economic Narratives Dashboard

Transforming complex economic indicators into narratives

📊 Latest Sentiment

Neutral

🕒 Last Updated

2025-04-14

📉 Recession Probability

0.4%

About this Dashboard

This dashboard transforms complex economic data into clear, concise narratives using advanced AI models (GPT-2).

- **Economic Indicators:**
  - **Unemployment:** % of labor force without work but seeking employment.
  - **S&P 500:** Index tracking 500 large U.S. companies.
  - **CPI:** Measures price changes in consumer goods/services.
  - **Yield Spread:** Difference between long- and short-term Treasury yields.
  - **Recession Probability:** Likelihood of economic recession.
- **Data Sources:**
  - FRED (Federal Reserve Economic Data)
  - Yahoo Finance
- **Features:**
  - Visualize trends and highlight recession periods
  - AI-generated daily economic summaries
  - Sentiment analysis using ensemble methods

Economic Data from 2025-04-07 to 2025-04-14

DATE	unemployment	yield_spread	SP500	CPI	recession_probabilities	unemployment_change	yield_spread_change	SP500_change	CPI_change	recession_probabilities_change	sentiment
2025-04-07 00:00:00	4.20	0.42	5062.25	319.62	0.38	0.00	0.09	-11.83	0.00	0.00	negative
2025-04-08 00:00:00	4.20	0.55	4982.77	319.62	0.38	0.00	0.13	-79.48	0.00	0.00	negative
2025-04-09 00:00:00	4.20	0.43	5456.90	319.62	0.38	0.00	-0.12	474.13	0.00	0.00	positive
2025-04-10 00:00:00	4.20	0.56	5268.05	319.62	0.38	0.00	0.13	-188.85	0.00	0.00	negative
2025-04-11 00:00:00	4.20	0.52	5363.36	319.62	0.38	0.00	-0.04	95.31	0.00	0.00	positive
2025-04-14 00:00:00	4.20	0.54	5363.36	319.62	0.38	0.00	0.02	0.00	0.00	0.00	neutral