

HKU SPACE TADASI Project

Group 4: NASDAQ Dashboard

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Aim of Dashboard

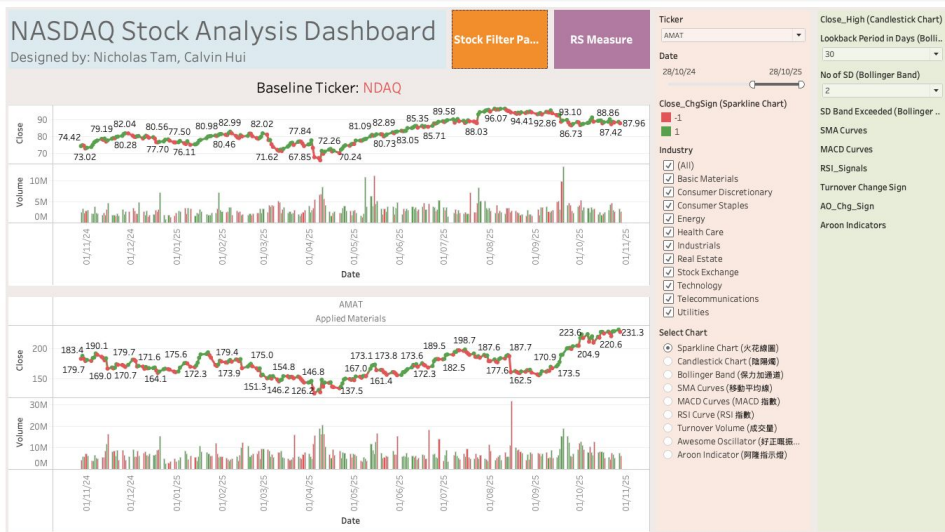
- Given variety of industries among the stocks involved in various indexes, not all stocks will be performing equally well at any given time; profits could be acquired by utilising stocks that perform better than common baseline
- NDAQ index: Stock index that covers 100 largest domestic and international 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 [Jupyter Notebook](#):
 - $RSI = 100 / [100 / (1 + (14\text{-day avg. gain}) / (14\text{-day avg. loss}))]$
 - $Aroon\ Up/Down = [14 - (Days\ since\ period\ high/low)] / 14$
 - $100\text{-day drawdown} = (Current\ Price - Peak) / Peak$
 - Given $R = \text{Ratio of price between Ticker and NDAQ}$;
 $Relative\ Strength\ to\ NDAQ = [(Current\ R) - (Historical\ R)] / (Historical\ R)$
 - 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-day SMA) - (34-day SMA)
 - Close and volume from previous days and corresponding change
 - Rate of change of Close

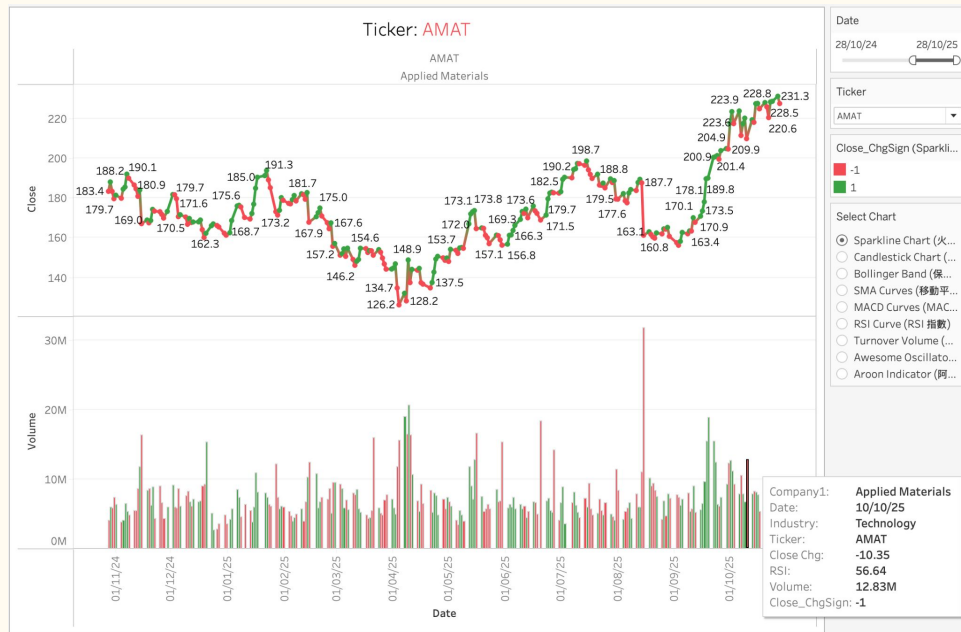
Base Dashboard

- 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



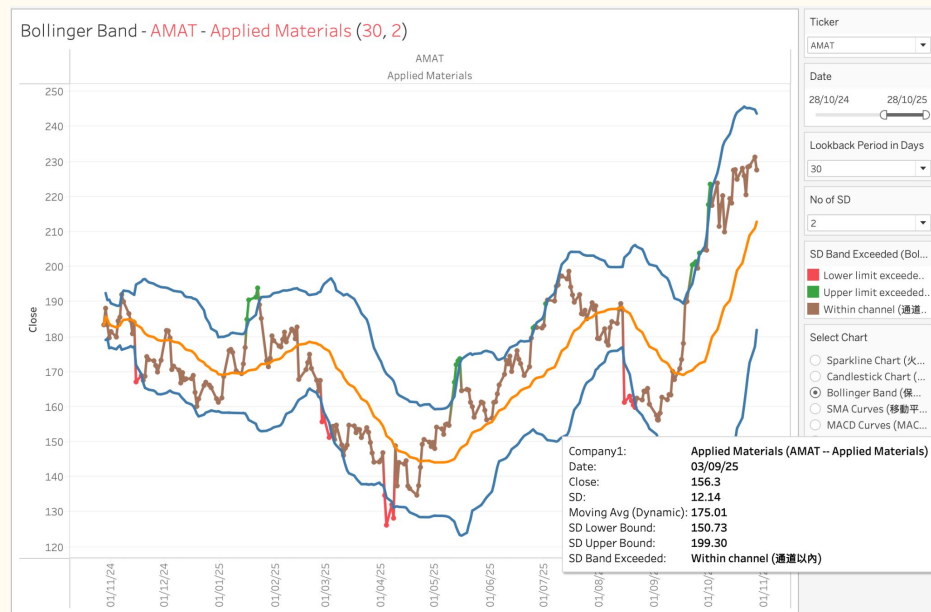
Candlestick Chart

- 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 = $(DMA) \pm (No\ of\ SD) * (SD\ of\ DMA)$
- 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



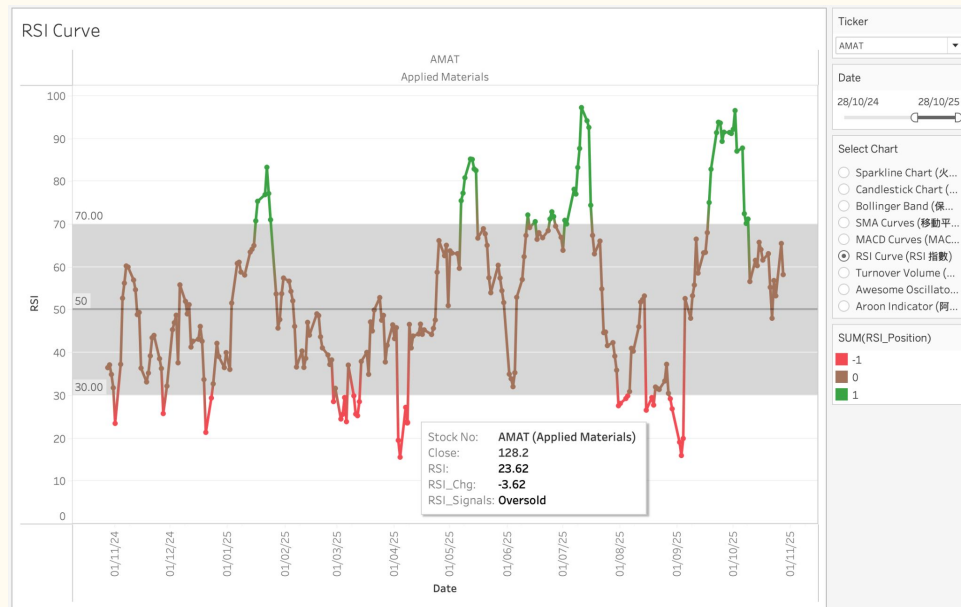
MACD Curves

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



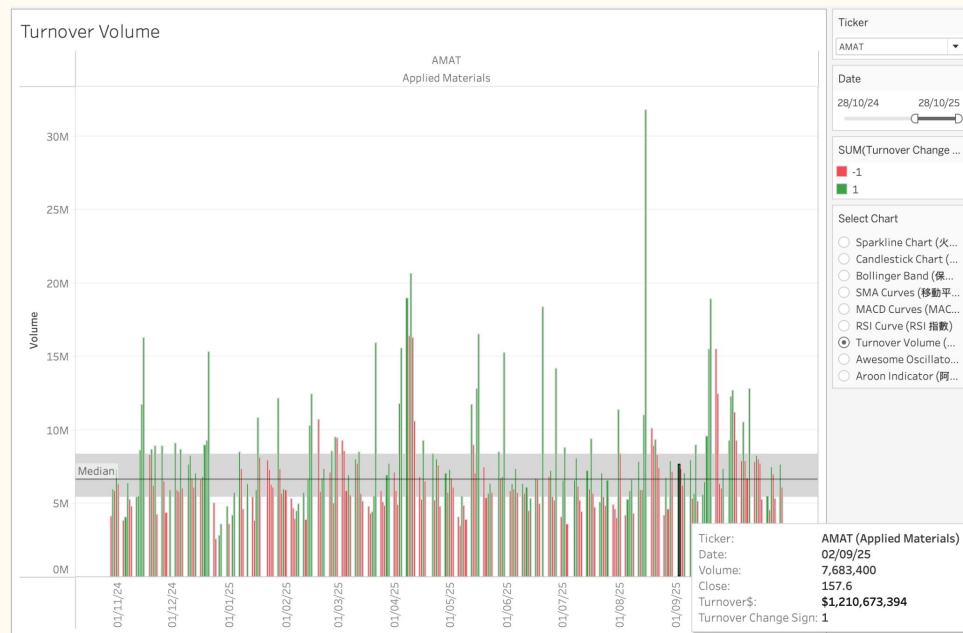
RSI Curve

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



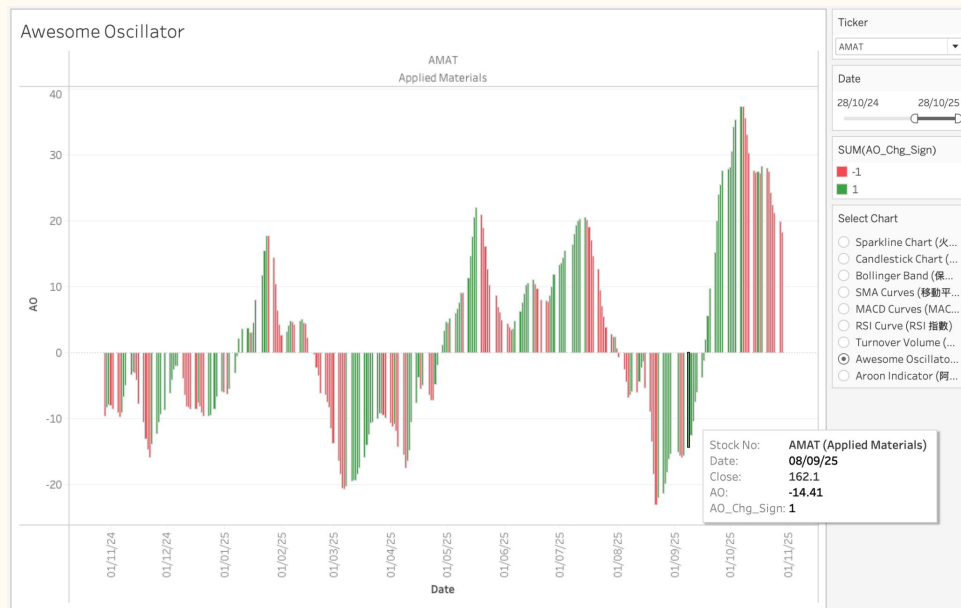
Turnover Volume

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



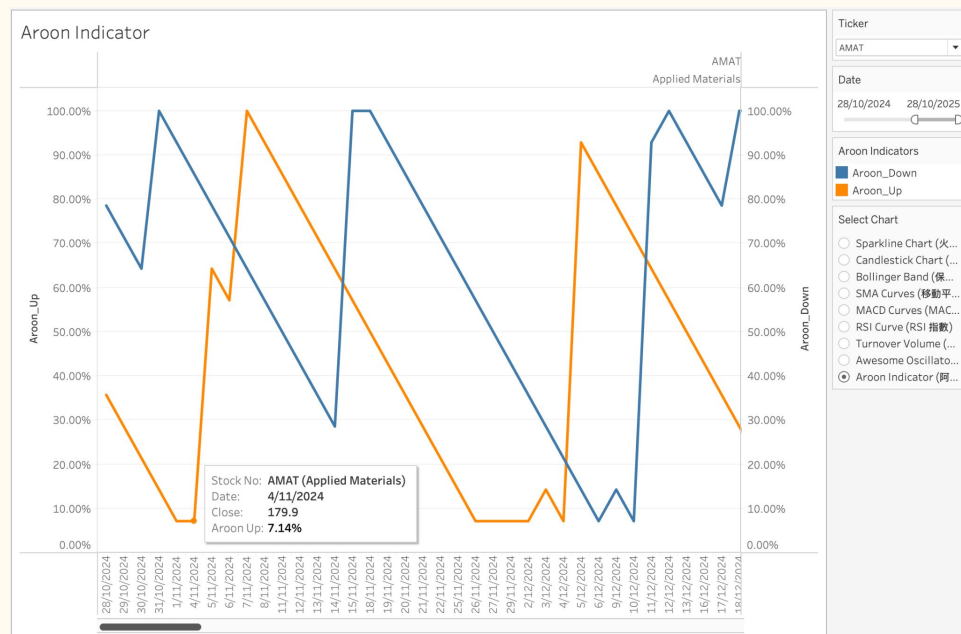
Awesome Oscillator (AO)

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



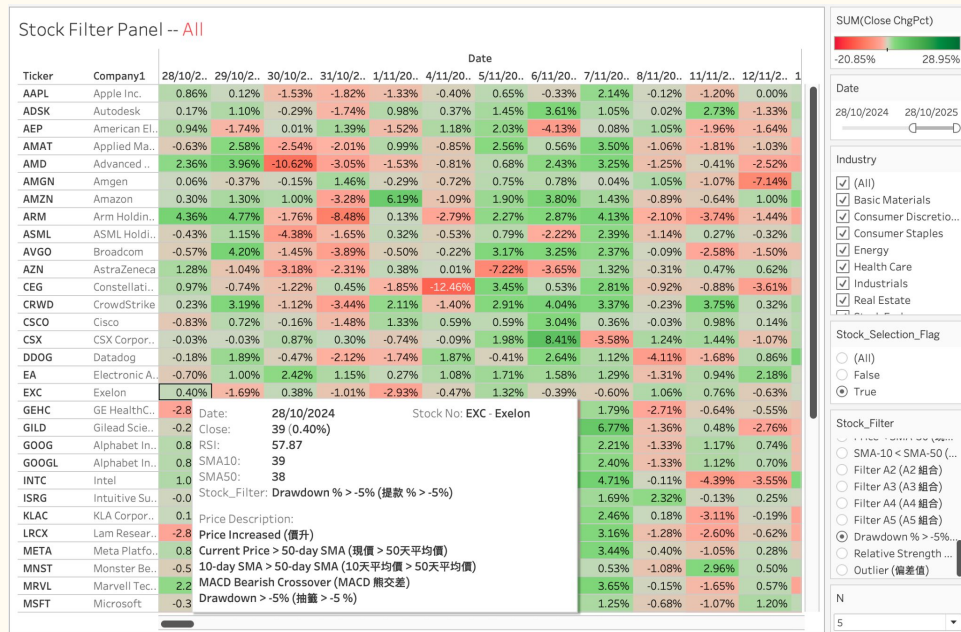
Aroon Indicator

- $\text{Aroon Up/Down} = [14 - (\text{Periods since 14-day high})]/14$
- 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



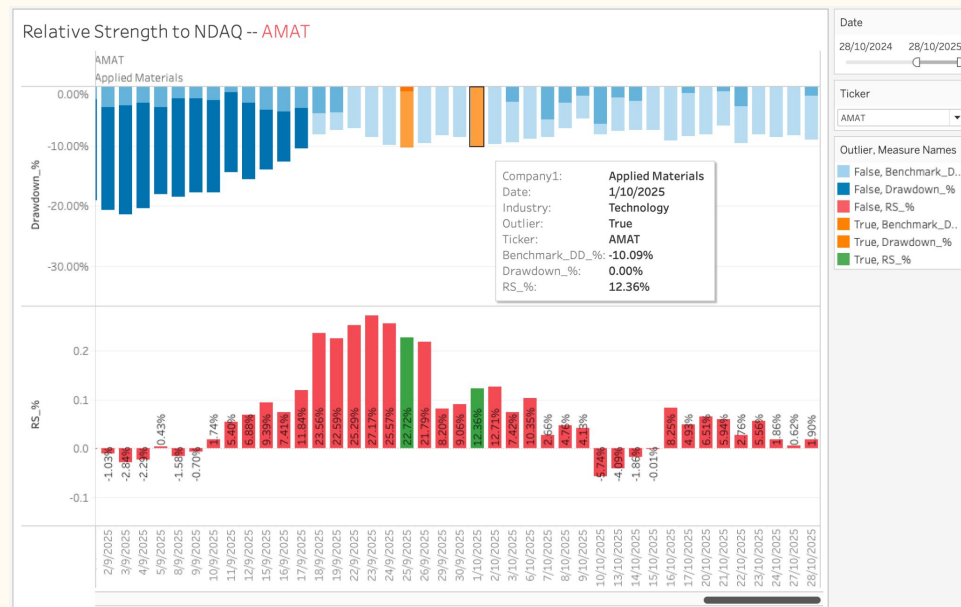
Stock Filter Panel

- 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



Relative Strength to NASDAQ

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



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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