

Trading Strategy

Strategy Overview:

My trading strategy is designed to identify potential entry and exit points in the financial markets, focusing on price movements within a given time frame. The strategy incorporates three key components:

1. Kernel Regression Smoothing:

1. This component involves applying kernel regression smoothing to historical price data. It helps in filtering out noise and identifying underlying price trends.
2. We use a kernel to generate weights that will be used to calculate the mean price of a candle using historical data. This smoothed line only depends on the parameter bandwidth that we use to generate weights

2. making an envelope:

1. using the smoothed price line, we make an envelope.
2. The upper level (which is in green colour) of the envelope will be multi(Width parameter) times the standard deviation above the smoothed line
3. Similarly, the lower level (red colour) of the envelope will be multi times the standard deviation below the smoothed line

3. Average True Range (ATR):

1. ATR is a technical indicator which is utilized to determine the optimal placement of stop-loss and target levels. It provides a measure of price volatility, allowing for adaptive risk management.
2. ATR is calculated as below-

True Range (TR) is the greatest of:

1. The difference between the current high and low.
2. The absolute value of the current high minus the previous day's close.
3. The absolute value of the current low minus the previous day's close.

$$TR = \text{Max}(\text{High} - \text{Low}, |\text{High} - \text{Previous Close}|, |\text{Low} - \text{Previous Close}|)$$

ATR is calculated as a moving average over a chosen period (typically 14 days), starting with the TR of the first day and then using the formula:

$$ATR = [(\text{Prior ATR} * 13) + \text{Current TR}] / 14$$

In order to calculate the ATR values we use TA-lib library which is a technical indicator library. Which provides us the ATR values for the close data of the stock.

Trade setup and execution-

1. If the price crosses the green line of the envelope we get sell signal and if the price crosses the red line of the envelope we get a buy signal and trade gets executed.
2. The trade is executed with a stoploss and a target.
 - a. Stoploss = ATR value of that candle
 - b. Target = risk reward ratio * stoploss
3. Once the trade is executed
 - a. If we get the same signal before hitting our target or stoploss, we ignore that signal
 - b. If we get an opposite signal to the current signal, we exit our current trade and enter into next trade
 - c. When the price reaches either the stop-loss or the target level, the trade is closed.

Hypothesis:

1. The core hypothesis behind this strategy is that by combining envelope generated kernel regression smoothing, we can effectively identify price trends and periods of heightened volatility (This is commonly known as **Nadaraya-watson envelope**).
2. When the price crosses or goes beyond the green line of the envelope this means that the stock is overbought indicating strong short signal. Similarly, if price crosses or goes below the red line of the envelope this means that the stock is oversold indicating strong buy signal
3. The ATR is employed to dynamically adjust stop-loss and target levels based on the current market conditions, leading to improved risk management.

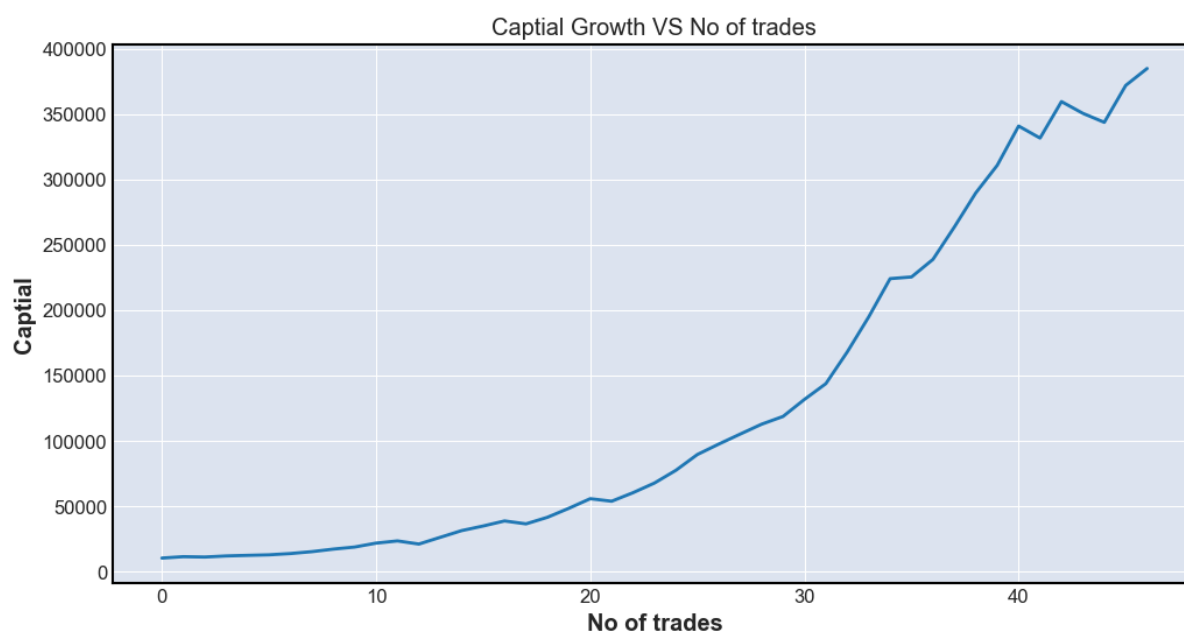
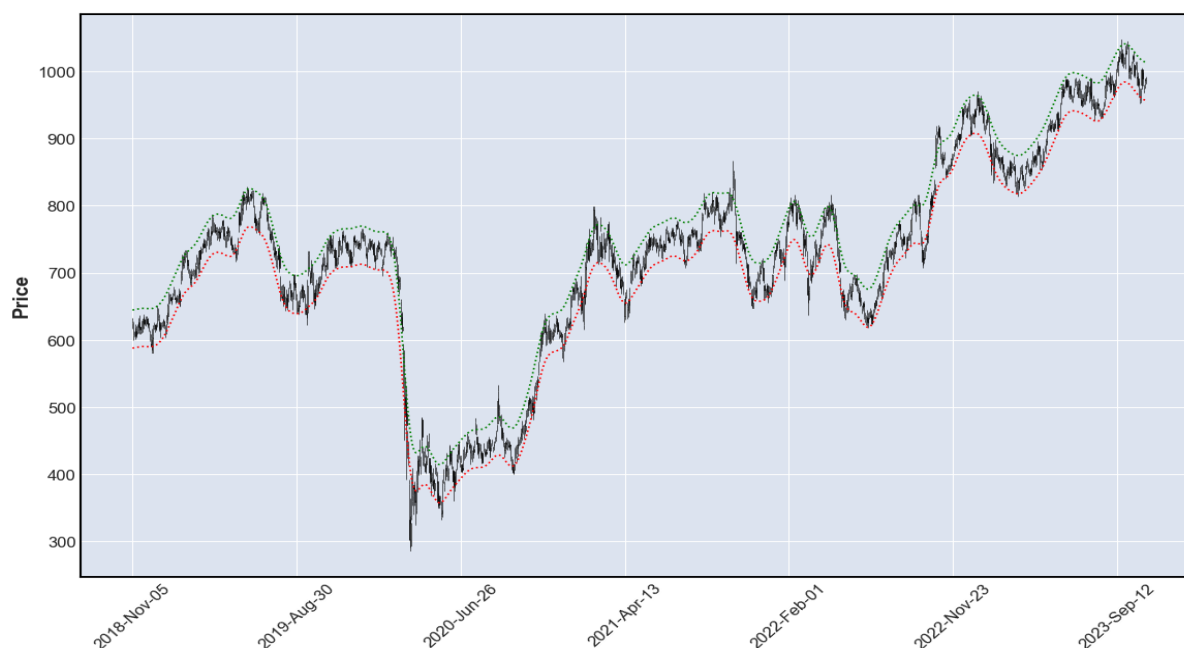
How can I further develop this strategy-

1. we make bandwidth and width parameters dynamic based on the market conditions which can help us to identify more reliable and profitable positions to trade.
2. We can combine this strategy with other strategies or include other various indicators like RSI Divergence indicator which help can us with confirmation of the signal to minimize Risk

I applied this strategy on Axis bank stock. Parameters-

1. Years = 5
2. Bandwidth = 8
3. Multi = 2 (used to calculate width of the envelope
4. Risk-reward ratio = 4:1
5. Initial capital used = 10000

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Summary-

My trading strategy combines kernel regression smoothing, the Nadaraya-Watson envelope, and the Average True Range (ATR) to make trading decisions. In summary, the strategy involves:

- Applying kernel regression smoothing to historical price data to identify underlying price trends.
- Using the Nadaraya-Watson envelope to create a standard deviation-based band around the smoothed price curve, helping to detect periods of heightened volatility.
- Employing the ATR to dynamically adjust stop-loss and target levels, thus optimizing risk management.

