



# DB-Hackathon

## PS3

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# Overview

## Dataset

- Equity & Sector Index OHLCV.
- News websites.
- Company Balance Sheets

## Logic

- Scores derived from diverse features.
- Volume based liquidity prediction.
- NLP based sentiment analysis.

## User Interface

- Used Streamlit, plotly, pandas
- Used ngrok to connect a local web server to the internet

## Features

- News & Macro-economic sentiment analysis.
- Balance Sheet Ratios.

## Models

- FinBERT for sentiment analysis.
- LSTMs for OHLC based liquidity prediction.

## Results

- Multi-scenario investment banking based advice
- Diverse strategy recommendations.



# DataSet

## News

- Web scraping from popular news websites including Moneycontrol, Economic Times, Wall Street Journal, and Tradingview.

## OHLCV

- Company specific equity OHLCV data obtained from NSE India
- Sector specific data used is OHLCV data for sector index, ie. NIFTYBANK.

## Company Fundamentals

- Annual and Quarterly filings of the company to obtain P&L reports, Balance Sheets, etc.

## Macroeconomic Data

- India specific macroeconomic data scraped from RBI website.
- Global data obtained from the economy page of Wall Street Journal.

# Features

## **Sentiment Scores**

- 0-100 based score for analyzing company, and sector news sentiments.

## **OHLC Score**

- 0-100 based score for analyzing company, and sector performance based on day-to-day market behaviour of the stock and the index.

## **Balance Sheet Score**

- 0-100 based score for analysis of a company's balance sheet using filings and additional parameters like P/E, ROE, ROCE, Profit Margin, Cash Flow, etc.

## **Macroeconomic Score**

- 0-100 based score to determine macroeconomic health of both Indian and Global markets.
- Parameters including Risk Free Interest Rate, Inflation, Jobs Data, etc are used.



# Logic

## Data

- News articles
- OHLCV time series.
- Balance Sheet

## LSTM

- LSTM based model to detect time series data patterns .
- Used to derive value from OHLC data.

## FinBERT

- Finance specialized BERT.
- Sentiments analysis financial news using NLPs and transformers

## Scores

- Derived scores from data is cleaned and normalized.
- Visualizations and inferences are extracted.

## Strategies

- Profit Maximization strategies.
- Cash Reserve prioritization.
- Risk Averse strategies.

# Balance Sheet Analysis

- **Data Processing:**

- Calculated additional financial metrics such as Net Profit Margin, Return on Equity (ROE), Debt to Equity Ratio, Free Cash Flow, EBITDA, and Total Shareholder Return (TSR).

- **Sentiment Analysis Metrics:**

- Profitability and Growth Sentiment: Evaluates the company's growth potential and profitability based on Net Profit Margin, ROE, and sales growth.
- Liquidity Sentiment: Assesses short-term financial stability using Current Ratio and Operating Cash Flow Ratio.
- Leverage Sentiment: Measures the company's financial leverage to understand debt dependency.
- Cash Flow and Dividend Sentiment: Analyzes cash flow availability and dividend sustainability.
- Valuation Sentiment: Looks at the company's market valuation in relation to its earnings.
- Investment and Operational Efficiency Sentiment: Considers operational efficiency through metrics like Asset Turnover Ratio and EBITDA margin.
- Market Performance Sentiment: Tracks market returns to gauge shareholder value.

- **Cumulative Financial Score:**

- Calculated a weighted cumulative score combining all sentiment metrics.
- This score provides a comprehensive view of the company's financial health, with higher scores indicating stronger financial performance.

# Overall Score & Strategy Recommendation

- **Composite Score Formula:**

$$\text{Score} = (\text{OHLCScore} \times 0.25) + (\text{CompanyNews} \times 0.20) + (\text{SectorNews} \times 0.15) + (\text{Macroeconomic} \times 0.15) + (\text{BalanceSheet} \times 0.15) + (\text{ForeignMarket} \times 0.10)$$

- **Strategy Recommendation System:**

- We follow a 3 pronged approach to suit multiple requirements, ie. Profit Maximization, Cash Reserve Prioritization and Risk Averse Strategies.

- **Profit Maximization Strategies:**

- Public Debt Offering: Raising capital by issuing bonds with predictable returns.
- Secondary Equity Offering (FPO): Issuing new shares to quickly generate funds for growth.
- Structured Equity Financing: Using complex financial instruments to maximize capital with tailored risk.
- Strategic Mergers/Acquisitions: Acquiring or merging with firms to increase market share and profits.
- Private Equity Investment: Partnering with private equity for long-term growth capital.



# Overall Score & Strategy

## Recommendation

- **Cash Reserves Prioritization:**

- Commercial Paper: Short-term debt for immediate cash needs at lower interest rates.
- Secondary Equity Offering (FPO): Generating quick cash by offering additional shares.
- Structured Debt Financing: Attracting investors through diverse debt securities.
- Debt Restructuring: Refinancing existing debt to improve liquidity and terms.
- Strategic Mergers/Acquisitions: Consolidating firms to boost cash flow and operational efficiency.
- Private Equity Investment: Partnering with private equity firms to bolster cash reserves.

- **Risk Averse Strategies:**

- Public Debt Offering: Reducing equity dilution by raising capital through bonds.
- Structured Debt Financing: Using tailored debt instruments to manage financial risk.
- Debt Restructuring: Adjusting debt structures to ease financial burdens.
- Strategic Mergers/Acquisitions: Diversifying revenue streams to lower market risk.
- Private Equity Investment: Leveraging expertise from private equity for strategic risk management.





**Thank You**