GROUP A-3

An AI-Based Python Program for

Business Valuation & Data-Driven Insights

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01

Project Statement and Objective

Business Problem: Traditional Valuation models have certain limitations

Current Valuation Problems

1. **Discounted Cash Flow:**
   - High Sensitivity to assumptions
   - Complex for investors and shareholders to understand assumptions
   - Bias in numbers

2. **Relative Valuation –Multiples–Based Valuation**
   - Variability of Multiples Across Different Industries
   - Unable to reflect the market sentiment

Problems for public companies

1. Market Volatility
2. Bias from analyst
3. Manipulation on accounting practice

Problems for private companies

1. Hard to find comparables companies
2. Lack of Market Data

Objective :A program offering a more dynamic and convenient valuation method

01 **Provide AI-Enabled Forecasting for Enhanced Valuation**

- ➢ *Provide a less-assumption dependent method to evaluate business, avoiding bias from analyst*

02 **Incorporate Financial Ratios and News Sentiment for Holistic Valuation**

- ➢ *Combats bias and captures real-time market sentiment not reflected in traditional models*

03 **Simplify Financial Data Visualization for Better and Easier Decision-Making**

- ➢ *Tabulates financial summaries and visualizes data in dashboards, making insights easy to understand.*

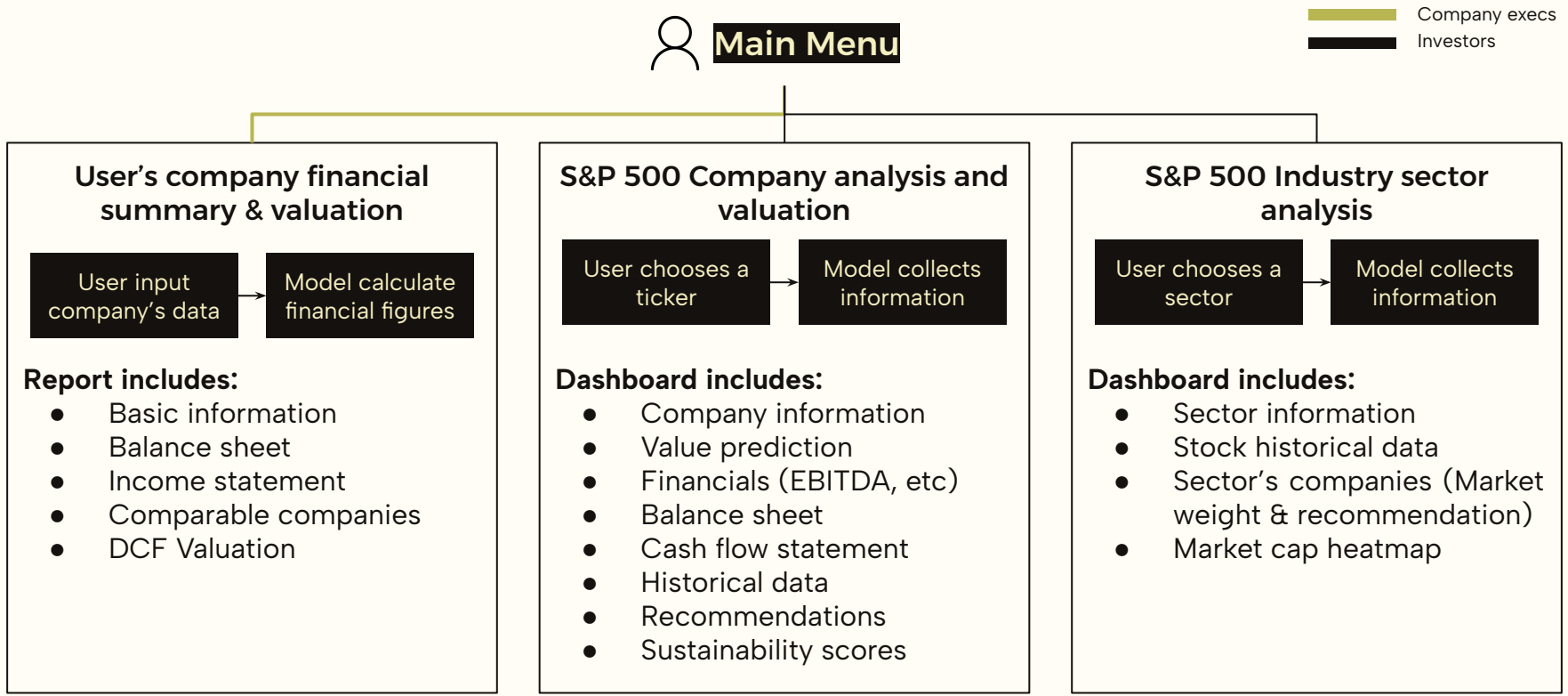
04 **Support Private Company Valuation with Custom Data Inputs**

- ➢ *Addresses the challenge of finding comparable data for private firms*

02

Program Overview and Responsibilities Distribution

Three Pillars of Functionality: Financial Summary, Company Valuation, and Sector Analysis



Project Workflow & Team Contributions

	Mia	Limey	Rebecca	Rock	Weiqiang
01 Concepting Select dataset, determine structure and main features of the program	●	●	●	●	●
02 Writing Functions for Data Collection A. User inputs for company profiling B. Company information from yfinance C. Sector information from yfinance	A	C	A	Merging codes during interim	B
03 Building Models A. DCF Value Prediction B. Sentiments Analysis	A		A	B	
04 Designing Dashboards Creating visualizations and formatting outputs A. Company B. Sector		B			A

03

The Design of Enterprise Value Prediction Model

Private Companies' Valuations: Utilizing K-Means Clustering and DCF to Predict Market Cap

Target customer

- Owners and Founders of Private Business
- Angel investors, venture capitalists, and private equity firms

Feature

- AI-Enhanced DCF model with K-Means Clustering
- Identifying Comparable Firms and Leveraging Their Average Metrics

Comparable Companies

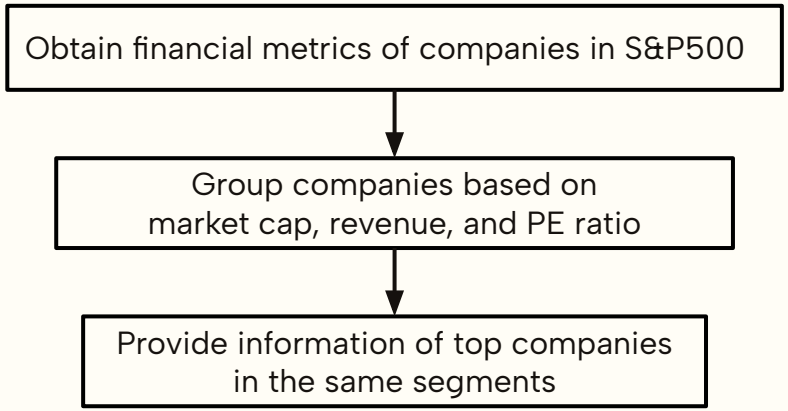
Ticker	Market Cap (Billion)	Revenue (Billion)
GE	$208.87	$69.41
CAT	$191.03	$66.37
UBER	$178.45	$40.06

Average Growth Rate of Comparable Companies: 5.40%

Discounted Cash Flow (DCF) Valuation

Period	DCF Value
5	$52,024,654.54

K-Means Clustering - Cluster similar firms



- Reduces subjectivity in selecting comparables
- Can adjust to new data and evolving market conditions

Public Companies' Valuations: Utilizing DCF and Lasso Regression to Predict Stock Price

Traditional Method

- Analyst Target Price Range
- 52-week Range

Limitations

- **Subjective**: Relies on analysts' opinions, which can be biased.
- **No Real-Time Updates**: Doesn't account for changing market sentiment.
- **Limited Future Insights**: Fails to adapt to future trends and macroeconomic shifts.

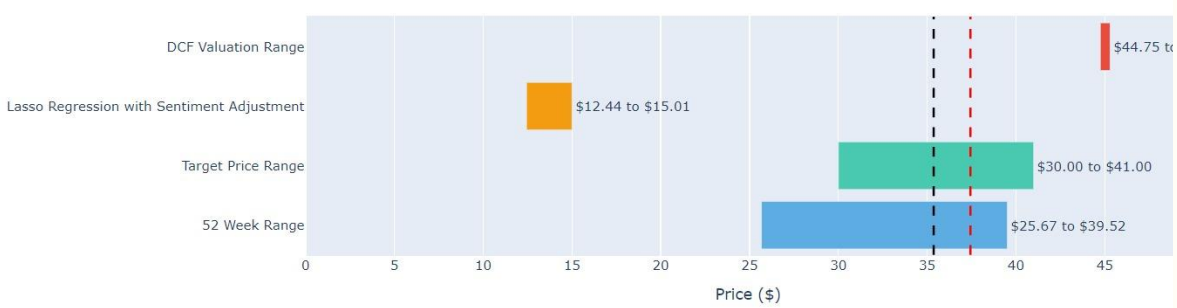
AI-Incorporated Method

DCF + Revenue Growth Prediction Based on Sentiment Scores

- Adjust future free cash flows with growth rates based on sentiment analysis
- Forecasts both optimistic and pessimistic scenarios for stock prices

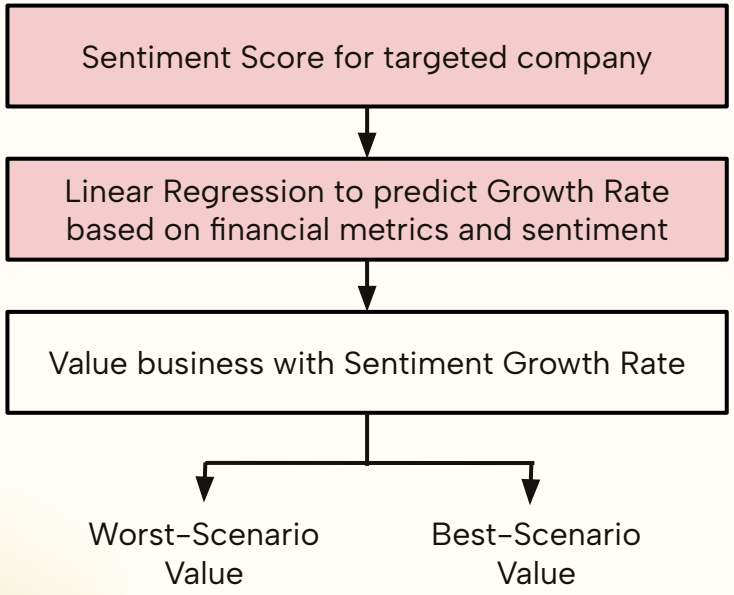
Lasso Regression + Sentiment Score

- Adjusts predictions with sentiment to create a more realistic stock price forecast

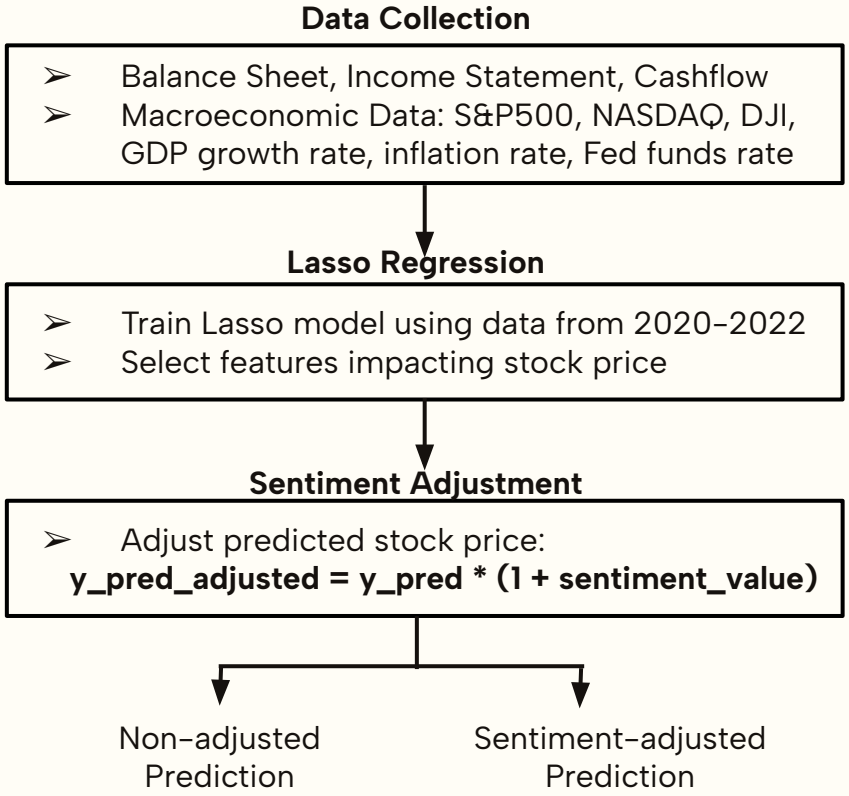


Discounted Cash Flow

Leveraging Sentiment Analysis and AI Prediction to Enhance Growth Rate Assumptions in the DCF Model

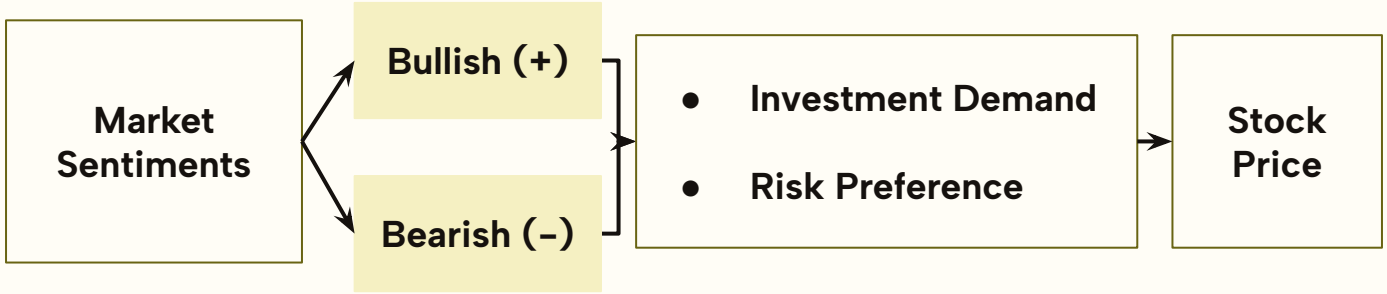


AI Enhanced: Lasso



Using Sentiments to Predict Revenue Growth

Why can we use sentiments to predict stock price?



How do we gather sentiment data?

Data is collected from

- 2 **HuggingFace** datasets (Historical Data)
- Yahoo Finance **stock.get_news()** function (Recent Data)

Using Sentiments to Predict Revenue Growth

Building a Linear Regression Model to Predict Revenue Growth

01 Training Sentiment Classifiers

Using historical financial news from Hugging Face to train the classifiers:

- SentimentIntensityAnalyzer(vader)
- NaiveBayesClassifier
- TextBlob

02 Vader Method is Chose to Predict Sentiments

Having a larger variance

03 Import Other Selected Variables

Using variables are selected in predicting the stock price

04 Linear Regression Model

All variables are scaled.
Fitting result is significant.

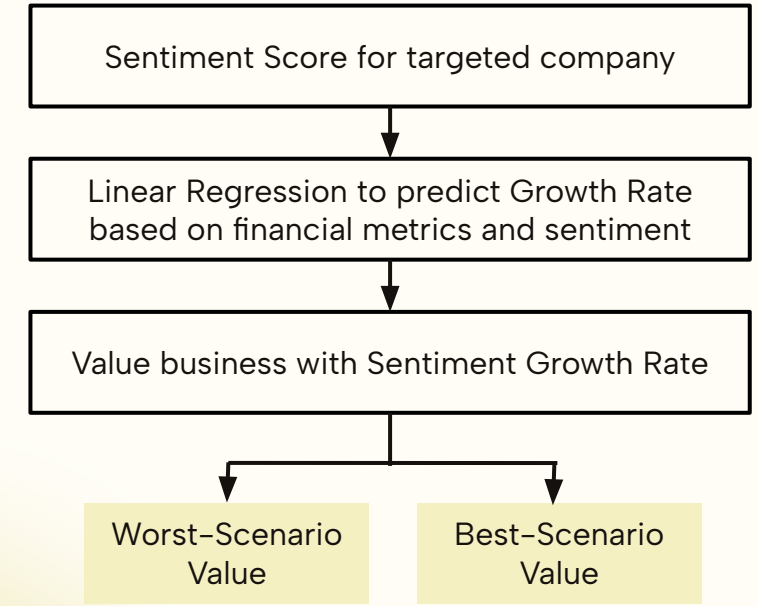
05 Confidence Interval

With OLS model confidence interval, we are able to predict the range of revenue growth

	coef	std err	t	P>|t|	[0.025	0.975]
Intercept	0	0	nan	nan	0	0
Sentiment	0.0699	0.003	27.167	0.000	0.065	0.075
Gross_Profit	0.3457	0.011	30.417	0.000	0.323	0.368
Operating_Income	-3.5397	0.087	-40.453	0.000	-3.711	-3.368
Net_Income	3.0872	0.078	39.475	0.000	2.934	3.240

Discounted Cash Flow

Leveraging Sentiment Analysis and AI Prediction to Enhance Growth Rate Assumptions in the DCF Model



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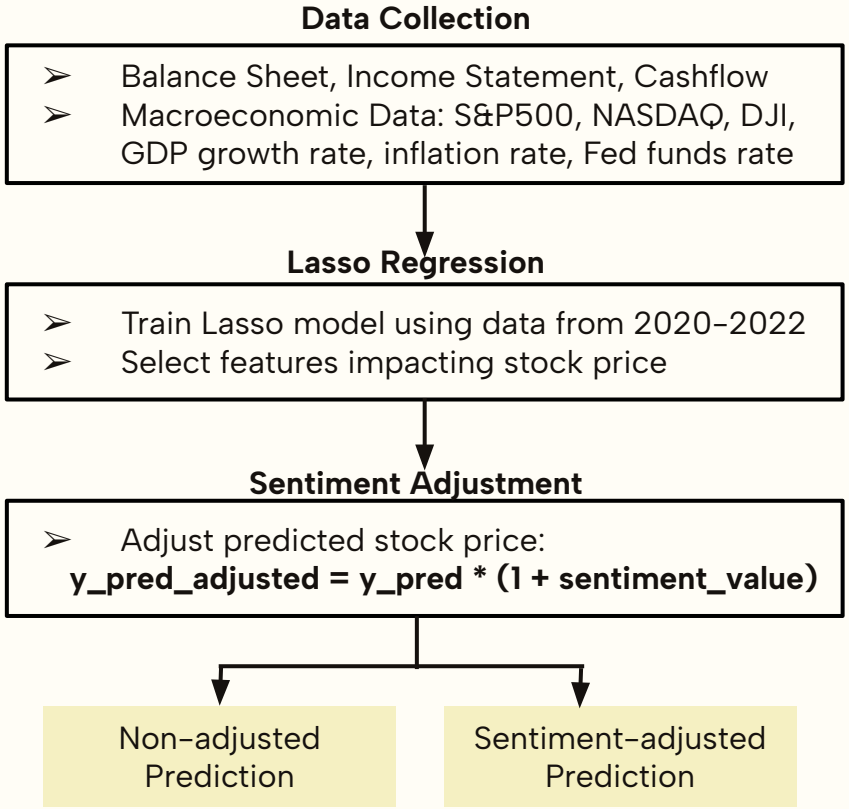

THANK YOU!

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