

# Feature Engineering: Transforming Raw Data into Useful Inputs

## Feature Engineering for Stocks

### Price-Based Features

- Returns:  $r_t = \frac{P_t - P_{t-1}}{P_{t-1}}$
- Log returns:  $\log(P_t/P_{t-1})$
- Moving averages: MA(5), MA(20)
- Bollinger Bands

### Momentum Features

- RSI (Relative Strength Index)
- MACD (Moving Avg Convergence)
- 52-week high/low ratio
- Price momentum (various lags)

### Volatility Features

- Historical volatility
- ATR (Average True Range)
- GARCH estimates
- Realized variance

### Volume Features

- Volume moving average
- Volume/price correlation
- On-balance volume (OBV)
- Volume rate of change

## Technical Indicators Example

