# PREDICTING Q4 RESTAURANT EQUITY PRICES


- Isaiah Capel


# BUSINESS UNDERSTANDING

- It’s very exciting to hear that you, one of the biggest pension funds in the country, have decided to open your own trading office.
- You have asked me to examine the performance of the restaurant sector for the rest of the year. You are especially worried about the effect that a possible winter surge will have on prices.
- Today I will:
  - Show you a model that predicts closing price using past prices and future COVID death projections.
  - Recommend 3 stocks to buy and 3 to avoid.

# DATA UNDERSTANDING

- In order to predict future equity prices, I need past equity prices. I used over 5 years of closing prices from Yahoo Finance.
- In order to predict future COVID deaths, I need past COVID death numbers. I obtained those from the CDC.


# ROI%

$$ROI\% = \frac{\text{final predicted price} - \text{final observed price}}{\text{final observed price}} \times 100$$

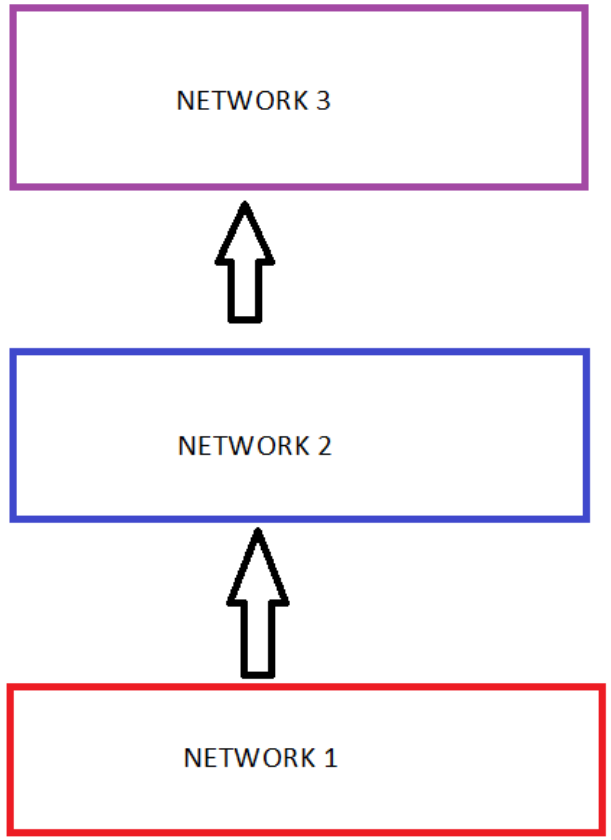
# MODELING

To calculate the daily number of COVID deaths for the rest of the year, I used an algorithm from Facebook called Prophet.

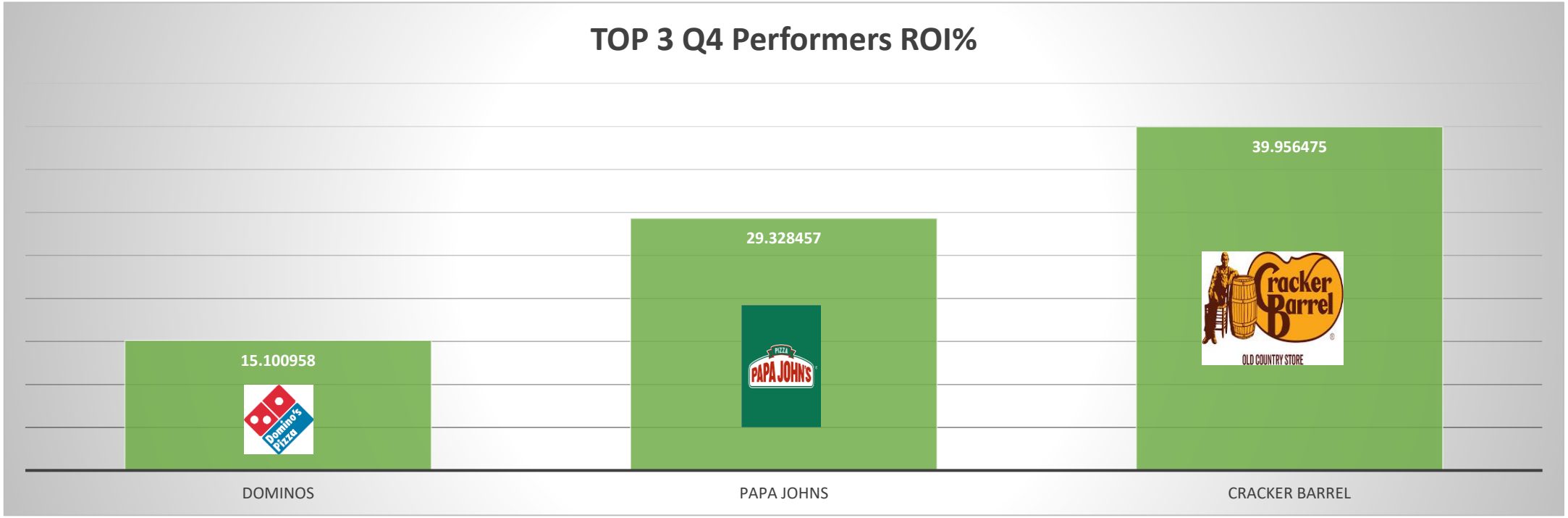
To calculate the stock prices with the COVID number generated from Prophet, I used a Long Short Term Memory neural network (LSTM) .

# LSTM
# (Long Short Term Memory)

- An LSTM is a type of neural network (a computing system modeled on the human brain) that handles long term data especially well, can learn from data multiple times, and can potentially learn and improve with each pass.



# RECOMMENDATION-TOP 3 PERFORMERS



# RECOMMENDATION- BOTTOM 3 PERFORMERS

BOTTOM 3 Q4 PERFORMERS ROI%

Chipotle

-32.755933

Wingstop

-23.757793

McDonalds

-13.35461

# CONCLUSION

- The top performers were Cracker Barrel, Papa Johns, and Dominos while the poorest performers were Chipotle, Wingstop, and McDonalds.
- Interestingly, the 2 pizza chains fared well. This may be because they are uniquely placed to survive a winter surge.
- Also, Chipotle falling is surprising and valuable information since it has risen consistently.

# NEXT STEPS

Improving the COVID Death predictions. My predictions had a 36% MAPE( Mean Absolute Percentage Error) which is mediocre among the predictors that the CDC lists at their website. The predictions could be improved by the addition of exogenous variables like mask use rates and weather.

Using COVID infection rates instead of death rates may yield better results.

Adding more exogenous variables  like inflation rate, interest rates, volume, and commodities prices to the price prediction model may provide illuminating results.

- Thanks
- Github:https://github.com/icapeli/Restaurant_Sector_2022_LSTM