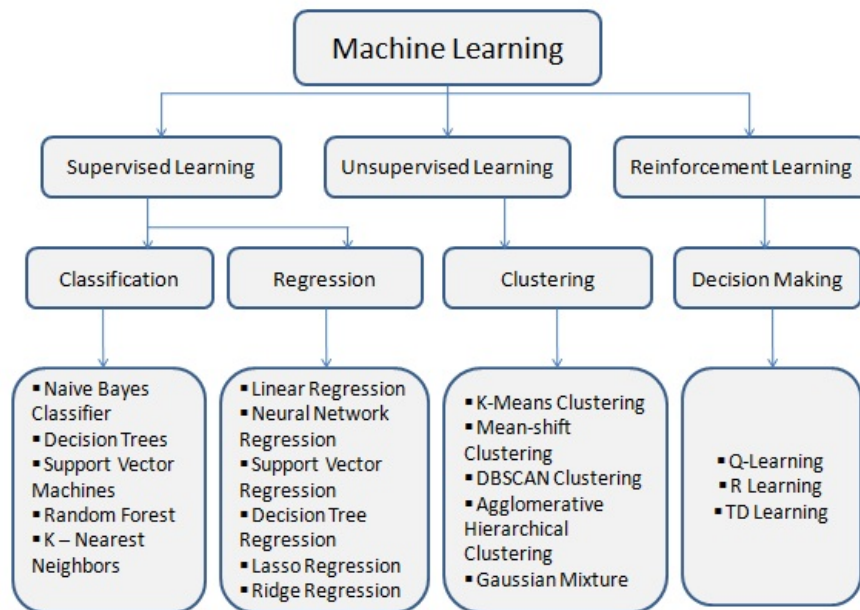


We will use basic linear regression to look the performance of stock market, we will keep updating project with other algorithms too, once we keep learning other ML model.

STOCK MARKET PERFORMANCE ANALYSIS

Lets import necessary libraries (NOTE: FOR now, we are only doing linear regression, we are just practicing basic regression)



```
In [3]: import pandas as pd
import yfinance as yf
from sklearn.linear_model import LinearRegression
import plotly.express as px
```

Now lets look data from yfinance

```
In [4]: #for example lets see simply any data for now (lets see Microsoft data)
```

```
In [5]: M=yf.Ticker("MSFT")
```

```
In [6]: M.info
```

```
Out[6]: {'address1': 'One Microsoft Way',
'city': 'Redmond',
'state': 'WA',
'zip': '98052-6399',
'country': 'United States',
'phone': '425 882 8080',
'website': 'https://www.microsoft.com',
'industry': 'Software - Infrastructure',
'industryKey': 'software-infrastructure',
'industryDisp': 'Software - Infrastructure',
'sector': 'Technology',
'sectorKey': 'technology',
'sectorDisp': 'Technology',
'longBusinessSummary': 'Microsoft Corporation develops and supports software, services, devices and solutions worldwide. The Productivity and Business Processes segment offers office, exchange, SharePoint, Microsoft Teams, office 365 Security and Compliance, Microsoft viva, and Microsoft 365 copilot; and office consumer services, such as Microsoft 365 consumer subscriptions, Office licensed on-premises, and other office services. This segment also provides LinkedIn; and dynamics business solutions, including Dynamics 365, a set of intelligent, cloud-based applications across ERP, CRM, power apps, and power automate; and on-premises ERP and CRM applications. The Intelligent Cloud segment provides server products and cloud services, such as azure and other cloud services; SQL and windows server, visual studio, system center, and related client access licenses, as well as nuance and GitHub; and enterprise services including enterprise support services, industry solutions, and nuance professional services. The More Personal Computing segment offers Windows, including windows OEM licensing and other non-volume licensing of the Windows operating system; Windows commercial comprising volume licensing of the Windows operating system, windows cloud services, and other Windows commercial offerings; patent licensing; and windows Internet of Things; and devices, such as surface, HoloLens, and PC accessories. Additionally, this segment provides gaming, which includes Xbox hardware and content, and first- and third-party content; Xbox game pass and other subscriptions, cloud gaming, advertising, third-party disc royalties, and other cloud services; and search and news advertising, which includes Bing, Microsoft News and Edge, and third-party affiliates. The company sells its products through OEMs, distributors, and resellers; and directly through digital marketplaces, online, and retail stores. The company was founded in 1975 and is headquartered in Redmond, Washington.',
'fullTimeEmployees': 221000,
'companyOfficers': [{'maxAge': 1,
'name': 'Mr. Satya Nadella',
'age': 55,
```

```

'title': 'Chairman & CEO',
'yearBorn': 1967,
'fiscalYear': 2023,
'totalPay': 9276400,
'exercisedValue': 0,
'unexercisedValue': 0},
{'maxAge': 1,
'name': 'Mr. Bradford L. Smith LCA',
'age': 63,
'title': 'President & Vice Chairman',
'yearBorn': 1959,
'fiscalYear': 2023,
'totalPay': 3591277,
'exercisedValue': 0,
'unexercisedValue': 0},
{'maxAge': 1,
'name': 'Ms. Amy E. Hood',
'age': 50,
'title': 'Executive VP & CFO',
'yearBorn': 1972,
'fiscalYear': 2023,
'totalPay': 3452196,
'exercisedValue': 0,
'unexercisedValue': 0},
{'maxAge': 1,
'name': 'Mr. Judson B. Althoff',
'age': 49,
'title': 'Executive VP & Chief Commercial Officer',
'yearBorn': 1973,
'fiscalYear': 2023,
'totalPay': 3355797,
'exercisedValue': 0,
'unexercisedValue': 0},
{'maxAge': 1,
'name': 'Mr. Christopher David Young',
'age': 50,
'title': 'Executive Vice President of Business Development, Strategy & Ventures',
'yearBorn': 1972,
'fiscalYear': 2023,
'totalPay': 2460507,
'exercisedValue': 0,
'unexercisedValue': 0},
{'maxAge': 1,
'name': 'Ms. Alice L. Jolla',
'age': 55,
'title': 'Corporate VP & Chief Accounting Officer',
'yearBorn': 1967,
'fiscalYear': 2023,
'exercisedValue': 0,
'unexercisedValue': 0},
{'maxAge': 1,
'name': 'Mr. James Kevin Scott',
'age': 50,
'title': 'Executive VP of AI & CTO',
'yearBorn': 1972,
'fiscalYear': 2023,
'exercisedValue': 0,
'unexercisedValue': 0},
{'maxAge': 1,
'name': 'Brett Iversen',
'title': 'Vice President of Investor Relations',
'fiscalYear': 2023,
'exercisedValue': 0,
'unexercisedValue': 0},
{'maxAge': 1,
'name': 'Mr. Hossein Nowbar',
'title': 'Chief Legal Officer',
'fiscalYear': 2023,
'exercisedValue': 0,
'unexercisedValue': 0},
{'maxAge': 1,
'name': 'Mr. Frank X. Shaw',
'title': 'Chief Communications Officer',
'fiscalYear': 2023,
'exercisedValue': 0,
'unexercisedValue': 0}],
'auditRisk': 7,
'boardRisk': 3,
'compensationRisk': 3,
'shareHolderRightsRisk': 2,
'overallRisk': 2,
'governanceEpochDate': 1698796800,
'compensationAsOfEpochDate': 1703980800,
'maxAge': 86400,
'priceHint': 2,
'previousClose': 376.17,
'open': 373.61,
'dayLow': 367.0,
'dayHigh': 374.37,

```

'regularMarketPreviousClose': 376.17,
'regularMarketOpen': 373.61,
'regularMarketDayLow': 367.0,
'regularMarketDayHigh': 374.37,
'dividendRate': 3.0,
'dividendYield': 0.0081,
'exDividendDate': 1700006400,
'payoutRatio': 0.2636,
'fiveYearAvgDividendYield': 1.03,
'beta': 0.885,
'trailingPE': 35.83818,
'forwardPE': 28.559847,
'volume': 37419964,
'regularMarketVolume': 37419964,
'averageVolume': 23232935,
'averageVolume10days': 27118920,
'averageDailyVolume10Day': 27118920,
'bid': 366.56,
'ask': 366.5,
'bidSize': 1000,
'askSize': 1200,
'marketCap': 2748821536768,
'fiftyTwoWeekLow': 219.35,
'fiftyTwoWeekHigh': 376.35,
'priceToSalesTrailing12Months': 12.591368,
'fiftyDayAverage': 336.175,
'twoHundredDayAverage': 313.7418,
'trailingAnnualDividendRate': 2.79,
'trailingAnnualDividendYield': 0.007416859,
'currency': 'USD',
'enterpriseValue': 2710558212096,
'profitMargins': 0.35314998,
'floatShares': 7425796261,
'sharesOutstanding': 7432260096,
'sharesShort': 39562050,
'sharesShortPriorMonth': 39514918,
'sharesShortPreviousMonthDate': 1695945600,
'dateShortInterest': 1698710400,
'sharesPercentSharesOut': 0.0053,
'heldPercentInsiders': 0.00052,
'heldPercentInstitutions': 0.73212,
'shortRatio': 1.61,
'shortPercentOfFloat': 0.0053,
'impliedSharesOutstanding': 7432260096,
'bookValue': 29.702,
'priceToBook': 12.4520235,
'lastFiscalYearEnd': 1688083200,
'nextFiscalYearEnd': 1719705600,
'mostRecentQuarter': 1696032000,
'earningsQuarterlyGrowth': 0.27,
'netIncomeToCommon': 77096001536,
'trailingEps': 10.32,
'forwardEps': 12.95,
'pegRatio': 2.17,
'lastSplitFactor': '2:1',
'lastSplitDate': 1045526400,
'enterpriseToRevenue': 12.416,
'enterpriseToEbitda': 24.975,
'52WeekChange': 0.5279901,
'SandP52WeekChange': 0.14280725,
'lastDividendValue': 0.75,
'lastDividendDate': 1700006400,
'exchange': 'NMS',
'quoteType': 'EQUITY',
'symbol': 'MSFT',
'underlyingSymbol': 'MSFT',
'shortName': 'Microsoft Corporation',
'longName': 'Microsoft Corporation',
'firstTradeDateEpochUtc': 511108200,
'timeZoneFullName': 'America/New_York',
'timeZoneShortName': 'EST',
'uuid': 'b004b3ec-de24-385e-b2c1-923f10d3fb62',
'messageBoardId': 'finmb_21835',
'gmtOffsetMilliseconds': -18000000,
'currentPrice': 369.85,
'targetHighPrice': 450.0,
'targetLowPrice': 285.0,
'targetMeanPrice': 403.31,
'targetMedianPrice': 414.0,
'recommendationMean': 1.7,
'recommendationKey': 'buy',
'numberOfAnalystOpinions': 46,
'totalCash': 143945007104,
'totalCashPerShare': 19.368,
'ebitda': 108530999296,
'totalDebt': 105681002496,
'quickRatio': 1.531,
'currentRatio': 1.663,
'totalRevenue': 218310000640,

```
{
  'debtToEquity': 47.881,
  'revenuePerShare': 29.347,
  'returnOnAssets': 0.1457,
  'returnOnEquity': 0.39106998,
  'freeCashflow': 50418876416,
  'operatingCashflow': 94966996992,
  'earningsGrowth': 0.272,
  'revenueGrowth': 0.128,
  'grossMargins': 0.69441,
  'ebitdaMargins': 0.49714002,
  'operatingMargins': 0.47587,
  'financialCurrency': 'USD',
  'trailingPegRatio': 2.2382}
```

In above, here we are getting all types of info

```
In [7]: # Lets try to see share info from past 3 month to till now
M_3month_data = yf.download('MSFT', start='2023-08-01', end='2023-11-01')

[*****100%*****] 1 of 1 completed
```

```
In [8]: print(M_3month_data)
```

	Open	High	Low	Close	Adj Close	\
Date						
2023-08-01	335.190002	338.540009	333.700012	336.339996	334.949554	
2023-08-02	333.630005	333.630005	326.359985	327.500000	326.146118	
2023-08-03	326.000000	329.880005	325.950012	326.660004	325.309601	
2023-08-04	331.880005	335.140015	327.239990	327.779999	326.424957	
2023-08-07	328.369995	331.109985	327.519989	330.109985	328.745331	
...	
2023-10-25	345.019989	346.200012	337.619995	340.670013	339.979980	
2023-10-26	340.540009	341.630005	326.940002	327.890015	327.225861	
2023-10-27	330.429993	336.720001	328.399994	329.809998	329.141968	
2023-10-30	333.410004	339.450012	331.829987	337.309998	336.626770	
2023-10-31	338.850006	339.000000	334.690002	338.109985	337.425140	

	Volume
Date	
2023-08-01	18311900
2023-08-02	27761300
2023-08-03	18253700
2023-08-04	23727700
2023-08-07	17741500
...	...
2023-10-25	55053800
2023-10-26	37828500
2023-10-27	29856500
2023-10-30	22828100
2023-10-31	20265300

[65 rows x 6 columns]

```
In [9]: #What happen with reset index?
M_3month_data=M_3month_data.reset_index()
```

```
In [10]: M_3month_data.head()
```

```
Out[10]:
```

	Date	Open	High	Low	Close	Adj Close	Volume
0	2023-08-01	335.190002	338.540009	333.700012	336.339996	334.949554	18311900
1	2023-08-02	333.630005	333.630005	326.359985	327.500000	326.146118	27761300
2	2023-08-03	326.000000	329.880005	325.950012	326.660004	325.309601	18253700
3	2023-08-04	331.880005	335.140015	327.239990	327.779999	326.424957	23727700
4	2023-08-07	328.369995	331.109985	327.519989	330.109985	328.745331	17741500

Now lets import google data too so that we can know how to import data from yfinance

```
In [11]: G=yf.Ticker("GOOG")
```

```
In [12]: G.info
```

```
Out[12]: {'address1': '1600 Amphitheatre Parkway',
  'city': 'Mountain View',
  'state': 'CA',
  'zip': '94043',
  'country': 'United States',
  'phone': '650 253 0000',
  'website': 'https://www.abc.xyz',
  'industry': 'Internet Content & Information',
  'industryKey': 'internet-content-information',
  'industryDisp': 'Internet Content & Information',
  'sector': 'Communication Services',
  'sectorKey': 'communication-services',
```

```

'sectorDisp': 'Communication Services',
'longBusinessSummary': 'Alphabet Inc. offers various products and platforms in the United States, Europe, the Middle East, Africa, the Asia-Pacific, Canada, and Latin America. It operates through Google Services, Google Cloud, and Other Bets segments. The Google Services segment provides products and services, including ads, Android, Chrome, hardware, Gmail, Google Drive, Google Maps, Google Photos, Google Play, Search, and YouTube. It is also involved in the sale of apps and in-app purchases and digital content in the Google Play store; and Fitbit wearable devices, Google Nest home products, Pixel phones, and other devices, as well as in the provision of YouTube non-advertising services. The Google Cloud segment offers infrastructure, cybersecurity, data, analytics, AI, and machine learning, and other services; Google Workspace that include cloud-based collaboration tools for enterprises, such as Gmail, Docs, Drive, Calendar, and Meet; and other services for enterprise customers. The Other Bets segment sells health technology and internet services. The company was founded in 1998 and is headquartered in Mountain View, California.',
'fullTimeEmployees': 182381,
'companyOfficers': [{
  'maxAge': 1,
  'name': 'Mr. Sundar Pichai',
  'age': 49,
  'title': 'CEO & Director',
  'yearBorn': 1973,
  'fiscalYear': 2022,
  'totalPay': 7947461,
  'exercisedValue': 39618220,
  'unexercisedValue': 0},
{
  'maxAge': 1,
  'name': 'Ms. Ruth M. Porat',
  'age': 64,
  'title': 'President, Chief Investment Officer, Senior VP & CFO',
  'yearBorn': 1958,
  'fiscalYear': 2022,
  'totalPay': 1790046,
  'exercisedValue': 0,
  'unexercisedValue': 0},
{
  'maxAge': 1,
  'name': 'Mr. Lawrence Edward Page',
  'age': 49,
  'title': 'Co-Founder & Director',
  'yearBorn': 1973,
  'fiscalYear': 2022,
  'totalPay': 1,
  'exercisedValue': 0,
  'unexercisedValue': 0},
{
  'maxAge': 1,
  'name': 'Mr. Sergey Brin',
  'age': 48,
  'title': 'Co-Founder & Director',
  'yearBorn': 1974,
  'fiscalYear': 2022,
  'totalPay': 1,
  'exercisedValue': 0,
  'unexercisedValue': 0},
{
  'maxAge': 1,
  'name': 'Mr. J. Kent Walker',
  'age': 61,
  'title': 'President of Global Affairs, Chief Legal Officer & Company Secretary',
  'yearBorn': 1961,
  'fiscalYear': 2022,
  'totalPay': 1787541,
  'exercisedValue': 0,
  'unexercisedValue': 0},
{
  'maxAge': 1,
  'name': 'Dr. Prabhakar Raghavan',
  'age': 61,
  'title': 'Senior Vice President of Knowledge and Information - Google',
  'yearBorn': 1961,
  'fiscalYear': 2022,
  'totalPay': 1785329,
  'exercisedValue': 0,
  'unexercisedValue': 0},
{
  'maxAge': 1,
  'name': 'Mr. Philipp Schindler',
  'age': 51,
  'title': 'Senior Vice President & Chief Business Officer of Google',
  'yearBorn': 1971,
  'fiscalYear': 2022,
  'totalPay': 1785814,
  'exercisedValue': 0,
  'unexercisedValue': 0},
{
  'maxAge': 1,
  'name': 'Ms. Amie Thuener O'Toole',
  'age': 47,
  'title': 'Chief Accounting Officer & VP',
  'yearBorn': 1975,
  'fiscalYear': 2022,
  'exercisedValue': 0,
  'unexercisedValue': 0},
{
  'maxAge': 1,
  'name': 'Ms. Ellen West',
  'title': 'Vice President of Investor Relations',
  'fiscalYear': 2022,
  'exercisedValue': 0,
}

```

```
'unexercisedValue': 0},
{'maxAge': 1,
 'name': 'Ms. Fiona Clare Cicconi',
 'age': 56,
 'title': 'Chief People Officer',
 'yearBorn': 1966,
 'fiscalYear': 2022,
 'exercisedValue': 0,
 'unexercisedValue': 0}],
'auditRisk': 10,
'boardRisk': 7,
'compensationRisk': 10,
'shareHolderRightsRisk': 10,
'overallRisk': 10,
'governanceEpochDate': 1698796800,
'compensationAsOfEpochDate': 1672444800,
'maxAge': 86400,
'priceHint': 2,
'previousClose': 138.7,
'open': 137.82,
'dayLow': 135.48,
'dayHigh': 138.0,
'regularMarketPreviousClose': 138.7,
'regularMarketOpen': 137.82,
'regularMarketDayLow': 135.48,
'regularMarketDayHigh': 138.0,
'payoutRatio': 0.0,
'beta': 1.05,
'trailingPE': 26.233719,
'forwardPE': 20.6546,
'volume': 24309948,
'regularMarketVolume': 24309948,
'averageVolume': 21275140,
'averageVolume10days': 18627570,
'averageDailyVolume10Day': 18627570,
'bid': 137.21,
'ask': 136.99,
'bidSize': 900,
'askSize': 800,
'marketCap': 1702876282880,
'fiftyTwoWeekLow': 85.57,
'fiftyTwoWeekHigh': 142.38,
'priceToSalesTrailing12Months': 5.731043,
'fiftyDayAverage': 134.5982,
'twoHundredDayAverage': 119.86247,
'trailingAnnualDividendRate': 0.0,
'trailingAnnualDividendYield': 0.0,
'currency': 'USD',
'enterpriseValue': 1623452024832,
'profitMargins': 0.22459,
'floatShares': 10786789440,
'sharesOutstanding': 5725000192,
'sharesShort': 30483435,
'sharesShortPriorMonth': 30330232,
'sharesShortPreviousMonthDate': 1695945600,
'dateShortInterest': 1698710400,
'sharesPercentSharesOut': 0.0023999999,
'heldPercentInsiders': 0.00016000001,
'heldPercentInstitutions': 0.6221,
'shortRatio': 1.29,
'impliedSharesOutstanding': 12458399744,
'bookValue': 21.785,
'priceToBook': 6.285977,
'lastFiscalYearEnd': 1672444800,
'nextFiscalYearEnd': 1703980800,
'mostRecentQuarter': 1696032000,
'earningsQuarterlyGrowth': 0.415,
'netIncomeToCommon': 66731999232,
'trailingEps': 5.22,
'forwardEps': 6.63,
'pegRatio': 1.24,
'lastSplitFactor': '20:1',
'lastSplitDate': 1658102400,
'enterpriseToRevenue': 5.464,
'enterpriseToEbitda': 16.898,
'52WeekChange': 0.4289888,
'SandP52WeekChange': 0.14280725,
'exchange': 'NMS',
'quoteType': 'EQUITY',
'symbol': 'GOOG',
'underlyingSymbol': 'GOOG',
'shortName': 'Alphabet Inc.',
'longName': 'Alphabet Inc.',
'firstTradeDateEpochUtc': 1092922200,
'timeZoneFullName': 'America/New_York',
'timeZoneShortName': 'EST',
'uuid': 'ee8cce8c-2475-31c0-8436-ecdf889cbfbd',
'messageBoardId': 'finmb_29096',
'gmtOffsetMilliseconds': -18000000,
```

```
{
  'currentPrice': 136.94,
  'targetHighPrice': 160.0,
  'targetLowPrice': 130.0,
  'targetMeanPrice': 146.1,
  'targetMedianPrice': 147.5,
  'recommendationMean': 1.7,
  'recommendationKey': 'buy',
  'numberOfAnalystOpinions': 10,
  'totalCash': 119935000576,
  'totalCashPerShare': 9.583,
  'ebitda': 96071000064,
  'totalDebt': 29446000640,
  'quickRatio': 1.865,
  'currentRatio': 2.043,
  'totalRevenue': 297131999232,
  'debtToEquity': 10.778,
  'revenuePerShare': 23.337,
  'returnOnAssets': 0.13492,
  'returnOnEquity': 0.25334,
  'grossProfits': 156633000000,
  'freeCashflow': 71757127680,
  'operatingCashflow': 106444996608,
  'earningsGrowth': 0.46,
  'revenueGrowth': 0.11,
  'grossMargins': 0.56122,
  'ebitdaMargins': 0.32333001,
  'operatingMargins': 0.27962,
  'financialCurrency': 'USD',
  'trailingPegRatio': 1.2896}
```

```
In [13]: G_3month_data = yf.download('GOOG', start='2023-08-01', end='2023-11-01')
```

```
[*****100%*****] 1 of 1 completed
```

```
In [14]: G_3month_data=G_3month_data.reset_index()
G_3month_data.head()
```

```
Out[14]:
```

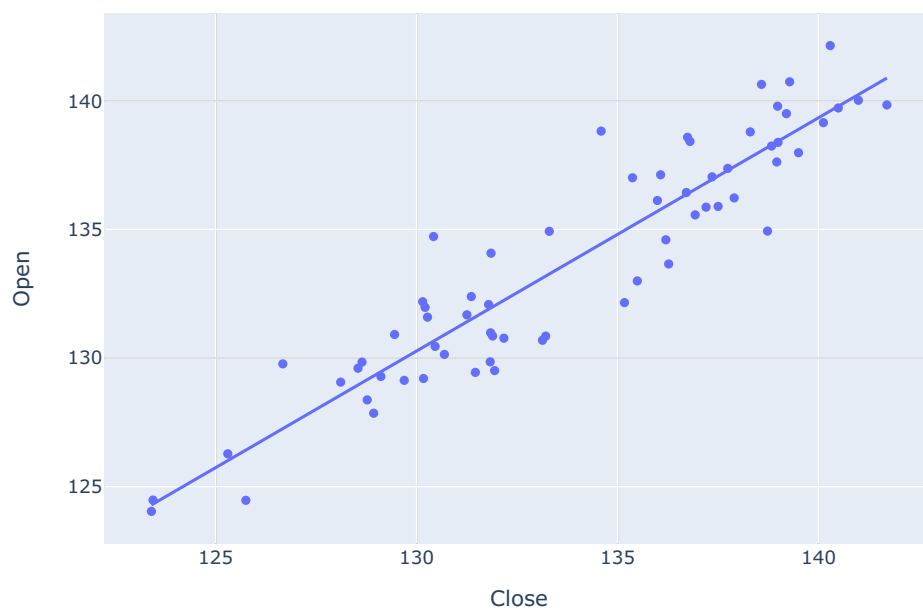
	Date	Open	High	Low	Close	Adj Close	Volume
0	2023-08-01	130.854996	132.919998	130.750000	131.889999	131.889999	22154300
1	2023-08-02	129.839996	130.419998	127.849998	128.639999	128.639999	22705800
2	2023-08-03	128.369995	129.770004	127.775002	128.770004	128.770004	15018100
3	2023-08-04	129.600006	131.929993	128.315002	128.539993	128.539993	20509500
4	2023-08-07	129.509995	132.059998	129.429993	131.940002	131.940002	17621000

```
In [16]: Google_relation=px.scatter(data_frame=G_3month_data,x='Close',y='Open',trendline="ols",title="Opening as indepe
```

```
In [17]: Google_relation.show()
```



Opening as independent and closing as dependent



```
In [20]: #Now lets prepare Model
```

```
y1,x1=G_3month_data["Open"],G_3month_data["Close"]
```

```
In [22]: import numpy as np  
x,y=np.array(x1).reshape(-1,1),np.array(y1)
```

```
In [23]: model=LinearRegression().fit(x,y)
```

```
In [24]: new_open_price=[[400.28]]  
new_close_price=model.predict(new_open_price)  
print(new_close_price)
```

```
[375.65698201]
```

Loading [MathJax]/extensions/Safe.js