

# HKU SPACE TADASI Project

## Group 4: NASDAQ Dashboard

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# Aim of Dashboard

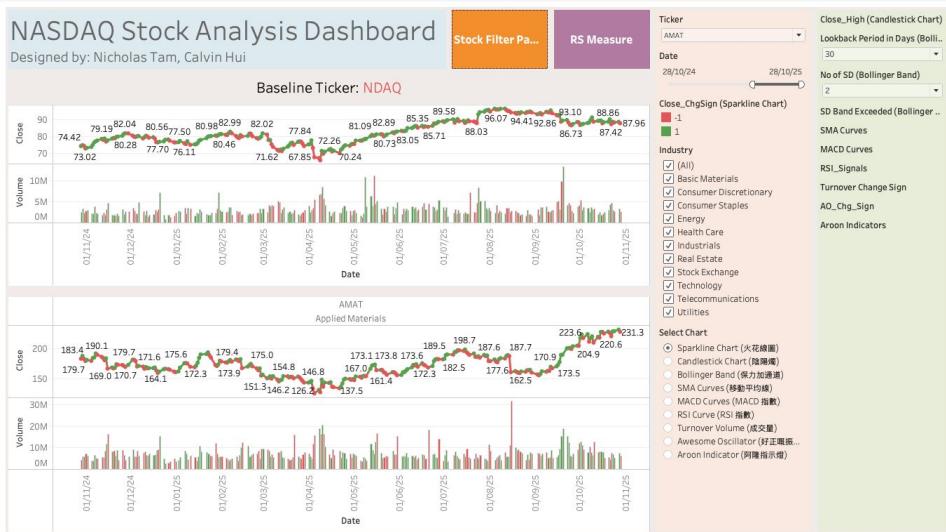
- Given variety of industries among the stocks involved in various indexes, not all stocks will be performing equally well at any given time; profits could be acquired by utilising stocks that perform better than common baseline
- NDAQ index: Stock index that covers 100 largest domestic and international non-financial companies listed on The Nasdaq Stock Market based on market capitalization (NASDAQ-100)
- Multiple types of technical indicator charts are provided to determine trading opportunities over time with high confluence
- Primary target of dashboard: Find NDAQ stocks that perform significantly better compared to baseline of NDAQ itself, especially over extensive periods of time; seeking out outliers among NDAQ stocks

# Dataset

- NASDAQ ticker list and details acquired from [Wikipedia](#) by scraping corresponding table (Wikimedia Foundation, 2025)
- OHLCV data sourced from `yfinance` (Yahoo!)
- Calculated the following columns through [Juptyer Notebook](#):
  - $RSI = 100/[100/(1 + (14\text{-day avg. gain})/(14\text{-day avg. loss}))]$
  - Aroon Up/Down =  $[14 - (\text{Days since period high/low})]/14$
  - 100-day drawdown =  $(\text{Current Price} - \text{Peak})/\text{Peak}$
  - Given R = Ratio of price between Ticker and NDAQ;  
Relative Strength to NDAQ =  $[(\text{Current R}) - (\text{Historical R})]/(\text{Historical R})$
  - Outliers with all of the following:
    - Ticker is strong (Drawdown  $> -5\%$ )
    - NDAQ is weak (Drawdown  $< -10\%$ )
    - Relative strength is high (% change in (Asset Price / Benchmark Price) ratio  $> 5\%$ )
  - Awesome Oscillator =  $(5\text{-day SMA}) - (34\text{-day SMA})$
  - Close and volume from previous days and corresponding change
  - Rate of change of Close

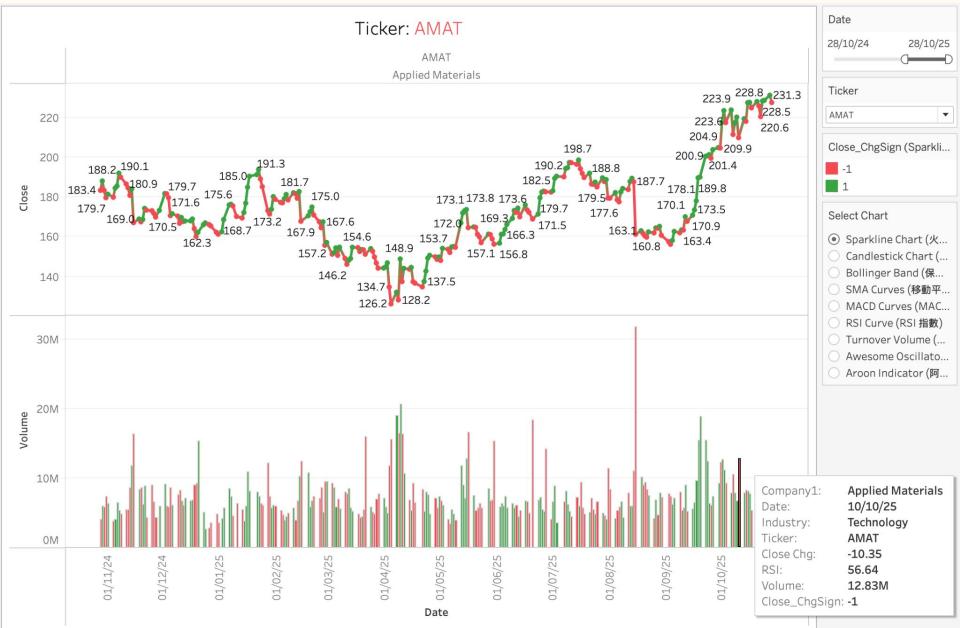
# Base Dashboard

- Top sparkline chart is for NASDAQ
- Orange sidebar shows filter for Ticker, Industry, Timeframe and Chart, with corresponding chart displayed at the bottom
- Green sidebar is used for specific charts
- Orange button redirects to Stock Filter Panel table
- Purple button redirects to Relative Strength Measure chart



# Sparkline Chart

- Chart of close and volume over time
- Colour mark for change in close for both Close and Volume, similar to most price charts



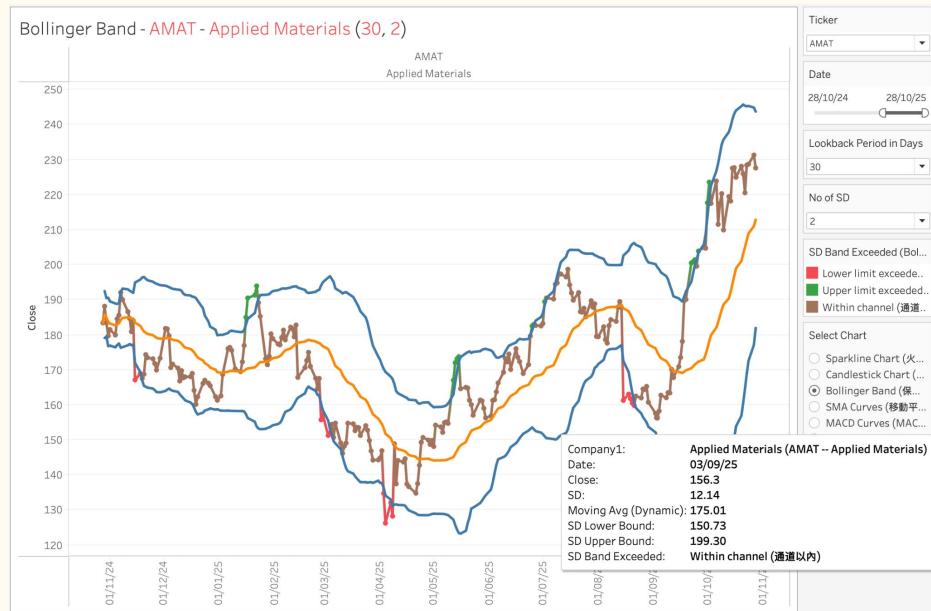
# Candlestick Chart

- Values represented by Gantt Bars
- Open and Close represented with boxes, High and Low represented with candle wicks
- Coloured based on price change from Open to Close
- Date treated as discrete to allow for consistent spacing between candles (Gantt Bars do not allow for such with continuous date)



# Bollinger Bands

- Dynamic Moving Average (DMA) = Average of Close over last (Lookback Period) days
- Upper/Lower Bollinger Bands =  $(DMA) +/-(\text{No of SD}) * (\text{SD of DMA})$
- Upper limit exceeded → Overbought
- Lower limit exceeded → Oversold



# SMA Curves

- SMAs of differing timeframes (e.g. 10, 20, 200)
- Note: In dataset, SMAs only begin to be calculated once there are sufficient number of days
- Short-timeframe SMA cross over long-timeframe SMA: Bullish signal
- Short-timeframe SMA cross under long-timeframe SMA: Bearish signal



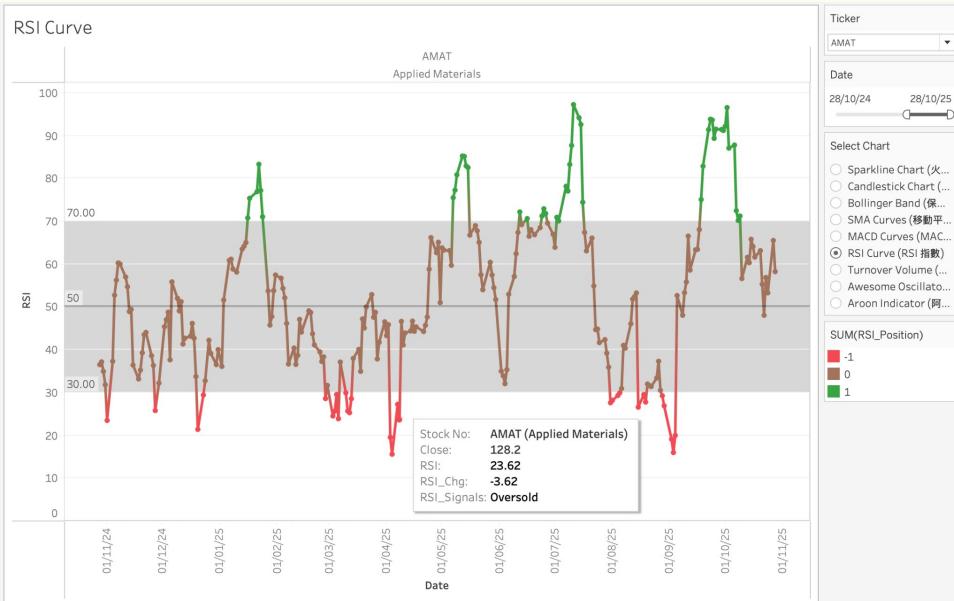
# MACD Curves

- $\text{MACD} = (\text{12-day Close EMA}) - (\text{26-day Close EMA})$
- MACD Signal = 9-day EMA of MACD
- MACD cross above Signal: Bullish signal
- MACD cross below Signal: Bearish signal



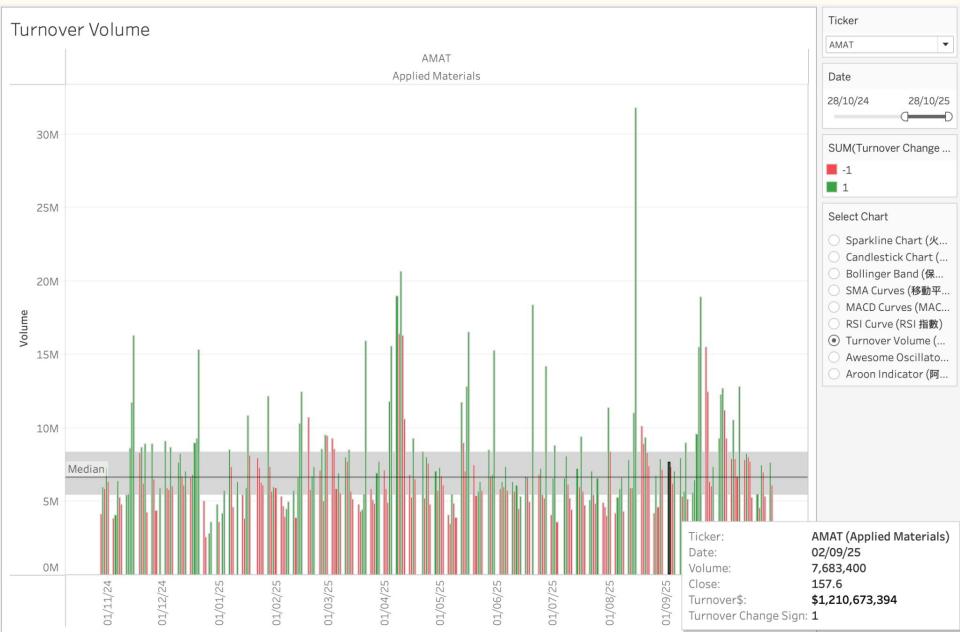
# RSI Curve

- $RSI = 100 - [100/(1 + RS)]$ 
  - $RS = (\text{Avg. Gain over 14 days})/(\text{Avg. Loss in 14 days})$
- RSI\_Position and RSI\_Signals to indicate if Ticker is overbought/oversold



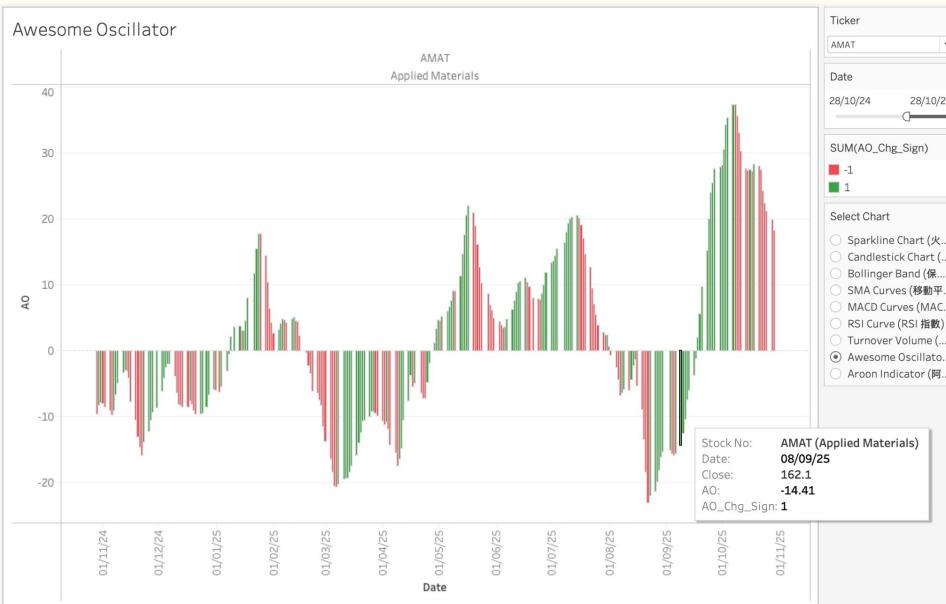
# Turnover Volume

- Volume can be used as indicator of volatility of price within the day
- Turnover\$ = Price \* Volume
- Volume bars coloured by change in Turnover\$



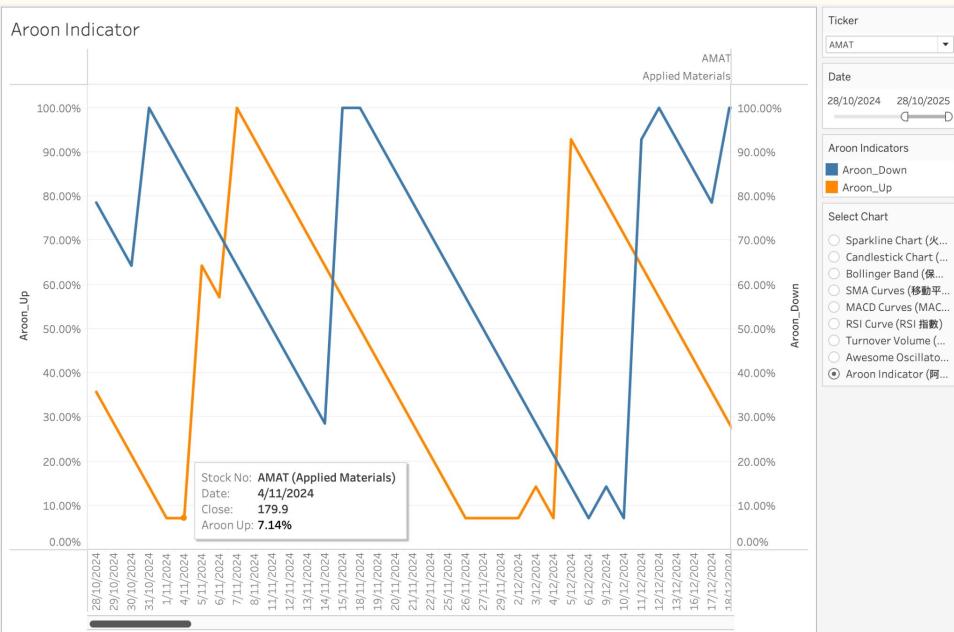
# Awesome Oscillator (AO)

- $\text{AO} = \text{5-day SMA} - \text{34-day SMA}$ 
  - $\text{AO} > 0$ : Overall momentum is bullish
  - $\text{AO} < 0$ : Overall momentum is bearish
  - $\text{AO} \approx 0$ : Overall momentum is low
- $\text{AO}_{\text{Chg\_Sign}} = 1$ : Bullish momentum decreasing
- $\text{AO}_{\text{Chg\_Sign}} = -1$ : Bearish momentum decreasing



# Aroon Indicator

- Aroon Up/Down =  $[14 - (\text{Periods since 14-day high})]/14$
- Aroon Up/Down are indicators for bullish/bearish momentum
  - $< 50$  for both: Unclear trend; consolidation
  - $> 70$  for one,  $< 30$  for another: Strong trend in corresponding direction



# Stock Filter Panel

- Displays % change in close for each ticker and date; each ticker shown with corresponding company
- Tickers can be filtered by industry and one of the following:
  - Price changes
  - Volume changes
  - MACD
  - RSI
  - SMAs relative to Price or each other
  - Drawdown %
  - Relative Strength %
  - Outliers

Stock Filter Panel -- All

Ticker	Company	Date											
		28/10/20..	29/10/20..	30/10/20..	31/10/20..	1/11/20..	4/11/20..	5/11/20..	6/11/20..	7/11/20..	8/11/20..	11/11/20..	12/11/20..
AAPL	Apple Inc.	0.86%	0.12%	-1.53%	-1.82%	-1.33%	-0.40%	0.65%	-0.33%	2.14%	-0.12%	-1.20%	0.00%
ADSK	Autodesk	0.17%	1.10%	-0.29%	-1.74%	0.98%	0.37%	3.45%	3.61%	1.05%	0.02%	2.73%	-1.33%
AEP	American El.	0.94%	-1.74%	0.01%	1.39%	-1.52%	1.18%	2.03%	-4.13%	0.08%	1.05%	-1.96%	-1.64%
AMAT	Applied Ma..	-0.63%	2.58%	-2.54%	-2.01%	0.99%	-0.85%	2.56%	0.56%	3.50%	-1.06%	-1.81%	-1.03%
AMD	Advanced ..	2.36%	3.96%	-10.62%	-3.05%	-1.53%	-0.81%	0.68%	2.43%	3.25%	-1.25%	-0.41%	-2.52%
AMGN	Amgen	0.06%	-0.37%	-0.15%	1.46%	-0.29%	-0.72%	0.75%	0.78%	0.04%	1.05%	-1.07%	-7.14%
AMZN	Amazon	0.30%	1.30%	1.00%	-3.28%	6.19%	-1.09%	1.90%	3.80%	1.43%	-0.89%	-0.64%	1.00%
ARM	Arm Holdin..	4.36%	4.77%	-1.76%	-8.48%	0.13%	-2.79%	2.27%	2.87%	4.13%	-2.10%	-3.74%	-1.44%
ASML	ASML Holdi..	-0.43%	1.15%	-4.38%	-1.65%	0.32%	-0.53%	0.79%	-2.22%	2.39%	-1.14%	0.27%	-0.32%
AVGO	Broadcom	-0.57%	4.20%	-1.45%	-3.89%	-0.50%	-0.22%	3.17%	3.25%	2.37%	-0.09%	-2.58%	-1.50%
AZN	AstraZeneca	1.28%	-1.04%	-3.18%	-2.31%	0.38%	0.01%	7.22%	-3.65%	1.32%	-0.31%	0.47%	0.62%
CEG	Constellati..	0.97%	-0.74%	-1.22%	0.45%	-1.85%	-12.46%	3.45%	0.53%	2.81%	-0.92%	-0.88%	-3.61%
CRWD	CrowdStrike	0.23%	3.19%	-1.12%	-3.44%	2.11%	-1.40%	2.91%	4.04%	3.37%	-0.23%	3.75%	0.32%
CSCO	Cisco	-0.83%	0.72%	-0.16%	-1.48%	1.33%	0.59%	0.59%	3.04%	0.36%	-0.03%	0.98%	0.14%
CSX	CSX Corpor..	-0.03%	-0.03%	0.87%	0.30%	-0.74%	-0.09%	1.98%	8.41%	-3.58%	1.24%	1.44%	-1.07%
DDOG	Datadog	-0.18%	1.89%	-0.47%	-2.12%	-1.74%	1.87%	-0.41%	2.64%	1.12%	-4.11%	-1.68%	0.86%
EA	Electronic A..	-0.70%	1.00%	2.42%	1.15%	0.27%	1.08%	2.71%	1.58%	1.29%	-1.31%	0.94%	2.18%
EXC	Exelon	0.40%	-1.69%	0.38%	-1.01%	-2.93%	-0.47%	1.32%	-0.39%	-0.60%	0.06%	0.76%	-0.63%
GEHC	GE HealthC..	-2.8	Date: 28/10/2024	Stock No: EXC - Exelon									
GILD	Gilead Scie..	-0.2	Close: 39 (40%)										
GOOG	Alphabet In..	0.8	RSI: 57.87										
GOOGL	Alphabet In..	0.8	SMA10: 39										
INTC	Intel	1.0	SMA50: 38										
ISRG	Intuitive Su..	-0.0	Stock_Filter: Drawdown % > -5% (提款 % > -5%)										
KLAC	KLA Corpor..	0.1	Price Description:										
LRCX	Lam Resear..	-2.8	Price Increased (價升)										
META	Meta Platfo..	0.8	Current Price > 50-day SMA (現價 > 50天平均價)										
MNST	Monster Be..	-0.5	10-day SMA > 50-day SMA (10天平均價 > 50天平均價)										
MRVL	Marvell Tec..	2.2	MACD Bearish Crossover (MACD 熊差交)										
MSFT	Microsoft	-0.3	Drawdown > -5% (抽籤 > -5%)										

SUM(Close ChgPct) -20.85% 28.95%

Date 28/10/2024 28/10/2025

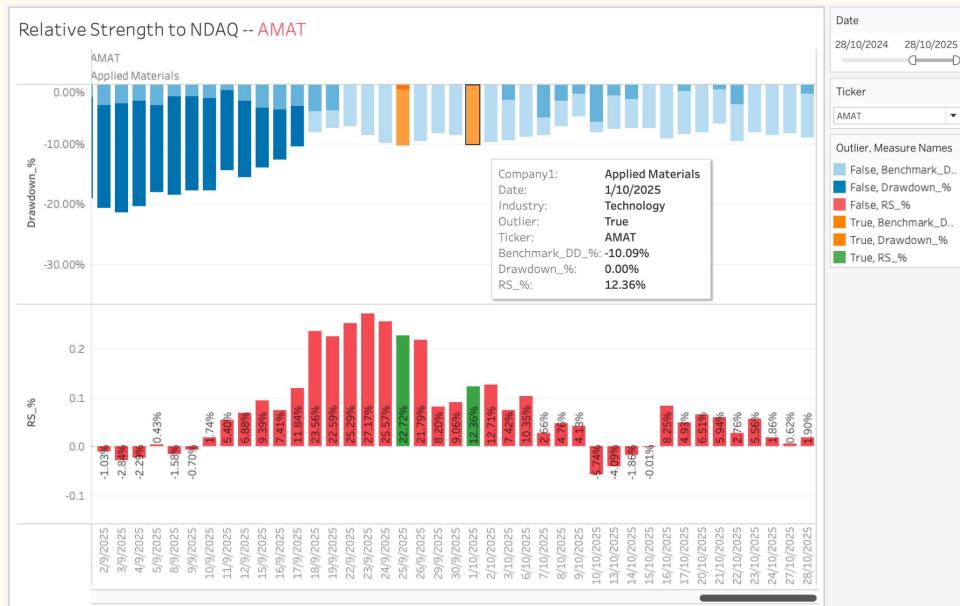
Industry  (All)  Basic Materials  Consumer Discretio...  Consumer Staples  Energy  Health Care  Industrials  Real Estate

Stock\_Selection\_Flag  (All)  False  True

Stock\_Filter  SMA-10 < SMA-50 ...  Filter A2 (A2 組合)  Filter A3 (A3 組合)  Filter A4 (A4 組合)  Filter A5 (A5 組合)  Drawdown % > -5...  Relative Strength ...  Outlier (偏離值)  N  S  N

# Relative Strength to NASDAQ

- Drawdown\_% = % drop from highest price within lookback window (100 days); Benchmark\_DD\_% shown alongside it
- RS\_% = Relative strength of Ticker relative to NDAQ; % change in (Asset Price / Benchmark Price) ratio
- Outlier has all of the following:
  - Ticker is strong (Drawdown\_% > -5%)
  - NDAQ is weak (Benchmark\_DD\_% < -10%)
  - Relative strength is high (RS\_% > 5%)



# Sources

- NASDAQ-100. Nasdaq GIW. (n.d.).  
<https://indexes.nasdaqomx.com/Index/Overview/NDX>
- Yahoo! (n.d.). Yahoo Finance - Stock Market Live, quotes, Business & Finance News. Yahoo! Finance. <https://finance.yahoo.com/>
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