Investment Insights (ML)

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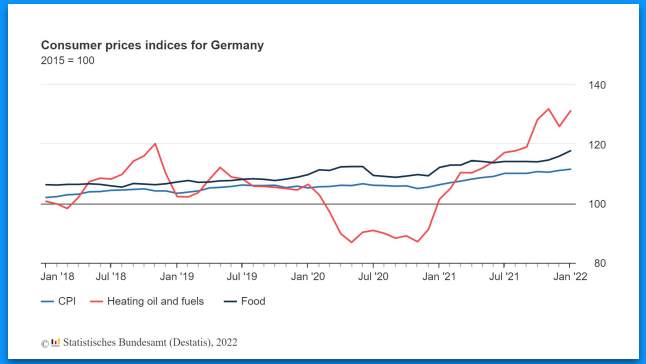
Group 7

Germany’s Record Inflation



Consumer Prices

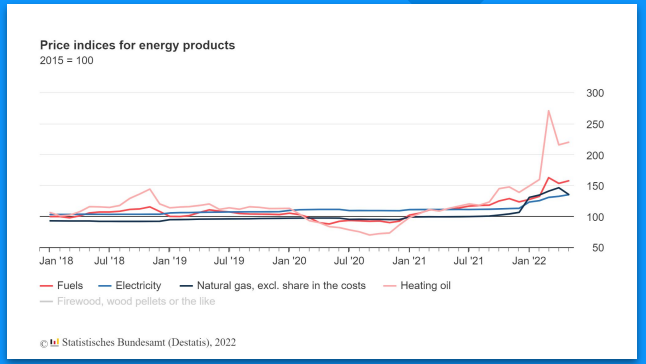
+4.9% on the same month a year earlier

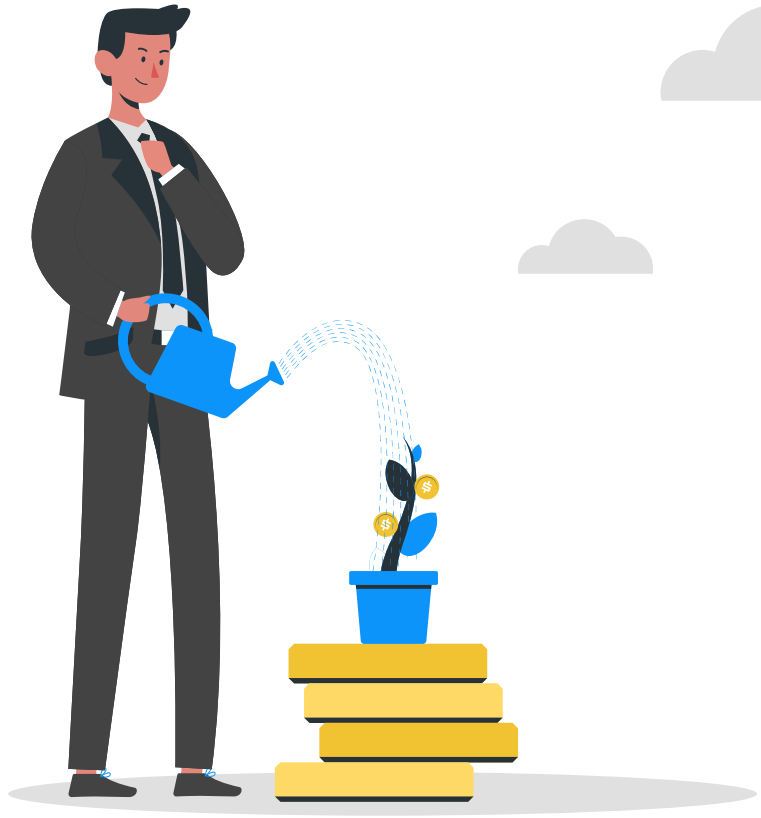
Energy

Energy prices up 20.5% year on year

Inflation Rate

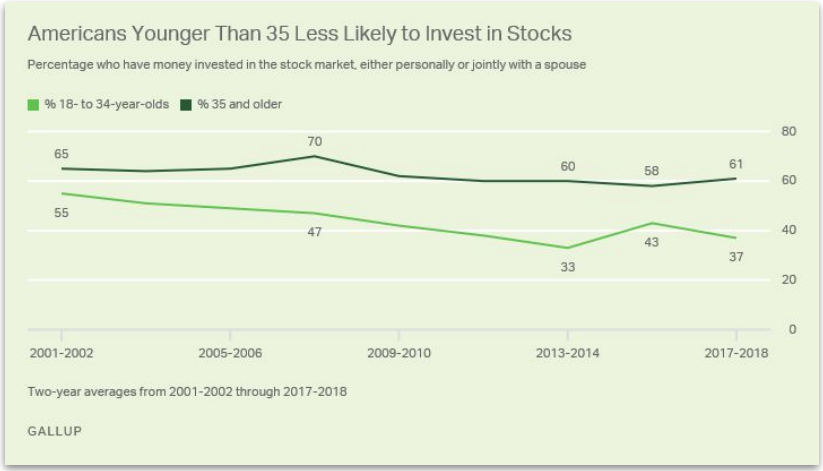
5.0% increase in food prices compared with a year earlier





In 2022, the percentages owning stock range from highs of 89% of adults in households earning $100,000 or more and 79% of those with postgraduate education to a low of 25% of those in households earning less than $40,000.

—Gallup



Stock Categories

1. **Technology**
   Popular, large returns and growth
2. **Healthcare**
   Consistent, required,
3. **Raw Material**
   Scarce, limited, related to everything
4. **Real Estate**
   Housing is always required, rent increasing
5. **Renewables**
   Major future potential, sustainable

What about data?

Date	Open	High	Low	Close	Adj Close	Volume	Revenue
01/01/2014	86989998	88559998	86080002	88349998	85826630	4530600	3,4914E+11
08/01/2014	88250000	90629997	87739998	89489998	86934082	6285000	3,4914E+11
15/01/2014	89639999	90550003	88209999	90129997	87555786	5040100	3,4914E+11
22/01/2014	90349998	90480003	85900002	85940002	83485466	6502900	3,4914E+11
29/01/2014	85480003	88050003	83680000	84949997	82523750	6288800	3,4914E+11
05/02/2014	84230003	85730003	76129997	77220001	75014526	20304200	3,4914E+11
12/02/2014	77389999	78660004	75370003	77589996	75373940	16124100	3,4914E+11
19/02/2014	77500000	79629997	76370003	78160004	75927689	13284600	3,4914E+11
26/02/2014	78029999	80040001	77419998	79709999	77433411	8438100	3,4914E+11
05/03/2014	79809998	80470001	78570000	79959999	77676262	7598300	3,4914E+11
12/03/2014	79070000	79779999	76410004	77690002	75509308	11947300	3,4914E+11
19/03/2014	77900002	84370003	77730003	80309998	78055779	14052800	3,4914E+11
26/03/2014	80410004	84730003	76790001	83050003	80718872	16131100	3,4914E+11
02/04/2014	82940002	83739998	80349998	81320000	79037415	9462700	3,4914E+11
09/04/2014	81519997	82230003	76269997	77330002	75159416	8824900	3,4914E+11

Lacked Context

Open, high, low, close, adj close

Unintuitive

Have less room for data analysis

Non-original

There's bunch of projects solely on this already

EBITDA

Operating Profit + Depreciation + Amortization

ETS

Total Earnings + Outstanding Shares

Graham

√ 22.5 * EPS * Book Value Per Share

dividendPayoutRatio / Average Inventory / Days Sales Outstanding / Days Payables Outstanding / Days of Inventory on Hand / Sector / Class / 3Y Shareholders Equity Growth (per Share) / 10Y Dividend per Share Growth (per Share) / 5Y Dividend per Share Growth (per Share) / 3Y Dividend per Share Growth (per Share) / 5Y Shareholders Equity Growth (per Share) / 10Y Shareholders Equity Growth (per Share) / 3Y Operating CF Growth (per Share) / 5Y Operating CF Growth (per Share) / 10Y Operating CF Growth (per Share) / Free Cash Flow growth / Operating Cash Flow growth / Short-term investments / Cash and short-term investments / Inventories / Total current assets / Long-term investments / Total non-current assets / Short-term debt / Total current liabilities / Long-term debt / Interest Expense / Tax Liabilities / Total non-current liabilities / Net Debt / Other Assets / Other Liabilities / Stock-based compensation / Acquisitions and disposals / Capital Expenditure / Investing Cash flow / Investment purchases and sales / Net Cash/Marketcap / dividendYield / returnOnAssets / returnOnCapitalEmployed / eBTperEBIT.1 / inventoryTurnover / currentRatio / quickRatio / cashRatio / aysOfSalesOutstanding / operatingCycle / cashConversionCycle / longtermDebtToCapitalization / totalDebtToCapitalization / interestCoverage / cashFlowToDebtRatio / payoutRatio / cashFlowCoverageRatios / shortTermCoverageRatios / Net Debt to EBITDA / Current ratio / Interest Coverage / Dividend / Yield Payout Ratio / SG&A to Revenue / R&D to Revenue / Stock-based compensation to Revenue / ROIC / Return on Tangible Assets / Working Capital / Net Current Asset Value / Inventory Turnover / Weighted Average Shares Diluted Growth / Dividends per Share Growth / Inventory Growth / R&D Expense Growth / R&D Expenses / SG&A Expense / Income Tax Expense / 2019 PRICE VAR [%] / SG&A Expenses Growth / Book Value per Share Growth / Capex per Share / Payables Turnover / Receivables Turnover / Average Payables / Average Receivables / Graham Net-Net / Capex to Depreciation / Capex to Operating Cash Flow / Capex to Revenue / Intangibles to Total Assets / Free Cash Flow Yield / Debt to Equity / Debt to Assets / EV to Operating cash flow / EV to Free cash flow / EV to Sales / Price to Sales Ratio / Interest Debt per Share / Tangible Book Value per Share / Shareholders Equity per Share / Free Cash Flow per Share / Cash per Share / Book Value per Share / dividendpaidAndCapexCoverageRatios / capitalExpenditureCoverageRatios / freeCashFlowOperatingCashFlowRatio / freeCashFlowPerShare / cashPerShare / operatingCashFlowSalesRatio / daysOfInventoryOutstanding / daysOfPayablesOutstanding / effectiveTaxRate / Dividend payments / Operating Expenses / Earnings before Tax / Net Income - Non-Controlling int / EPS Diluted / Weighted Average Shs Out / Weighted Average Shs Out (Dil) / Dividend per Share / Profit Margin / Free Cash Flow margin / Consolidated Income / Earnings Before Tax Margin / Cash and cash equivalents / Other comprehensive income / Retained earnings (deficit) / Depreciation & Amortization / Operating Cash Flow / Issuance (repayment) of debt /Issuance (buybacks) of shares / Dividend payments / Financing Cash Flow / Effect of forex changes on cash / Free Cash Flow

“Data” in depth

Prices

Open, high, low, close, adj close

1

EBIT / EBITDA

Earnings before interest, tax, depreciation, and amortization

2

3

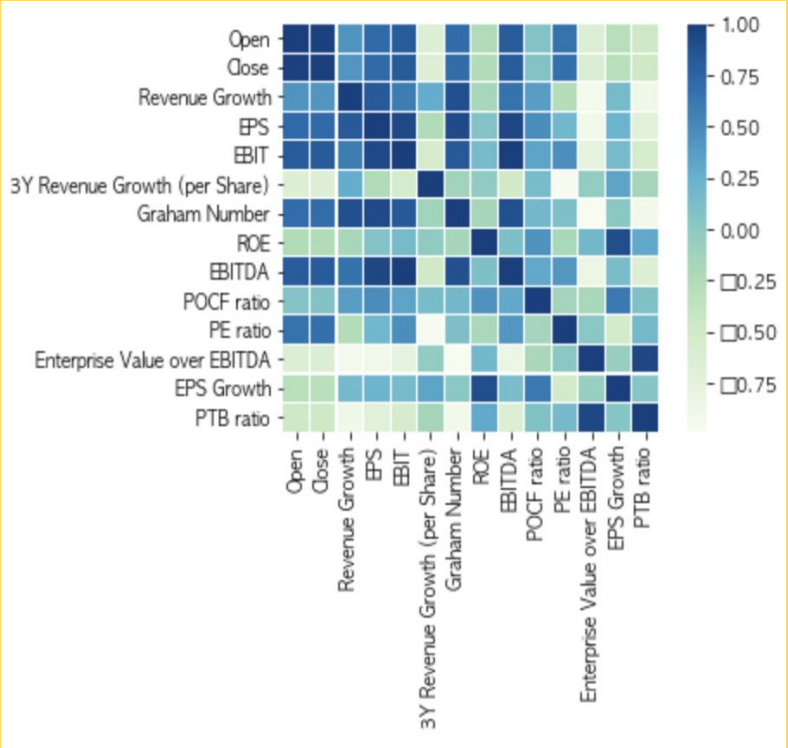
EPS

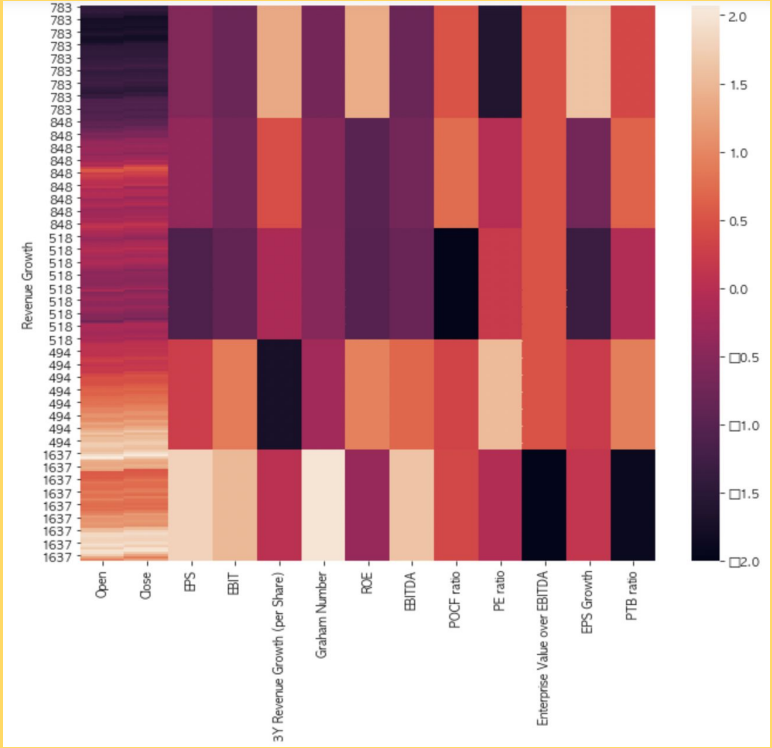
Value of earnings per outstanding share

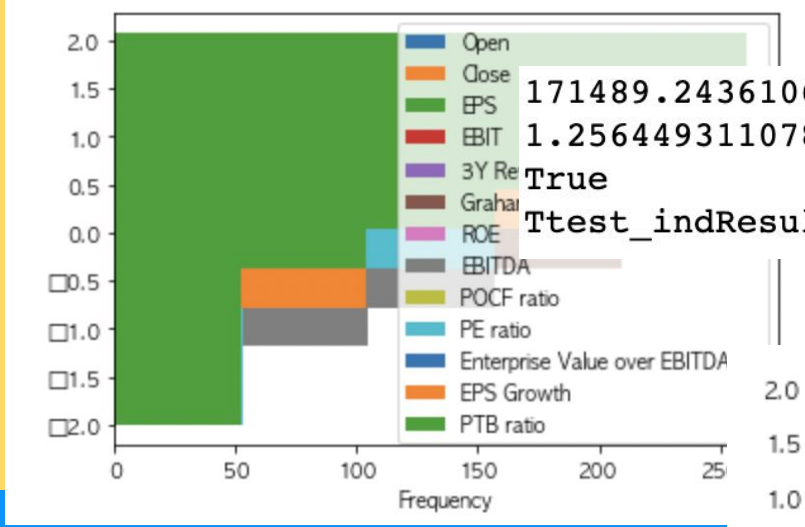
4

Graham

Stock’s fundamental value by EPS and BVPS


Open
Close
Revenue Growth
EPS
EBIT
3Y Revenue Growth (per Share)
Graham Number
ROE
EBITDA
POCF ratio
PE ratio
Enterprise Value over EBITDA
EPS Growth
PTB ratio
1.00
0.75
0.50
0.25
0.00
□0.25
□0.50
□0.75


Revenue Growth
783
848
518
494
1637
Open
Close
EPS
EBIT
3Y Revenue Growth (per Share)
Graham Number
ROE
EBITDA
POCF ratio
PE ratio
Enterprise Value over EBITDA
EPS Growth
PTB ratio
2.0
1.5
1.0
0.5
0.0
□0.5
□1.0
□1.5
□2.0

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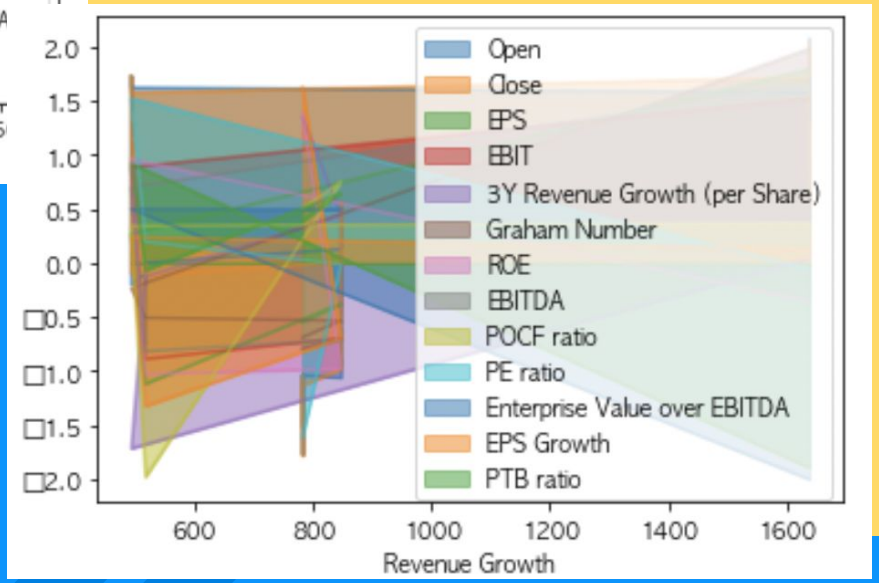
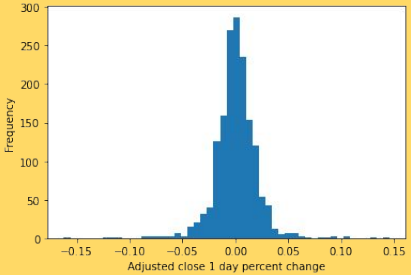
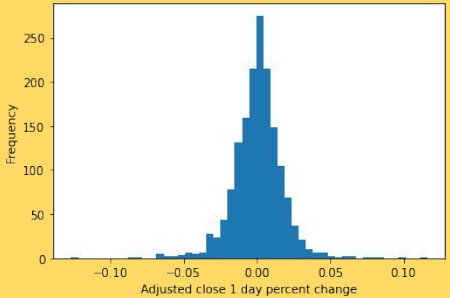


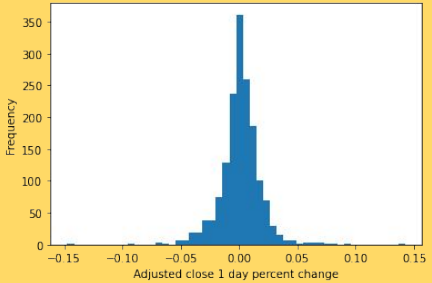
Data Exploration



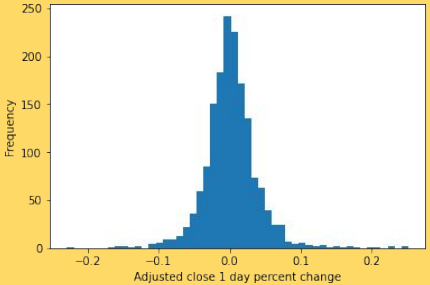
CIGNA

Equinix





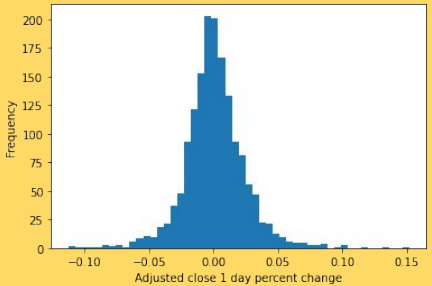
Microsoft



Solaredge Tech.

Gaussian Pattern

Around -0.01% to 0.01%.



Gold

Initial Modeling (ARIMA)

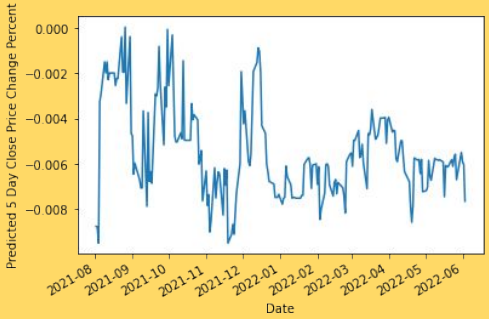
Unstable Results

Prediction too far off actual result

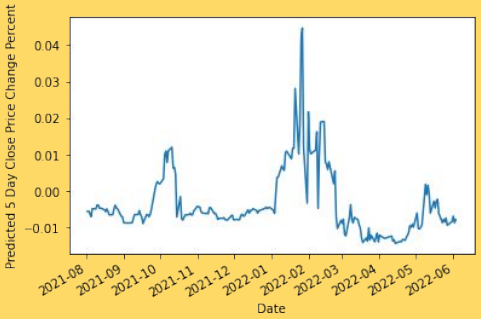
High RMSE

Gold - 0.41
Cigna - 3.32
Microsoft - 4.56
Solaredge Tech. - 8.03
Equinix (Real Est.) - 11.66

Random Forest #1

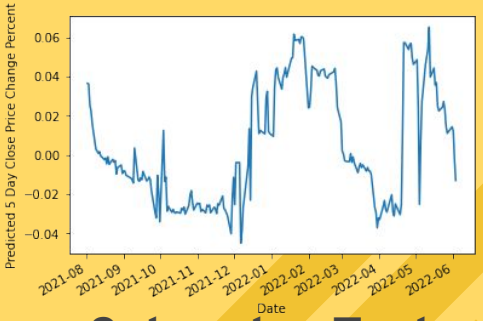


Cigna

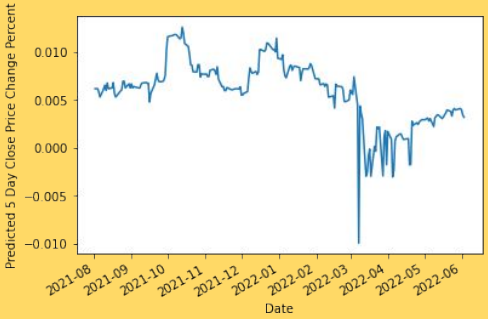


Equinix

Microsoft



Solaredge Tech.

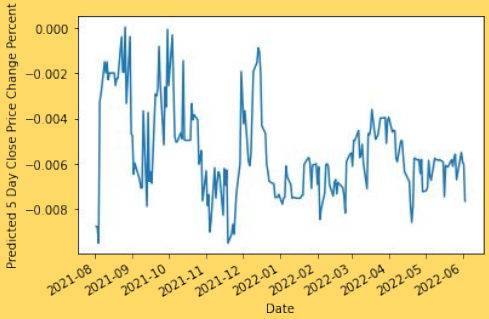


Gold

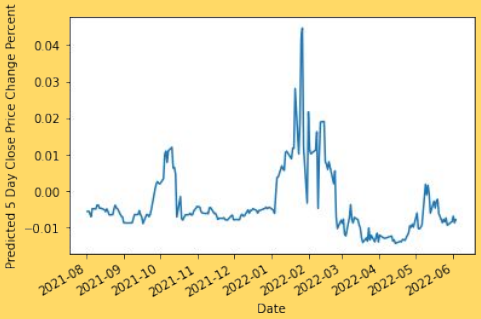
Change of Target

From actual Stock Value to % Change

Random Forest #2

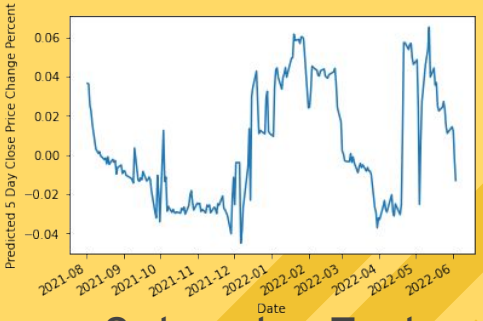


Cigna

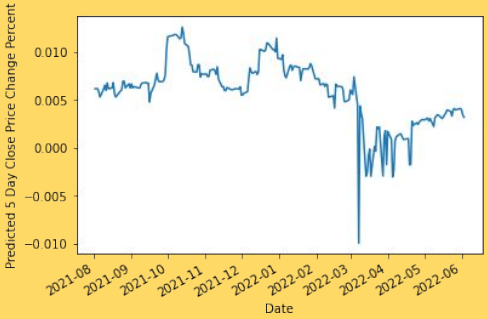


Equinix

Microsoft



Solaredge Tech.

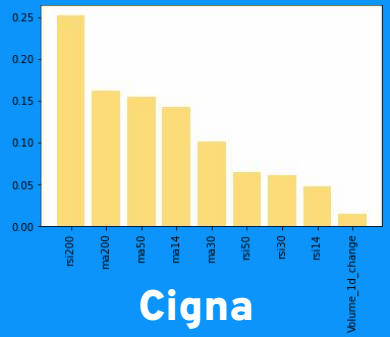


Gold

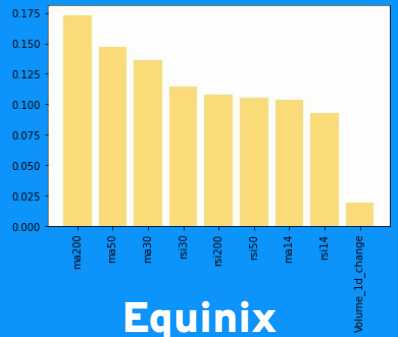
Better RMSE

Gold - **0.045**
Cigna - **0.036**
Microsoft - **0.046**
Solaredge Tech. - **0.095**
Equinix (Real Est.) - **0.040**

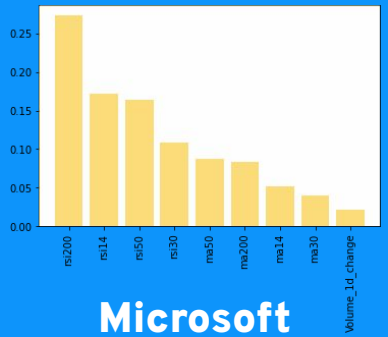
Feature Importance #1



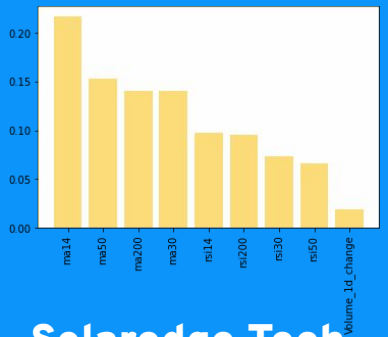
Cigna



Equinix



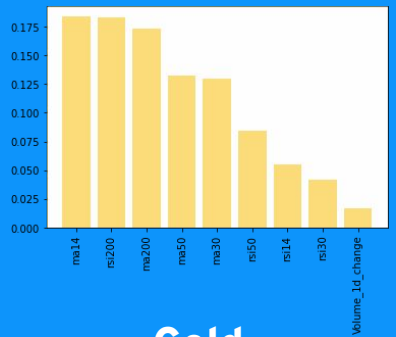
Microsoft



Solaredge Tech.

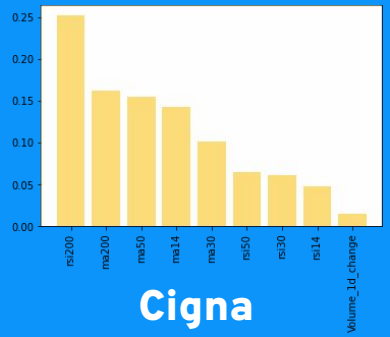
Most Important

RSI - 200 Days
MA - 200 Days

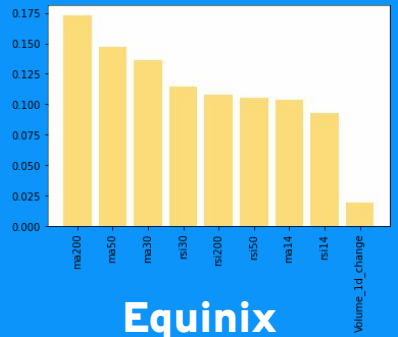


Gold

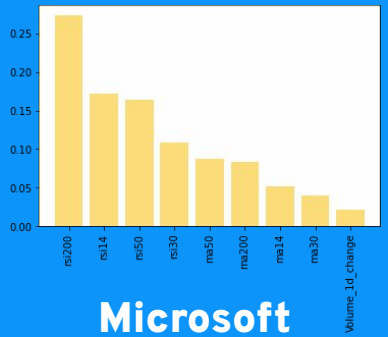
Feature Importance #2



Cigna



Equinix



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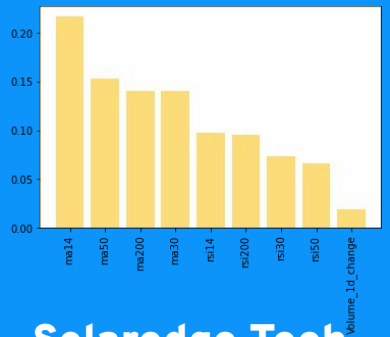
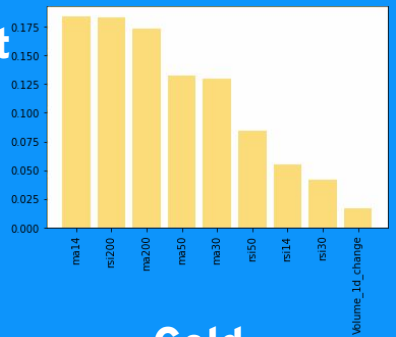


Solaredge Tech.

Least Important

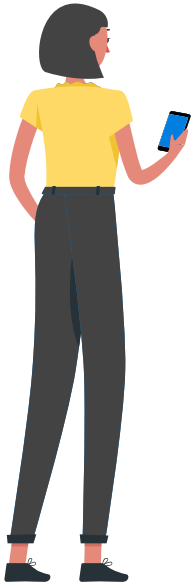
RSI - 14 Days
MA - 30 Days



Gold

Long Term Wins

Holding Stocks for more than 200 days

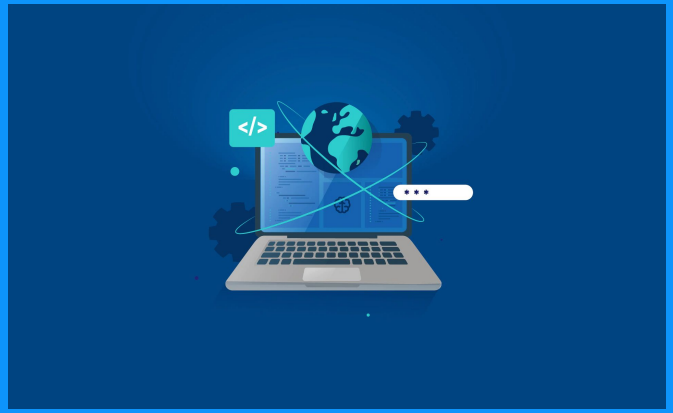


Real Estate

Less Vulnerable than Technology

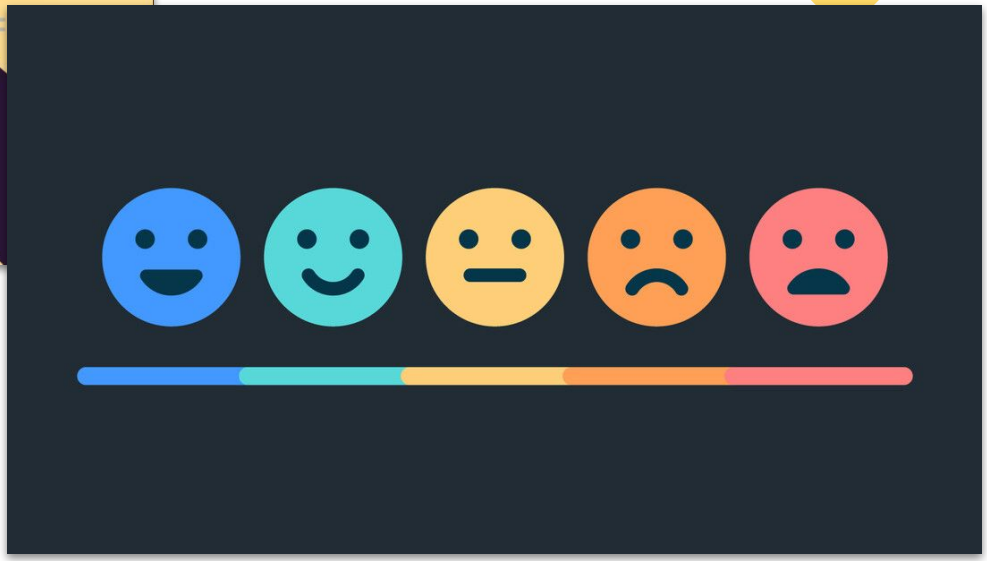
Renewables

Higher Stability



Ultimately the end goal of reporting and data visualization is to use your analytical results to impact decision making

Advanced Features



“Many systems will end up NOT being used as intended”

—Our program should be flexible enough so we can reflect the trends without disrupting how users have adapted the design to fit their needs.

Implications

Less financial burden

Fund analysis service has been usually the job for the haves

Educative nature

Have to take research on the fields to invest on certain funds

Further career

Some skills can be learned through the process listed

Encourages autonomy

Ultimately encourages autonomous financial means

Thanks!

Do you have any questions?