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Machine Learning in Finance
Mini project 2

Trading algorithm for the Tesla stock

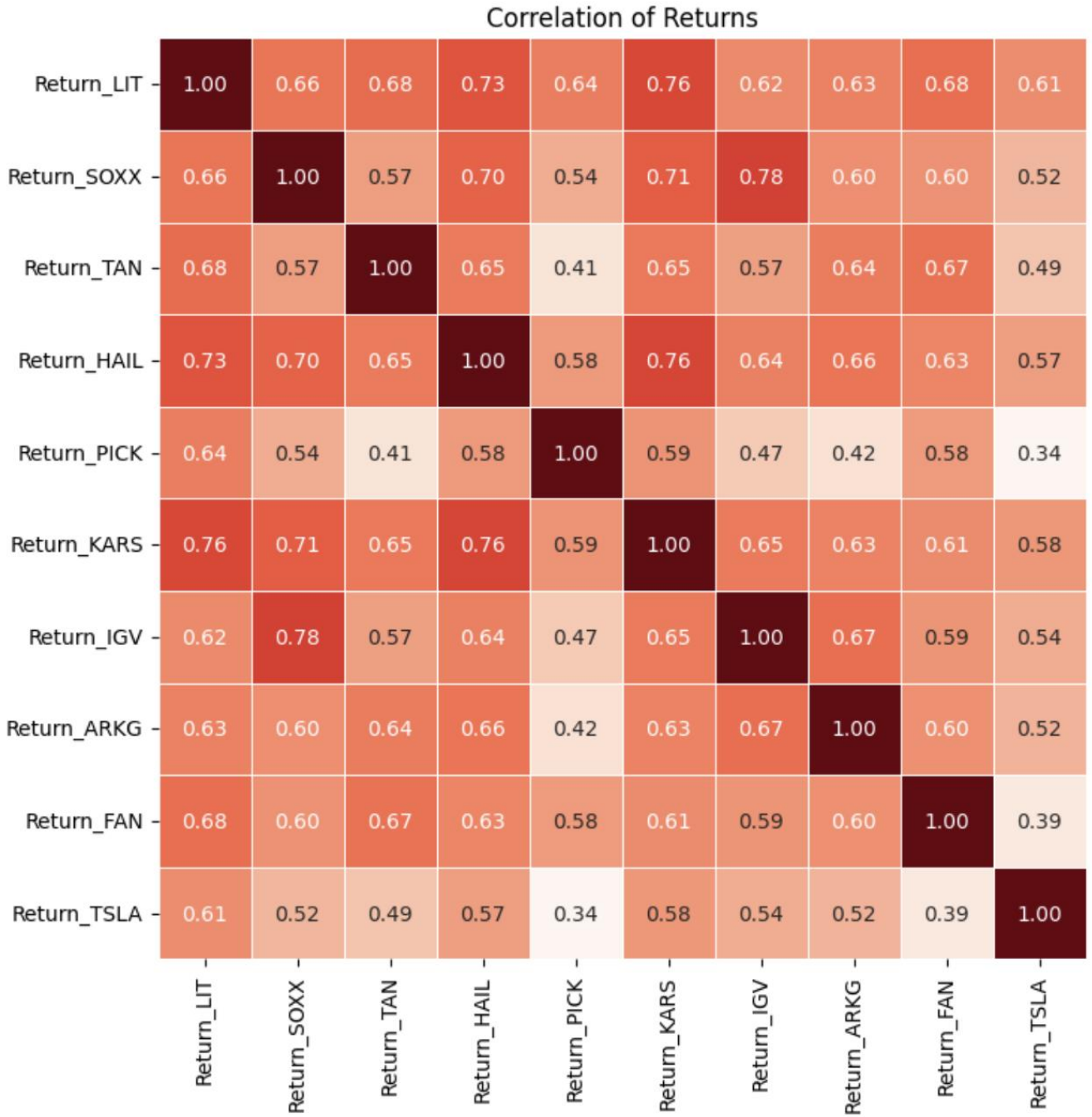
Data exploration

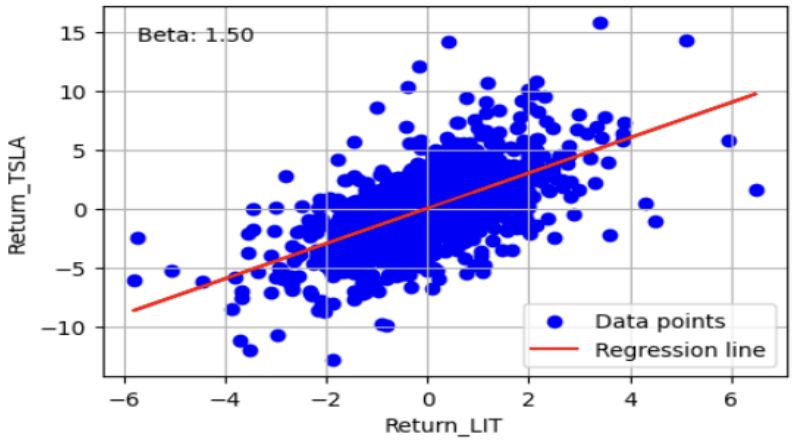
Tesla’s stock evolution

ETFs

Different kinds of ETFs with positive/negative expected correlation with Tesla:

- **TAN (Invesco Solar ETF)**
- **LIT (Global X Lithium & Battery Tech ETF)**
- **KARS (KraneShares Electric Vehicles and Future Mobility Index ETF)**
- **SOXX (iShares PHLX Semiconductor ETF)**
- **HAIL (SPDR S&P Kensho Smart Mobility ETF)**
- **PICK (iShares MSCI Global Metals & Mining Producers ETF)**
- **ARKG (ARK Genomic Revolution ETF)**
- **IGV (iShares Expanded Tech-Software Sector ETF)**
- **FAN (First Trust Global Wind Energy ETF)**

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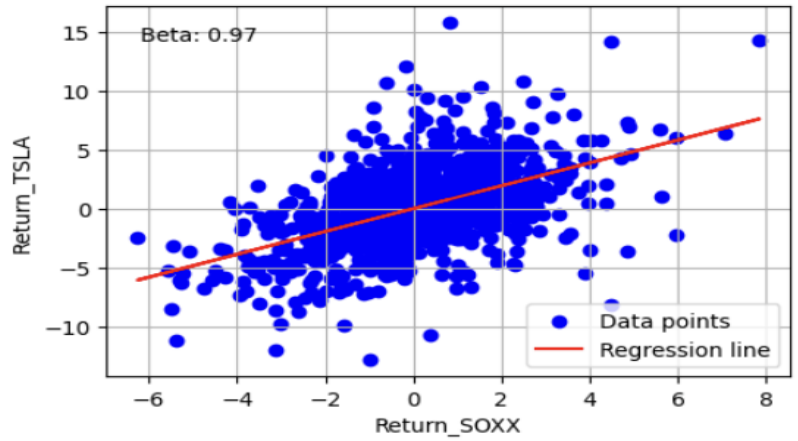
Return_TSLA
Return_LIT
Data points
Regression line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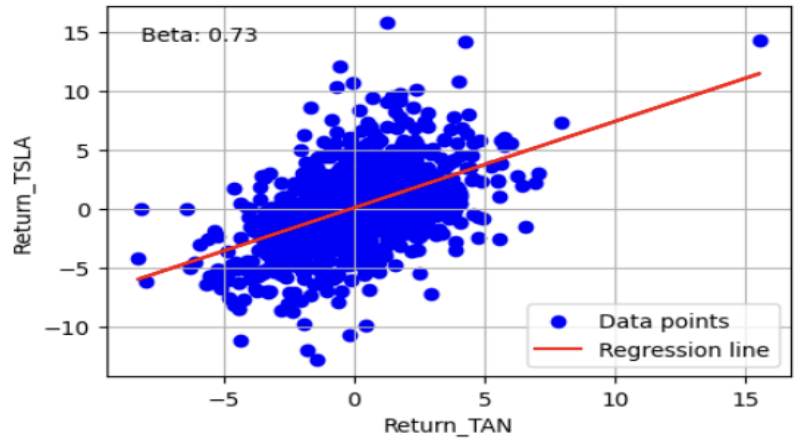
Return_SOXX
Data points
Regression line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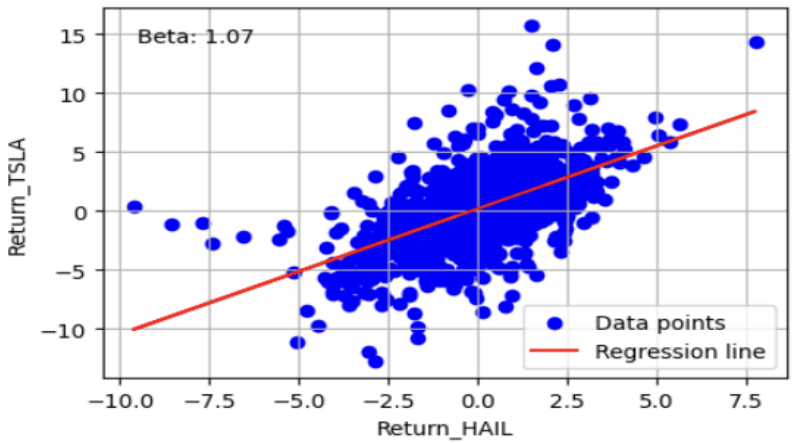
Return_TAN
Data points
Regression line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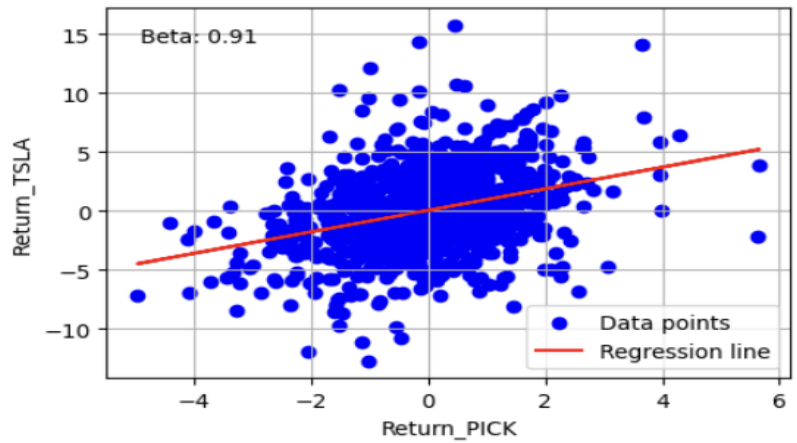
Return_TSLA
Return_HAIL
Data points
Regression line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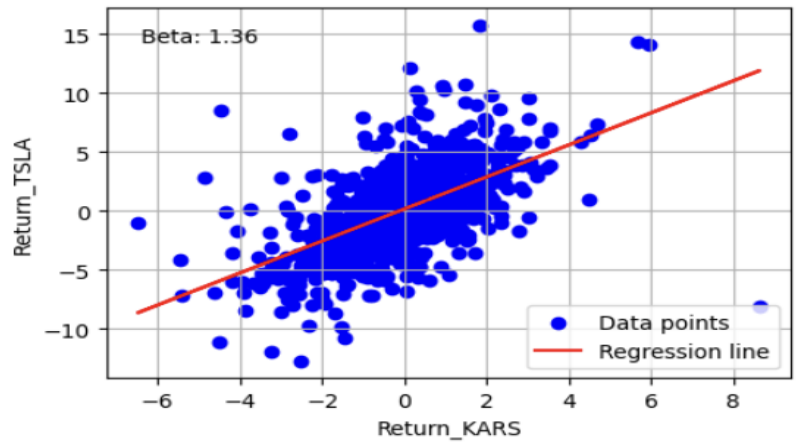
Return_TSLA
Return_PICK
Data points
Regression line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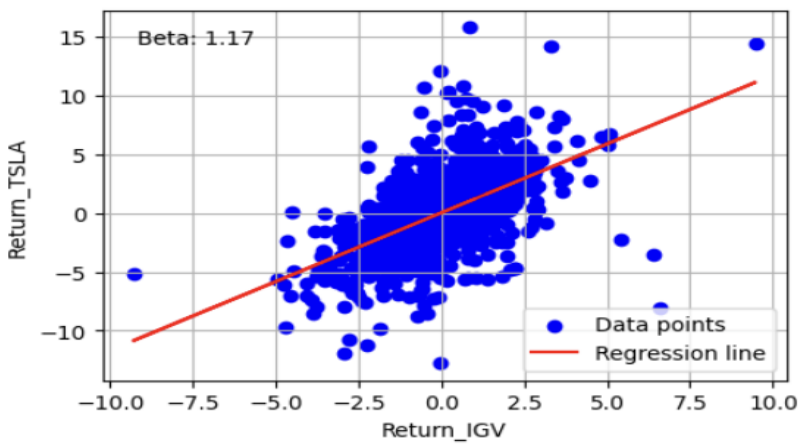
Return_TSLA
Return_KARS
Data points
Regression line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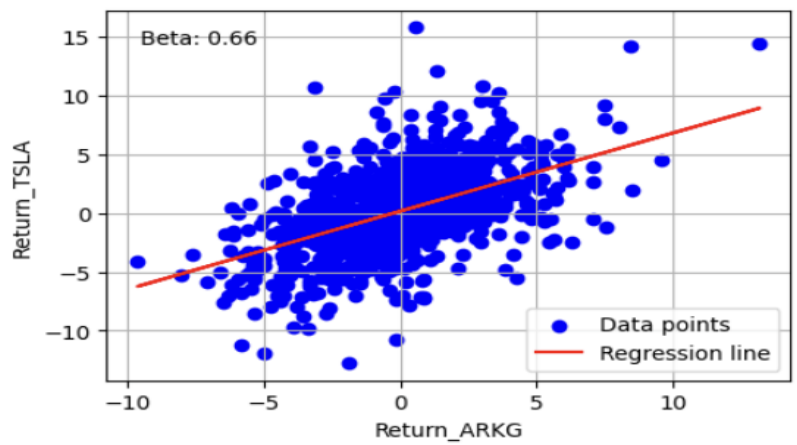
Return_TSLA
Return_IGV
Data points
Regression line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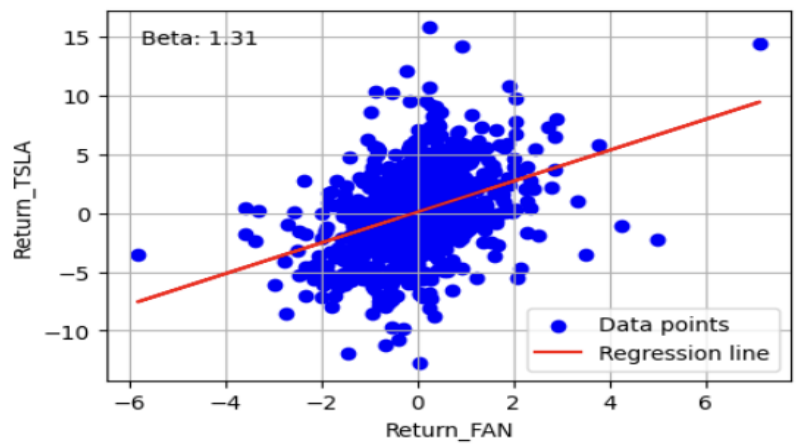
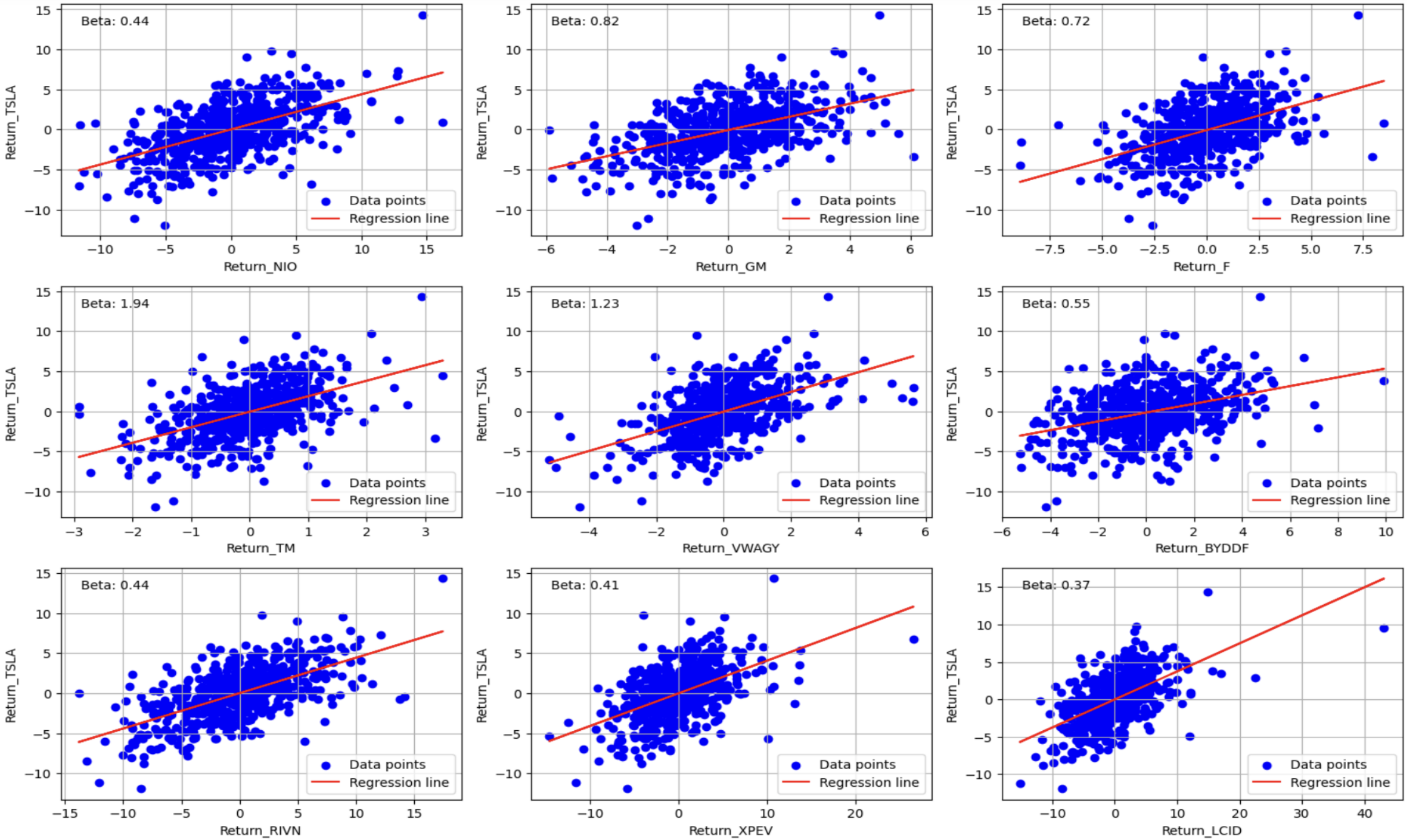
Return_TSLA
Return_ARKG
Data points
Regression line


Beta: 1.31
Return_TSLA
Return_FAN
Data points
Regression line

Same sector stocks

Different stocks with expected predictive power for Tesla:

- **NIO Inc. (NIO)**
- **General Motors Company (GM)**
- **Ford Motor Company (F)**
- **Toyota Motor Corporation (TM)**
- **Volkswagen Group (VWAGY)**
- **BYD Company Limited (BYDDF)**
- **Rivian (RIVN)**
- **XPeng Inc. (XPEV)**
- **Lucid Motors (LCID)**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Return_NIO
Data points
Regression line
Beta: 0.82
Return_TSLA
Return_GM
Data points
Regression line
Beta: 0.72
Return_TSLA
Return_F
Data points
Regression line
Beta: 1.94
Return_TSLA
Return_TM
Data points
Regression line
Beta: 1.23
Return_TSLA
Return_VWAGY
Data points
Regression line
Beta: 0.55
Return_TSLA
Return_BYDDF
Data points
Regression line
Beta: 0.44
Return_TSLA
Return_RIVN
Data points
Regression line
Beta: 0.41
Return_TSLA
Return_XPEV
Data points
Regression line
Beta: 0.37
Return_TSLA
Return_LCID
Data points
Regression line

Data further improvements

- Sentiment analysis of Twitter/Reddit posts about Tesla
- Dummy for Elon Musk speaking or posting in the last day, week, month

Description of the Models
(See Notebooks)

Results

- Results based on a rolling-window of past **ETFs and Tesla's** returns:

Algorithm	Test Accuracy (Previous return)	Test Accuracy (Rolling window)
Logistic regression	0.50	0.48
Random Forest	**0.57**	**0.53**
Gradient Boosting	0.50	0.45
KNN	0.53	0.49
Neural Networks	0.48	0.47

- Results based on a rolling-window of past **selected stocks'** returns:

Algorithm	Test Accuracy (Previous return)	Test Accuracy (Rolling window)
Logistic regression	0.48	0.42
Random Forest	0.52	0.52
Gradient Boosting	**0.54**	**0.57**
KNN	0.50	0.51
Neural Networks	**0.54**	**0.58**