

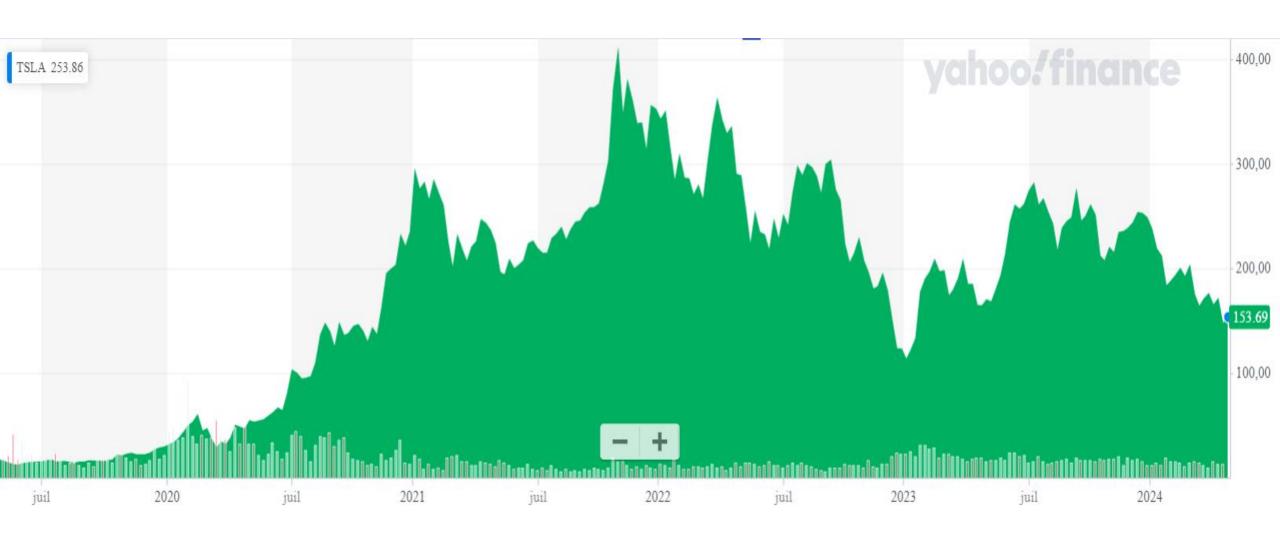


Machine Learning in Finance Mini project 2

Trading algorithm for the Tesla stock

Data exploration

Tesla's stock evolution

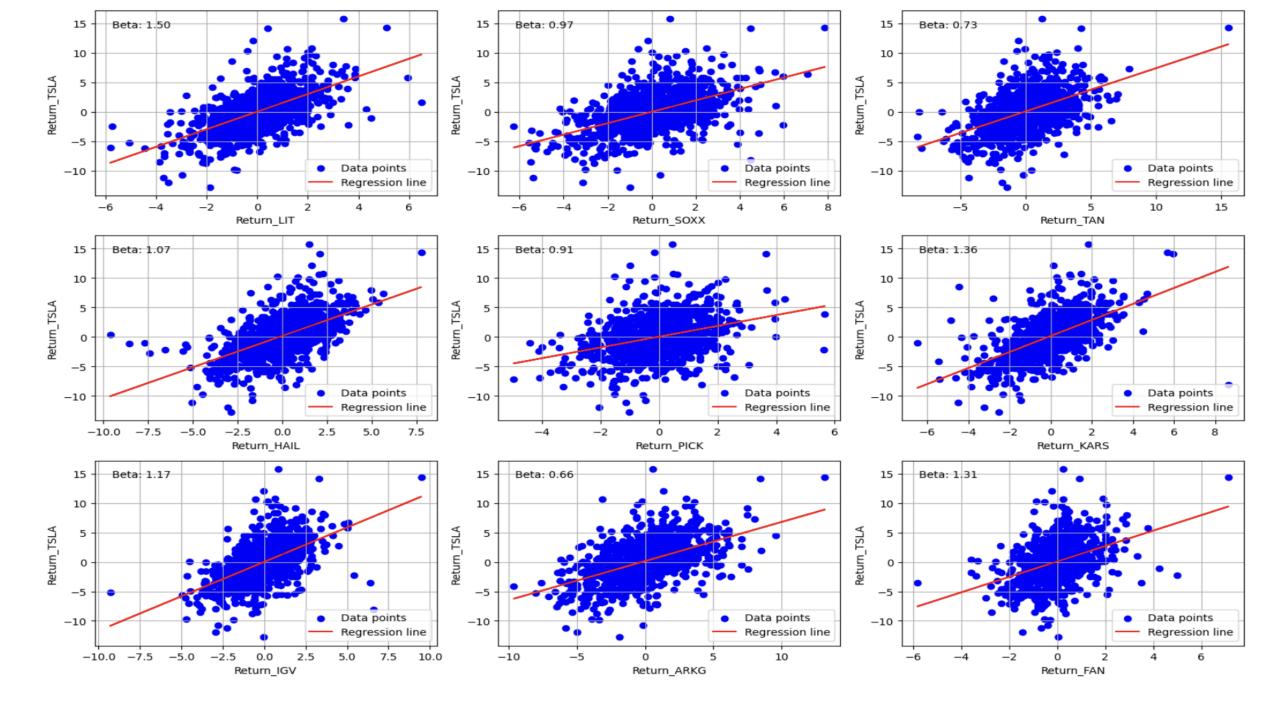


ETFs

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)**

				Cor	relation	of Retu	ırns			
Return_LIT -	1.00	0.66	0.68	0.73	0.64	0.76	0.62	0.63	0.68	0.61
Return_SOXX -	0.66	1.00	0.57	0.70	0.54	0.71	0.78	0.60	0.60	0.52
Return_TAN -	0.68	0.57	1.00	0.65	0.41	0.65	0.57	0.64	0.67	0.49
Return_HAIL -	0.73	0.70	0.65	1.00	0.58	0.76	0.64	0.66	0.63	0.57
Return_PICK -	0.64	0.54	0.41	0.58	1.00	0.59	0.47	0.42	0.58	0.34
Return_KARS -	0.76	0.71	0.65	0.76	0.59	1.00	0.65	0.63	0.61	0.58
Return_IGV -	0.62	0.78	0.57	0.64	0.47	0.65	1.00	0.67	0.59	0.54
Return_ARKG -	0.63	0.60	0.64	0.66	0.42	0.63	0.67	1.00	0.60	0.52
Return_FAN -	0.68	0.60	0.67	0.63	0.58	0.61	0.59	0.60	1.00	0.39
Return_TSLA -	0.61	0.52	0.49	0.57	0.34	0.58	0.54	0.52	0.39	1.00
	Return_LIT -	etum_SOXX -	Return_TAN -	Return_HAIL -	Return_PICK -	etum_KARS -	Return_IGV -	eturn_ARKG -	Return_FAN -	Return_TSLA -



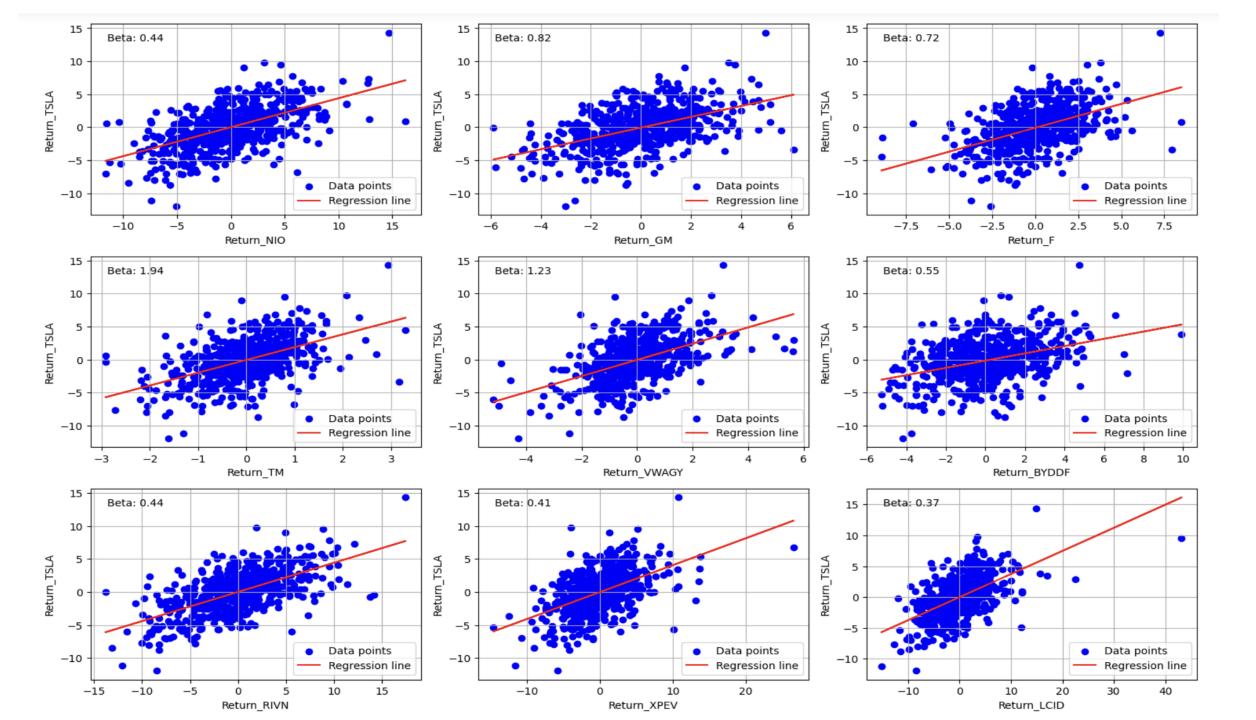
Same sector stocks

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)**

	Corre	lation	of	Returns
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	Correlation of Returns									
Return_NIO	1.00	0.45	0.41	0.45	0.41	0.48	0.57	0.78	0.52	0.56
Return_GM	0.45	1.00	0.82	0.62	0.56	0.30	0.49	0.38	0.42	0.50
Return_F	0.41	0.82	1.00	0.63	0.56	0.27	0.48	0.36	0.41	0.48
Return_TM	0.45	0.62	0.63	1.00	0.61	0.27	0.47	0.42	0.40	0.51
Return_VWAGY	0.41	0.56	0.56	0.61	1.00	0.32	0.43	0.38	0.36	0.52
Return_BYDDF	0.48	0.30	0.27	0.27	0.32	1.00	0.32	0.47	0.30	0.37
Return_RIVN	0.57	0.49	0.48	0.47	0.43	0.32	1.00	0.52	0.65	0.61
Return_XPEV	0.78	0.38	0.36	0.42	0.38	0.47	0.52	1.00	0.45	0.50
Return_LCID	0.52	0.42	0.41	0.40	0.36	0.30	0.65	0.45	1.00	0.56
Return_TSLA	0.56	0.50	0.48	0.51	0.52	0.37	0.61	0.50	0.56	1.00
	Return_NIO	Return_GM	Return_F	Return_TM	Return_VWAGY	Return_BYDDF	Return_RIVN	Return_XPEV	Return_LCID	Return_TSLA



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		