



STOCK SYNERGY

By Abhishek Pal

PROCESS

01

Find the Rate of Change of Stock over a window of 2 years and also take into account the near window Changes. Assign Each day into pre-defined category.

02

Label each stock as a sequence of the identified Categories

Find the pairwise similarity between sequences

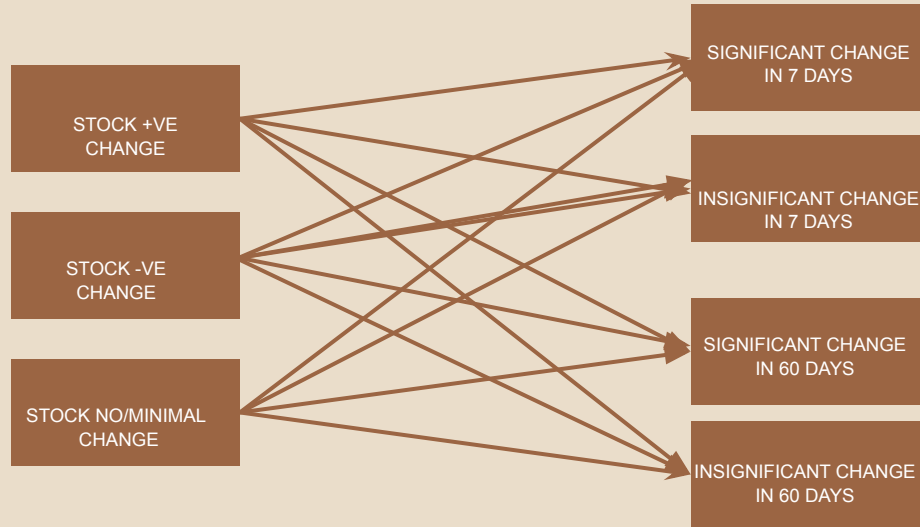
03

Cluster Stock Basis of Similarity Between stocks

STEP1: LABELLING MOVEMENT

1. Compute the rate of change in Stock price over a 2-year window. At every timestamp.
2. To take into account the variations we compute the mean and variance of this change in the 7 and 60-day period prior to each date.
3. Categorize the movement at each timestamp when compared to changes in 7 and 60 days window. Considering these properties we create a total of 12 categories.

STEP1: LABELLING MOVEMENT



12 LABELS

STEP2: LABELLING SEQUENCE



STEP2.1: SEQUENCE MATCHING

STOCK

1

3	5	6	11	12	2	1	1	1	9	5	7	10	12	12	8	8	8	6	6	6	6	1	1
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STOCK2

2	5	11	11	12	2	1	3	1	9	5	7	10	12	10	8	8	8	6	4	6	11	11	11
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SIMILARITY

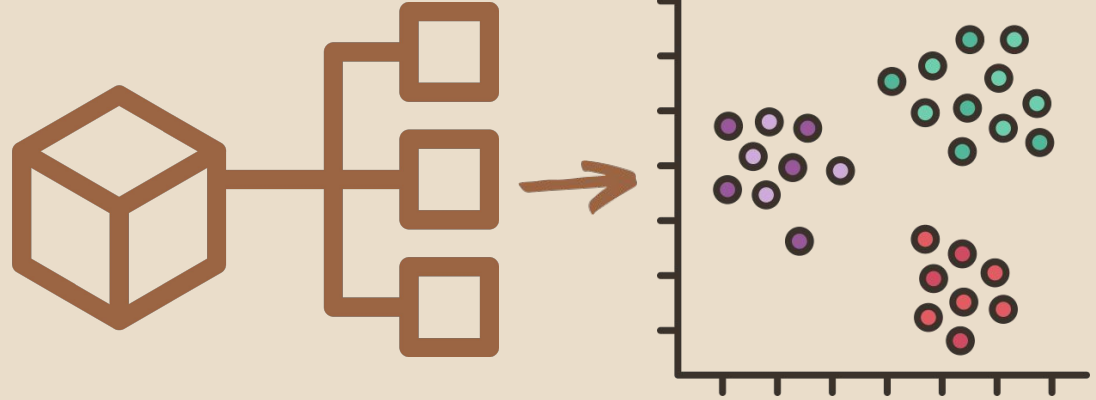
0	1	0	1	1	1	1	0	1	1	1	1	1	1	0	1	1	1	1	0	1	0	0	0
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66.67% MATCH

STEP3: CLUSTERING

Using the Similarity Score Derived in the Previous Step We Cluster Stocks that are highly Similar



OBSERVATION



MMM: 3M Company is an American multinational conglomerate operating in the fields of industry, worker safety, healthcare, and consumer goods

CTSH: Cognizant Technology Solutions Corporation is an American multinational information technology services and consulting company.

EMN: Eastman Chemical Company is an American company primarily involved in the chemical industry.

EVALUATION

1. Based On the clustering result we now know the Stocks that have similar movement
2. Over the Test Period (Beyond the Period of Clustering) we find the average similarity of Stocks that were assigned to same Cluster
3. This Similarity is computed over the rate of change every day for any pair of sequences over the 3/6 months period

Average Stock Similarity In Cluster (6 months)
65.59%

Weighted Average Stock Similarity In Cluster(6 months)
61.32%

Average Stock Similarity In Cluster (3 months)
70%

Weighted Average Stock Similarity In Cluster(3 months)
69.59%

EVALUATION

1. We Run the Similar Evaluation but now we have 3 categories of Up/Down/Flat instead of 12 categories

Average Stock Similarity In Cluster (6 months)
65.00%

Weighted Average Stock Similarity In Cluster(6 months)
61.03%

Average Stock Similarity In Cluster (3 months)
69.88%

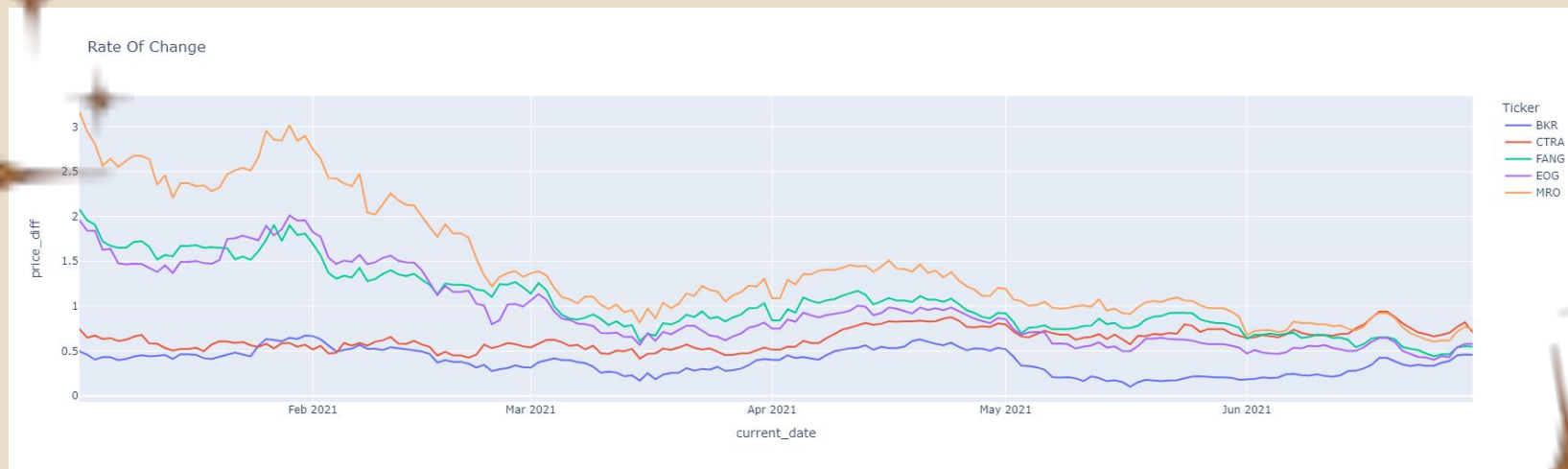
Weighted Average Stock Similarity In Cluster(3 months)
68.92%

EVALUATION

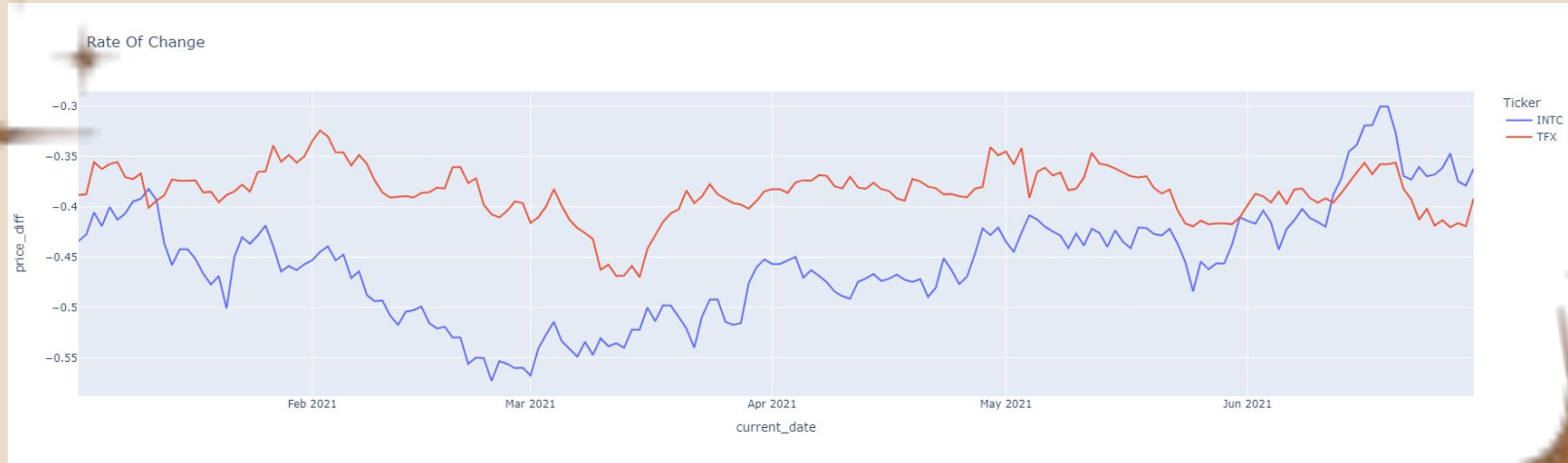
Cluster	Ticker	Average Percentage Match	len	Sub-Industry Counter	Different Sub-Industries
43	[BKR, 'CTRA', 'FANG', 'EOG', 'MRO]	0.9944751381	5	['Oil & Gas Equipment & Services': 1, 'Oil & Gas Exploration & Production': 4]	2
48	[LW, 'SRE]	0.9944751381	2	['Packaged Foods & Meats': 1, 'Multi-Utilities': 1]	2
27	[INTC, 'TFX]	0.9944751381	2	['Semiconductors': 1, 'Health Care Equipment': 1]	2
31	[ADBE, 'ALGN', 'BALL', 'BBY', 'EBAY', 'ETSY', 'QRVO]	0.9944751381	7	['Application Software': 1, 'Health Care Supplies': 1, 'Metal, Glass & Plastic Containers': 1, 'Computer & Electronics Retail': 1, 'Broadline Retail': 2, 'Semiconductors': 1]	6
23	[D, 'WDC]	0.9889502782	2	['Multi-Utilities': 1, 'Technology Hardware, Storage & Peripherals': 1]	2
51	[BAX, 'CPAY', 'WBD]	0.9834254144	3	['Health Care Equipment': 1, 'Transaction & Payment Processing Services': 1, 'Broadcasting': 1]	3
28	[MKTX, 'UBER', 'ZBH]	0.9834254144	3	['Financial Exchanges & Data': 1, 'Passenger Ground Transportation': 1, 'Health Care Equipment': 1]	3
59	[FE, 'PCG]	0.9779005525	2	['Electric Utilities': 1, 'Multi-Utilities': 1]	2
29	[AKAM, 'AMZN', 'ANSS', 'ADSK', 'CHTR', 'DLR', 'ILMN', 'MTCH', 'META', 'CRM', 'SWKS', 'SWK', 'TTWO]	0.951267885	13	['Internet Services & Infrastructure': 1, 'Broadline Retail': 1, 'Application Software': 3, 'Cable & Satellite': 1, 'Data Center REITs': 1, 'Life Sciences Tools & Services': 1, 'Interactive Media & Services': 2, 'Semiconductors': 1, 'Industrial Machinery & Supplies & Components': 1, 'Interactive Home Entertainment': 1]	10
26	[CLX, 'CSGP', 'DAY', 'ECL', 'NFLX', 'PYPL', 'DIS]	0.8939752697	7	['Household Products': 1, 'Real Estate Services': 1, 'Human Resource & Employment Services': 1, 'Specialty Chemicals': 1, 'Movies & Entertainment': 2, 'Transaction & Payment Processing Services': 1]	6
32	[ARE, 'CZR', 'YMX', 'CMCSA', 'EA', 'NEM', 'TROW', 'TVL]	0.8620757695	8	['Office REITs': 1, 'Casinos & Gaming': 1, 'Automotive Retail': 1, 'Cable & Satellite': 1, 'Interactive Home Entertainment': 1, 'Gold': 1, 'Asset Management & Custody Banks': 1, 'Application Software': 1]	8
41	[ATO, 'ED', 'EIX', 'H', 'KMI', 'TAP', 'OXY', 'OKE', 'PSX', 'SLB', 'VLO', 'VST]	0.8489033986	12	['Gas Utilities': 1, 'Multi-Utilities': 1, 'Electric Utilities': 2, 'Aerospace & Defense': 1, 'Oil & Gas Storage & Transportation': 2, 'Brewers': 1, 'Oil & Gas Exploration & Production': 1, 'Oil & Gas Refining & Marketing': 2, 'Oil & Gas Equipment & Services': 1]	9

We can observe that stocks from various sub-industries tend to move in a similar manner, thus confirming our hypothesis.

EVALUATION(CLUSTER SAMPLES)



EVALUATION(CLUSTER SAMPLES)



EVALUATION(CLUSTER SAMPLES)



The background is a light beige color with various decorative elements. In the top left, there are brown swirls. To the left of the text, there is a vertical line and a cluster of small brown dots. In the bottom left, there are more swirls and small star-like shapes. In the top right, there is a large, textured brown shape. In the bottom right, there are more swirls and star-like shapes.

THANK YOU
SO MUCH