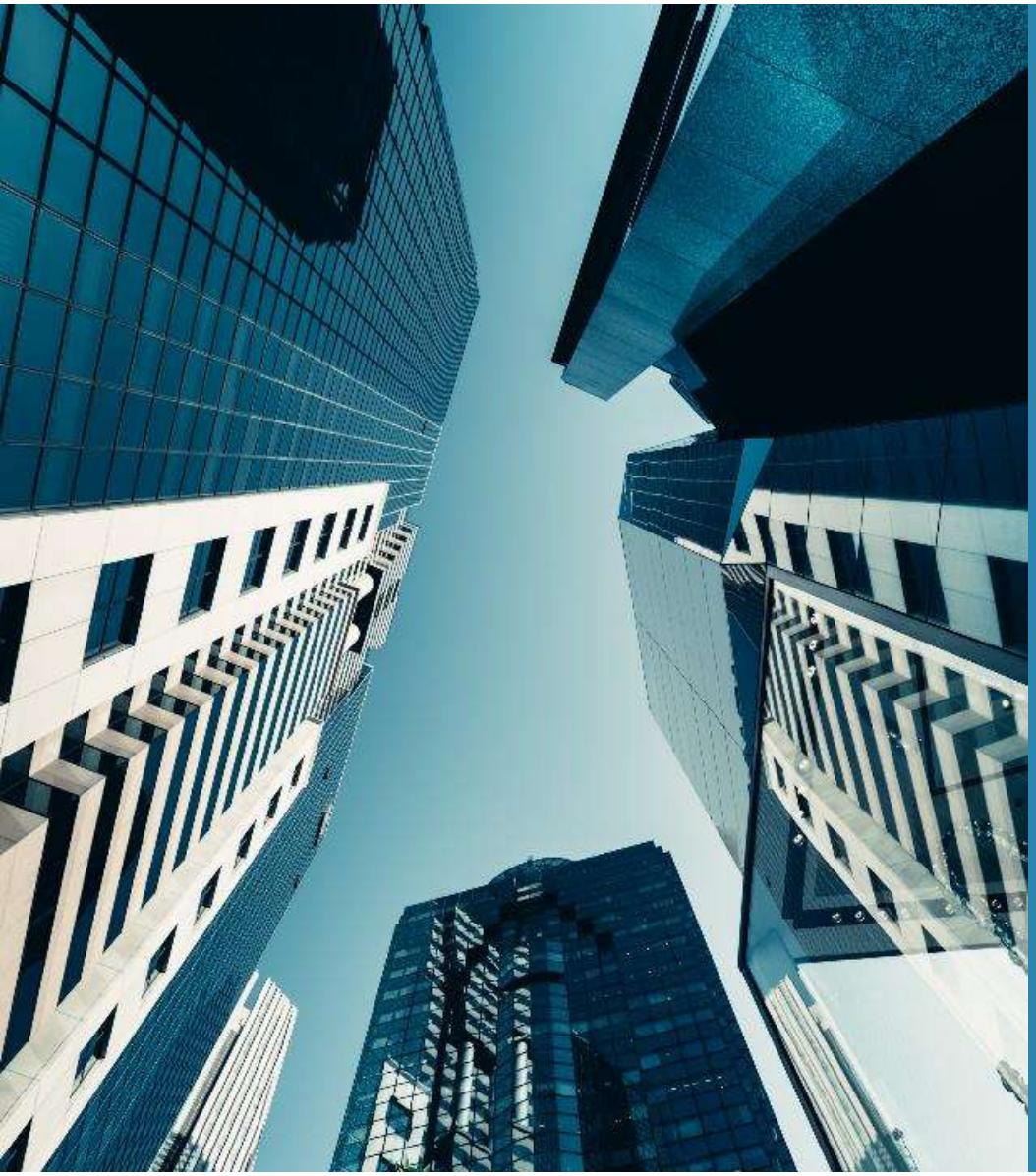


# STOCK PRICE PREDICTION USING ARIMA MODEL

- TESLA

MADE BY:-
AASHVI SHAH
SHRADDHA KODAVADE

# Aashvi Shah

- Aashvi is a Sophomore studying Applied Statistics and Analytics in Mumbai, India. She loves to have long and deep conversations with her near and dear ones with a warm cup of beverage. She aspires to be a business analyst!

# Shraddha Kodavade

- Shraddha is a Sophomore studying Applied Statistics and Analytics in Mumbai, India. She is strongly inclined to all things data and wishes to be a data scientist. Apart from that you could call her for a photoshoot anytime, anywhere!

# STOCK MARKET

# INTRODUCTION

- A STOCK MARKET, EQUITY MARKET OR SHARE MARKET IS THE AGGREGATION OF BUYERS AND SELLERS OF STOCKS (ALSO CALLED SHARES), WHICH REPRESENT OWNERSHIP CLAIMS ON BUSINESSES; THESE MAY INCLUDE SECURITIES LISTED ON A PUBLIC STOCK EXCHANGE, AS WELL AS STOCK THAT IS ONLY TRADED PRIVATELY, SUCH AS SHARES OF PRIVATE COMPANIES WHICH ARE SOLD TO INVESTORS THROUGH EQUITY CROWDFUNDING PLATFORMS.


# THE PROJECT IDEA

# ABOUT OUR PROJECT

- MACHINE LEARNING HAS FOUND ITS APPLICATIONS IN MANY INTERESTING FIELDS OVER THESE YEARS. TAMING STOCK MARKET IS ONE OF THEM.
- TIME SERIES IS A BIG COMPONENT OF OUR EVERYDAY LIVES. MANY MACHINE LEARNING MODELS HAVE BEEN CREATED IN ORDER TO TACKLE THESE TYPES OF TASKS.
- IN THIS PROJECT, WE ARE USING ARIMA (AUTOREGRESSIVE INTEGRATED MOVING AVERAGE) MODELS TO DERIVE ML DRIVEN SOLUTION.

# FORECASTING

FORECASTING IS A TECHNIQUE THAT USES HISTORICAL DATA AS INPUTS TO MAKE INFORMED ESTIMATES THAT ARE PREDICTIVE IN DETERMINING THE DIRECTION OF FUTURE TRENDS. BUSINESSES UTILIZE FORECASTING TO DETERMINE HOW TO ALLOCATE THEIR BUDGETS OR PLAN FOR ANTICIPATED EXPENSES FOR AN UPCOMING PERIOD OF TIME. THIS IS TYPICALLY BASED ON THE PROJECTED DEMAND FOR THE GOODS AND SERVICES OFFERED.

FORECASTING METHODS:

- LINEAR REGRESSION
- MULTIPLE LINEAR REGRESSION
- PRODUCTIVITY RATIOS
- TIME SERIES ANALYSIS
- STOCHASTIC ANALYSIS

# TIMESERIES FORECASTING: ARIMA VS LSTM MODELS

- ARIMA MODEL

Advantages of ARIMA

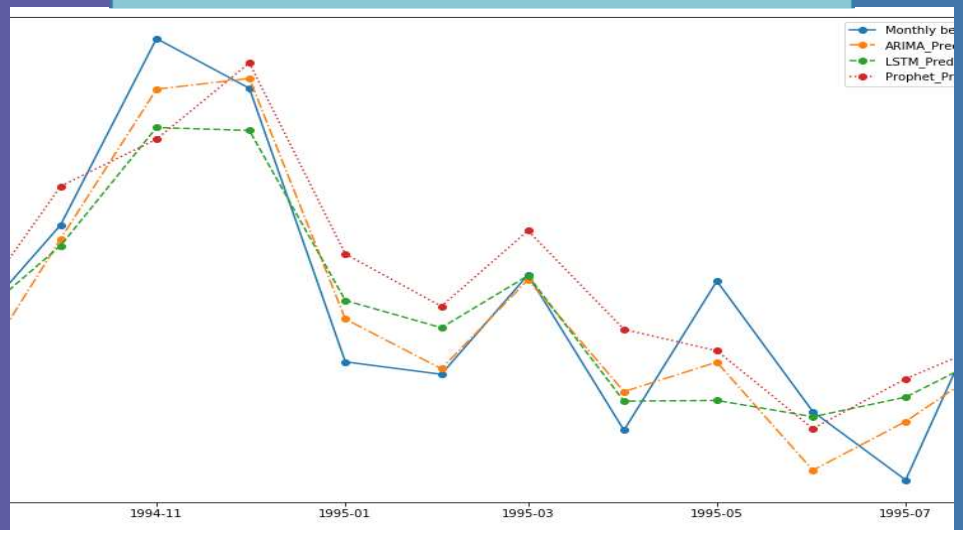
1.Simple to implement, no parameter tuning

2. Easier to handle multivariate data

3. Quick to run

Two of the most common types of analysis done on Time Series data include:

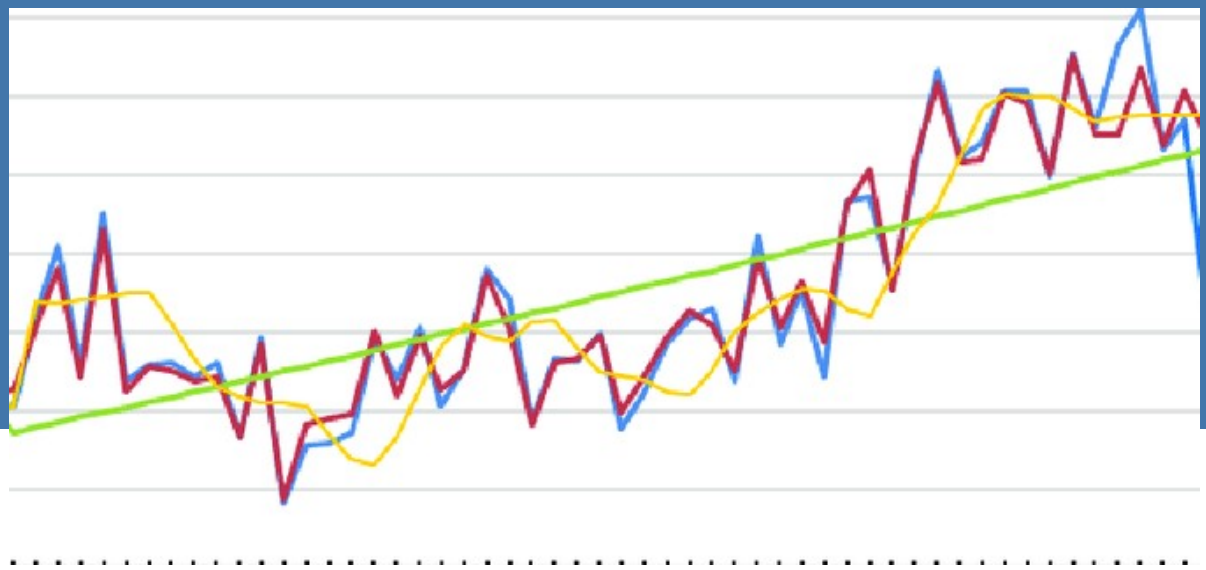
1. Pattern and outlier detection
2. Forecasting time series uses techniques like ARIMA. Recently Recurrent neural networks (LSTM) have been used with much success.




- LSTM MODEL

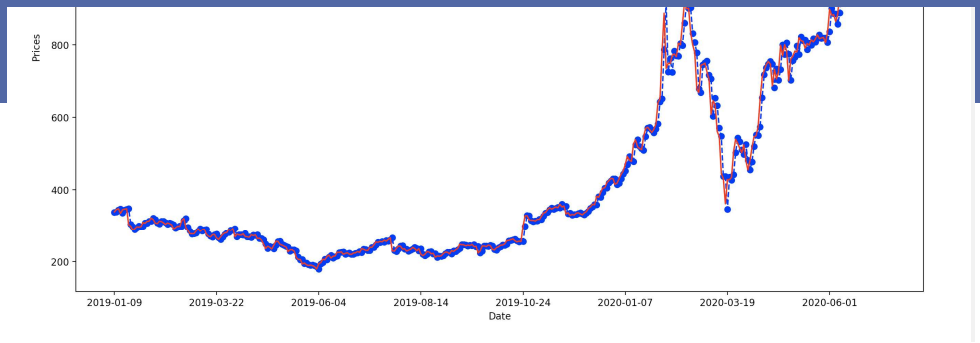
Advantages of LSTM

1. No pre-requisites (stationarity, no level shifts)
2. Can model non-linear function with neural networks
3. Needs a lot of data



# ARIMA MODEL

# ON FITTING ARIMA MODEL




## ABOUT ARIMA MODEL

- ARIMA is an acronym that stands for Auto Regressive Integrated Moving Average. An ARIMA model is a class of statistical models for analyzing and forecasting time series data.It explicitly caters to a suite of standard structures in time series data, and as such provides a simple yet powerful method for making skillful time series forecasts.

## PARAMETERS NEEDED

- p: The number of lag observations included in the model, also called the lag order.
- d: The number of times that the raw observations are differenced, also called the degree of differencing.
- q: The size of the moving average window, also called the order of moving average.

# INSIGHTS OF DEEP LEARNING IN ARIMA MODEL

AR: Autoregression

A model that uses the dependent relationship between an observation and some number of lagged observations.

I: Integrated

The use of differencing of raw observations (e.g. subtracting an observation from an observation at the previous time step) in order to make the time series stationary.

MA: Moving Average

A model that uses the dependency between an observation and a residual error from a moving average model applied to lagged observations.

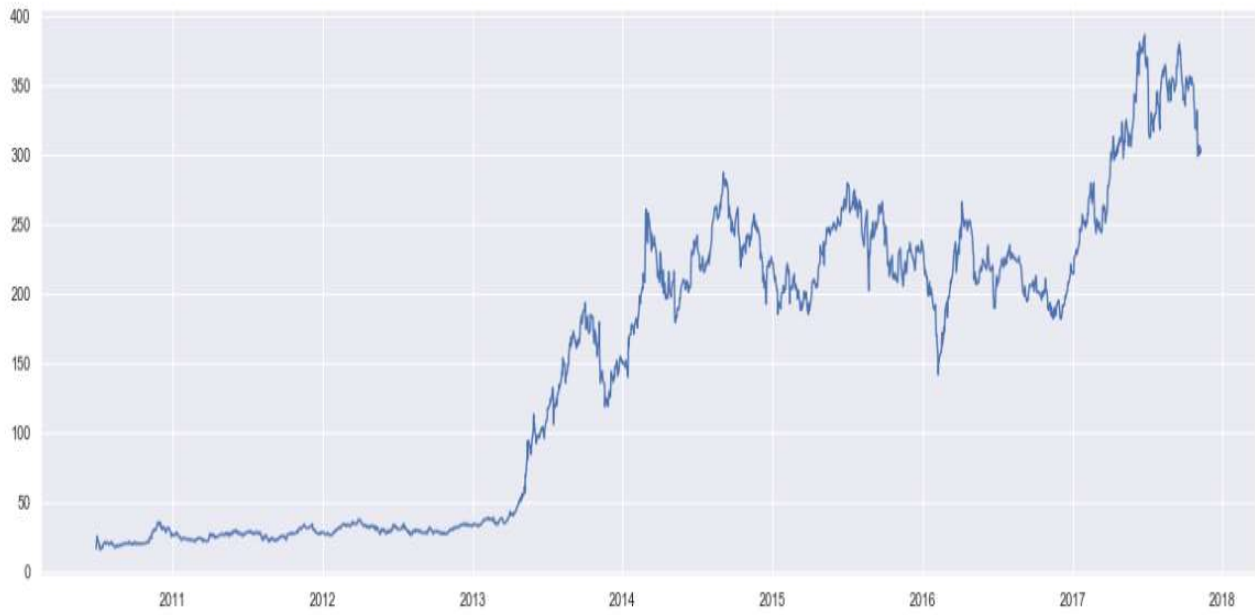
Each of these components are explicitly specified in the model as a parameter


# TESLA GRAPHS

# TESLA TRENDS

1)This graph shows the trend of opening and closing stock prices for TESLA.

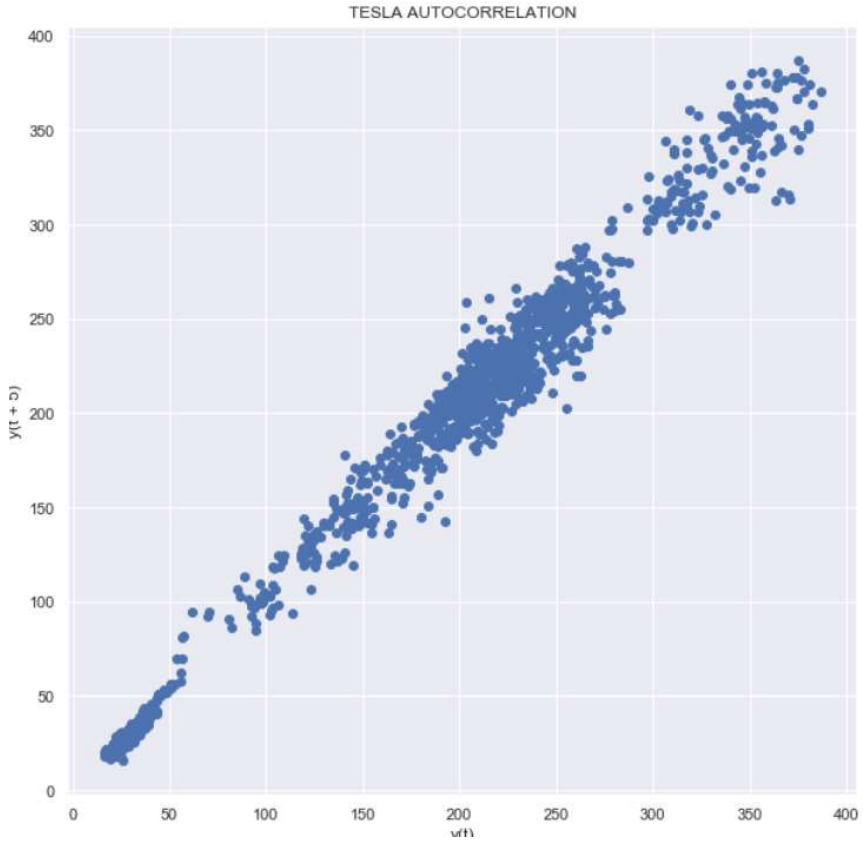
2)We can see that ,the people who've bought the stocks till 2013 ,if they sell it in 2017 ,they will generate a huge profit.



# AUTO CORRELATION

What is Autocorrelation?

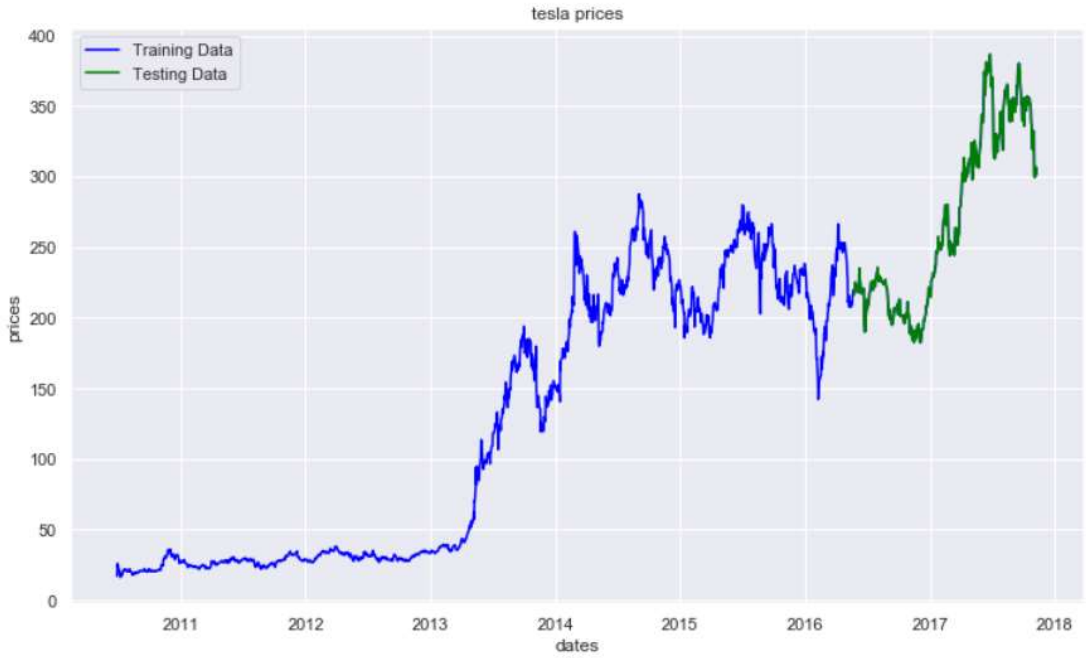
1)Autocorrelation, also known as serial correlation, is the correlation of a signal with a delayed copy of itself as a function of delay. Informally, it is the similarity between observations as a function of the time lag between them.



# TESLA PRICES : TRAINING AND TEST DATA

1)Here , we have divided the data into train and test data. We put 80% of the data as train data . This data will help the machine to predict the open and closed price better and more accurate.

2)The blue line is the training data which is 80% and the testing data is the predicted value by the model(ARIMA).



# TRAINING DATA, PREDICTED PRICE AND ACTUAL PRICE

- TESLA PRICE PREDICTION

1)As we have already said , 80% of the data is trained data.

2)What does this graph signify?

# The blue line is the  training data(0.8).

#The green  line is the predicted data.

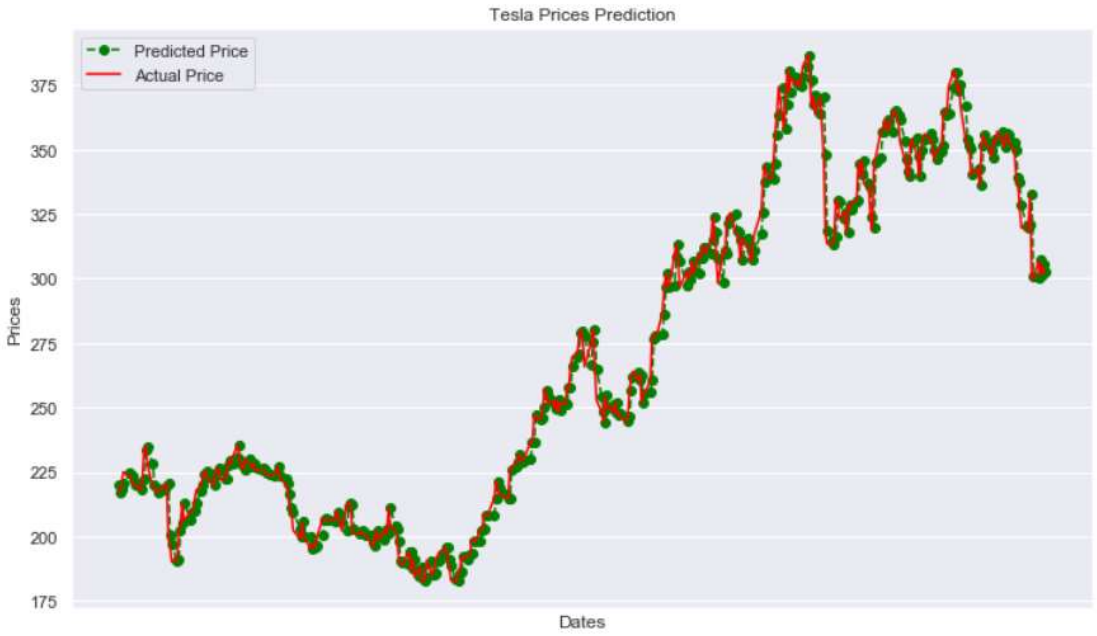
#The red line is the actual data

#INFERENCE:- the predicted and the actual data (stock prices)are very close to each other.

# PREDICTED PRICE AND ACTUAL PRICE

INFERENCE:-

1)The model has been successful in predicting the stock price because the predicted and the actual price are in a close proximity with each other.



# A TOKEN OF GRATITUDE TO OUR FACULTY MENTOR, AKASH SIR

- We’ve taken immense amount of efforts in this project. But it’d not have been possible without the guidance and constant support Mr Akash Nakashe ,our actuarial science professor. We’re highly indebted to you for your supervision, time as well as providing us necessary information regarding the project. Sir, we’d like to extend our sincere gratification to you.

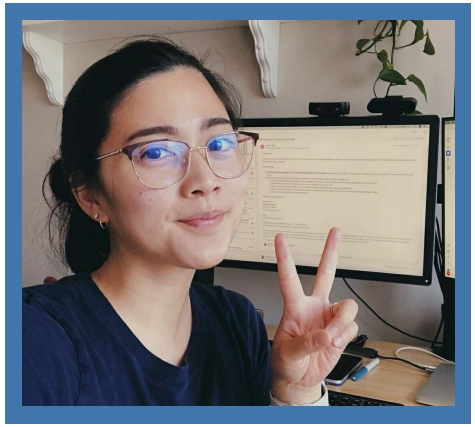
# THANK YOU,MAYUKO!

## Mayuko is a content creator in San Diego

Thank you for providing us with this wonderful opportunity.

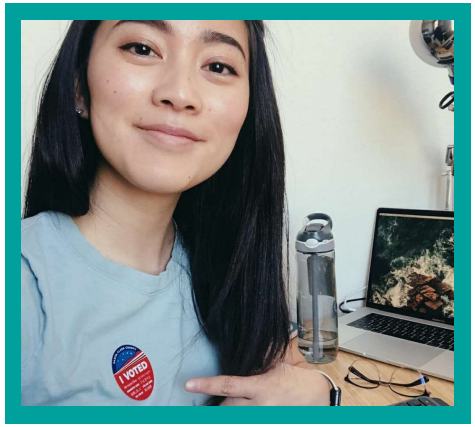
## She is a Japanese-American

We have learnt a myriad of things in the short span of one month .(from deep learning to just understanding the statistics behind each code)



## She has worked as Senior IOS software engineer

This opportunity was important to commence the process of coding



## She graduated from University of California ,San Diego

This was surely an amazing journey!

## CODE WITH FRIENDS : Fall 2020


- As beginners taking their first step in data science, we are very grateful for CWF fall 2020 edition to provide us a platform , which aided us in starting our own mini project.
- The wholesome community was a great support which welcomed us openly and gave us an opportunity to dive deep learn the very basics of coding and machine learning.