Technical Indicators and Trading Signals

Your Name

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1 10-Day Moving Average (10D MA)

$$MA = \frac{\sum_{i=0}^{9} \text{Price}_i}{10} \tag{1}$$

1.1 Trading Signal for 10D MA

$$MA_{td} = \begin{cases} 1 & \text{if Price} > MA \\ 0 & \text{otherwise} \end{cases} \tag{2}$$

2 30-Day Moving Average (30D MA)

$$3MA = \frac{\sum_{i=0}^{29} \text{Price}_i}{30} \tag{3}$$

2.1 Trading Signal for 30D MA

$$3MA_{td} = \begin{cases} 1 & \text{if Price} > 3MA \\ 0 & \text{otherwise} \end{cases} \tag{4}$$

3 Stochastic Oscillator (%K and %D)

3.1 %K Calculation

$$\%K = \frac{\text{Price} - \text{Lowest Low}_{10}}{\text{Highest High}_{10} - \text{Lowest Low}_{10}} \times 100 \tag{5}$$

3.2 Trading Signal for %K

$$\%K_{td} = \begin{cases} 1 & \text{if } \%K > \%K_{\text{shift}(1)} \\ 0 & \text{otherwise} \end{cases} \tag{6}$$

3.3 %D Calculation

$$\%D = \frac{\sum_{i=0}^{2} \%K_i}{3} \tag{7}$$

3.4 Trading Signal for %D

$$\%D_{td} = \begin{cases} 1 & \text{if } \%D > \%D_{\text{shift}(1)} \\ 0 & \text{otherwise} \end{cases} \tag{8}$$

4 Relative Strength Index (RSI)

4.1 RSI Calculation

$$\Delta\text{Price} = \text{Price}_i - \text{Price}_{i-1} \tag{9}$$

$$\text{Gain} = \frac{\sum_{i=0}^{13} \max(\Delta\text{Price}_i, 0)}{14} \tag{10}$$

$$\text{Loss} = \frac{\sum_{i=0}^{13} \max(-\Delta\text{Price}_i, 0)}{14} \tag{11}$$

$$RS = \frac{\text{Gain}}{\text{Loss}} \tag{12}$$

$$RSI = 100 - \frac{100}{1 + RS} \tag{13}$$

4.2 Trading Signal for RSI

$$RSI_{td} = \begin{cases} -1 & \text{if RSI} \geq 70 \\ 1 & \text{if RSI} \leq 30 \\ 0 & \text{otherwise} \end{cases} \tag{14}$$

5 Momentum

5.1 Momentum Calculation

$$\text{Momentum} = \text{Price} - \text{Price}_{\text{shift}(10)} \tag{15}$$

5.2 Trading Signal for Momentum

$$\text{Momentum}_{td} = \begin{cases} 1 & \text{if Momentum} > 1 \\ 0 & \text{otherwise} \end{cases} \tag{16}$$

6 Moving Average Convergence Divergence (MACD)

6.1 MACD Calculation

$$EMA_{12} = \text{Price}_{\text{ewm(span=12, adjust=False).mean()}} \tag{17}$$

$$EMA_{26} = \text{Price}_{\text{ewm(span=26, adjust=False).mean()}} \tag{18}$$

$$MACD = EMA_{12} - EMA_{26} \tag{19}$$

$$\text{Signal Line} = MACD_{\text{ewm(span=9, adjust=False).mean()}} \tag{20}$$

6.2 Trading Signal for MACD

$$MACD_{td} = \begin{cases} 1 & \text{if MACD} > MACD_{\text{shift(1)}} \\ 0 & \text{otherwise} \end{cases} \tag{21}$$

7 Commodity Channel Index (CCI)

7.1 CCI Calculation

$$TP = \frac{\text{High} + \text{Low} + \text{Price}}{3} \tag{22}$$

$$SMA_{TP} = \frac{\sum_{i=0}^{19} TP_i}{20} \tag{23}$$

$$MD = \frac{\sum_{i=0}^{19} |TP_i - SMA_{TP}|}{20} \tag{24}$$

$$CCI = \frac{TP - SMA_{TP}}{0.015 \times MD} \tag{25}$$

7.2 Trading Signal for CCI

$$CCI_{td} = \begin{cases} -1 & \text{if CCI} \geq 100 \\ 1 & \text{if CCI} \leq -100 \\ 0 & \text{otherwise} \end{cases} \tag{26}$$