Technical Indicator Information

1 Technical Indicator Formulae

Technical Indicator	**Formulae**
Relative Strength Index (RSI)	$100 - \frac{100}{1+(\sum_{i=0}^{n-1} UP_{t=i}/n)/(\sum_{i=0}^{n-1} DW_{t=i}/n)}$
Simple Moving Average (SMA)	$\frac{C_t+C_{t-1}+...+C_{t-9}}{n}$
Exponential Moving Average (EMA)	$EMA(K)_{t-1} + \alpha(C_t - EMA(K)_{t-1})$
Moving Average Convergence Divergence (MACD)	$MACD(n)_{t-1}+\frac{2}{n+1}\times(DIFF_t - MACD(n)_{t-1})$
Stochastic K%	$\frac{C_t-LL_{t-(n-1)}}{HH_{t-(n-1)}-LL_{t-(n-1)}} \times 100$
Stochastic D%	$\frac{\sum_{i=0}^{n-1} K_{t-i}}{10}\%$
William's Oscillator	$\frac{H_n-C_t}{H_n-L_n} \times 100$
Commodity Channel Index (CCI)	$\frac{M_t-SM_t}{0.015D_t}$

C_t, L_t and H_t are the closing, low and high price at time t respectively. K is the time period for $K-day$ EMA while n is the time period for all other indicators and α is a smoothing factor. LL_t and HH_t implies lowest low and highest high in the last t days respectively. $M_t = \frac{H_t+L_t+C_t}{3}$, $SM_t = \frac{\sum_{i=1}^{n} M_{t-i+1}}{n}$, $D_t = \frac{\sum_{i=1}^{n} |M_{t-i+1}-SM_t|}{n}$, UP_t implies upward price change while DW_t is the downward price change at time t

2 Technical Indicator Discretization

- RSI values range between 0 and 100. Values exceeding 70 indicate a downtrend (0) and values less than 30 indicate an uptrend (1). For values that lie between 30 and 70 a comparison between the RSI values of the current time point (t) and the preceding time point $(t-1)$ is performed. If the RSI value at t is greater than that of $(t-1)$, it is considered as an uptrend (1) and a downtrend (0) if otherwise
- The discretization of both SMA and EMA is done by comparing the respective values with the current closing price. If the current closing price is greater than the moving average values it is considered to be an uptrend (1) and vice-versa
- The discretization for MACD is performed by comparing the current MACD value with that of the preceding MACD value. If the MACD value at t exceeds that of $(t-1)$ an uptrend is indicated (1) and a downtrend (0) if otherwise
- The discretization for the Stochastic K%, Stochastic D% and William's Oscillator (R%) are similar to that of the MACD
- Two limits are set for the discretization procedure of CCI. Values that exceed 100 indicate a downtrend (0) and values less than -100 indicate an uptrend (1). For values that fall between -100 and 100, a comparison of the CCI value at t and $(t-1)$ is performed. If the value at t is greater than that of $(t-1)$, an uptrend (1) is indicated and vice-versa