

# PHILIPPINE STOCK PRICE PREDICTION VIA NATURAL LANGUAGE PROCESSING OF NEWS ARTICLES

LEARNING TEAM 3:

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# OBJECTIVE OF THE STUDY



Develop an ML model that incorporates sentiments of Philippine business news in predicting the price of the Philippine Stock Exchange index

01

# DATA SET

02

## PHILIPPINE STOCK EXCHANGE INDEX

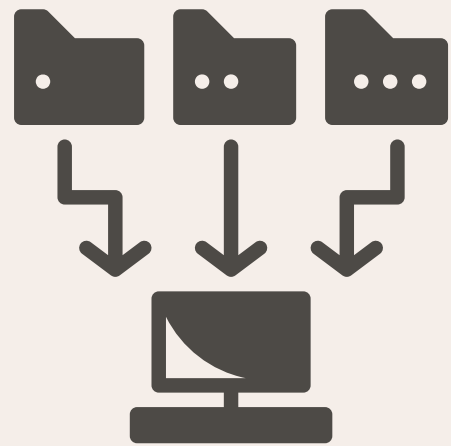
- 2015 - 2020
- Daily highest price
- Daily lowest price
- Daily opening price
- Daily closing price

## NEWS ARTICLES FROM RAPPLER

- 2015 - 2020
- Top news under Economy, Industries and Personal Finance
- Gathered entire content

# 03

# METHODOLOGY



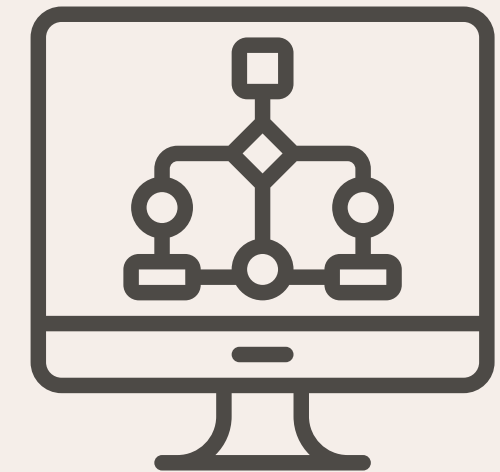
Data  
Scraping



Data  
Preprocessing



Exploratory  
Data Analysis

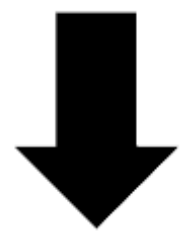


ML Model  
Development

# SENTIMENT ANALYSIS (VADER)

04

MANILA, Philippines - The Bangko Sentral ng Pilipinas (BSP) Monetary Board decided on Thursday, June 25, to cut interest rates by 50 basis points to support the economy amid the coronavirus pandemic. BSP Governor Benjamin Diokno said the overnight reverse repurchase facility will be at 2.25%, a new all-time low, effective Friday, June 26. Interest rates on the overnight deposit and lending facilities were reduced to 1.75% and 2.75%, respectively. Since February, the central bank has brought down interest rates by 1.75%. The Monetary Board trimmed key interest rates amid low inflation, which is expected to settle at 2.3% in 2020 and 2.6% in 2021. "The balance of risks to the inflation outlook leans toward the downside from 2020 up to 2022 owing largely to the potential impact of a deeper and more disruptive pandemic on domestic and global demand conditions," the BSP said. Diokno added that while economies are reopening worldwide, recovery would likely be "protracted and uneven." "Hence, there remains a critical need for continuing measures to bolster economic activity and support financial conditions, especially the effective implementation of interventions to protect human health, boost agricultural productivity, and build infrastructure," he said. ING Bank Manila senior economist Nicholas Mapa expects this to be the last interest rate cut for 2020. "Diokno will also likely hold back on reducing reserve requirements in the near term given that the financial system is swamped with liquidity with excess funds parked at BSP's deposit facilities hitting roughly P1.3 trillion in June," Mapa added. He also said the rate cut will likely "sap some appreciation pressure for the peso in the near term," as the currency "enjoyed relative strength in recent weeks buoyed by financial account inflows tied to the government's foreign borrowings." - Rappler.com



pos\_score  
0.162



neg\_score  
0.106



neu\_score  
0.732

# TO BUY OR NOT?

## RAW DATA

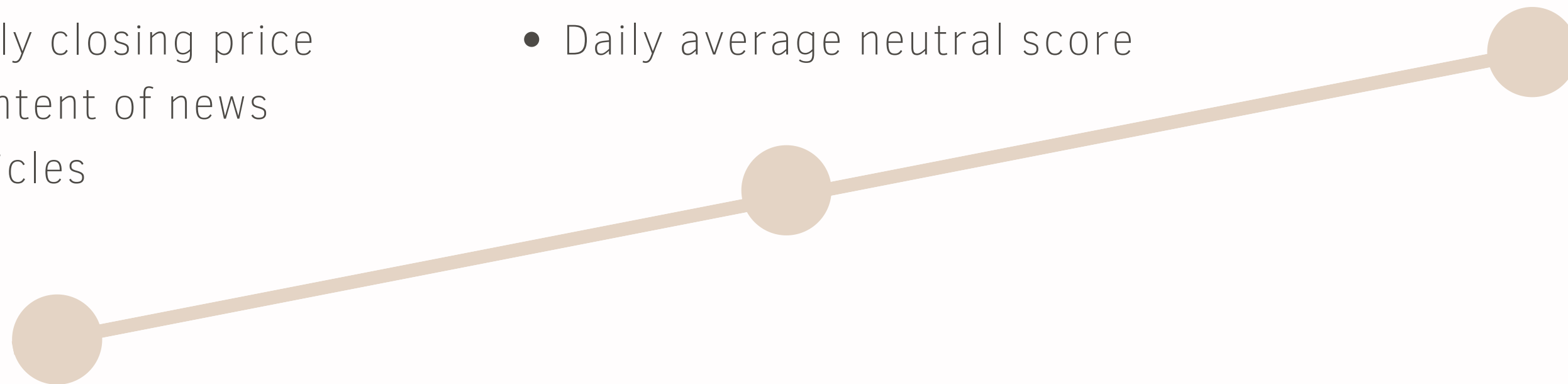
- Daily highest price
- Daily lowest price
- Daily opening price
- Daily closing price
- Content of news articles

## SELECTED FEATURES

- Daily return (closing price)
- Daily average positive score
- Daily average negative score
- Daily average neutral score

## DECISION

- BUY
- DO NOT BUY



Machine Learning Classification Method	Train Accuracy	Validation Accuracy	Test Accuracy	Training Time	Testing Time
kNN	0.692573	0.471503	0.567010	0.002992	0.004985
Logistic Regression	0.528497	0.476684	0.505155	0.006017	0.000998
Linear SVC	0.523316	0.497409	0.515464	0.001993	0.000973
Naive Bayes Gaussian	0.514680	0.419689	0.541237	0.002000	0.001026
Naive Bayes Multinomial	0.514680	0.419689	0.541237	0.001996	0.000993
Decision Tree	0.996546	0.492228	0.530928	0.002984	0.000996
Random Forest Classifier	0.996546	0.414508	0.551546	0.134646	0.009977
Gradient Boosting Classifier	0.868739	0.492228	0.587629	0.072810	0.000993

**50%**

RANDOM BUYING DECISION

**VS**

**65.5%**

RANDOM FOREST CLASSIFIER  
(TUNED HYPERPARAMETERS)



# RECOMMENDATIONS

**RECO 1:**

hasdajskdjas

**RECO 2:**

asdajsdnalsjdn

**RECO 3:**

asdasd



THANK YOU