Algorithm Bot to Predict SPY Price Ranges

The Rangers

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Introduction

- Stock market is known for its volatility
    - accurate stock prediction impacted by multiple factors
    - need for automated strategies to execute orders

- Project Strategy

    - predict weekly price range for SPY ETF

    - use ALPACA API for SPY data, VIX

    - use Finta Library for technical indicators

    - utilize LSTM to build a predictive model

Data Used

- SPY ohlc data from 2015-2022
- VIX from 2015-2022

- Technical indicators from 2015-2022

- Used weekly SPY ohlc data to get weekly range

Model Used

- LSTM model

    - captures historical trend patterns and predict future values with high accuracy

    - can store past important info and forget the information that is not

    - fit for time-series data

-Data preprocessing and model training process
    - combined indicator data, VIX and SPY data
    - target/feature separation
    - model building
    - model prediction
    - visualization

Features

- Library used : TA (Finta)
- 8 volatility centric indicators

Range Indicators:

-Average True Range (ATR)

-Keltner Channels(KC)

-Mass Index (MI)

Momentum indicators:

-Volatility Based Momentum(VBM)
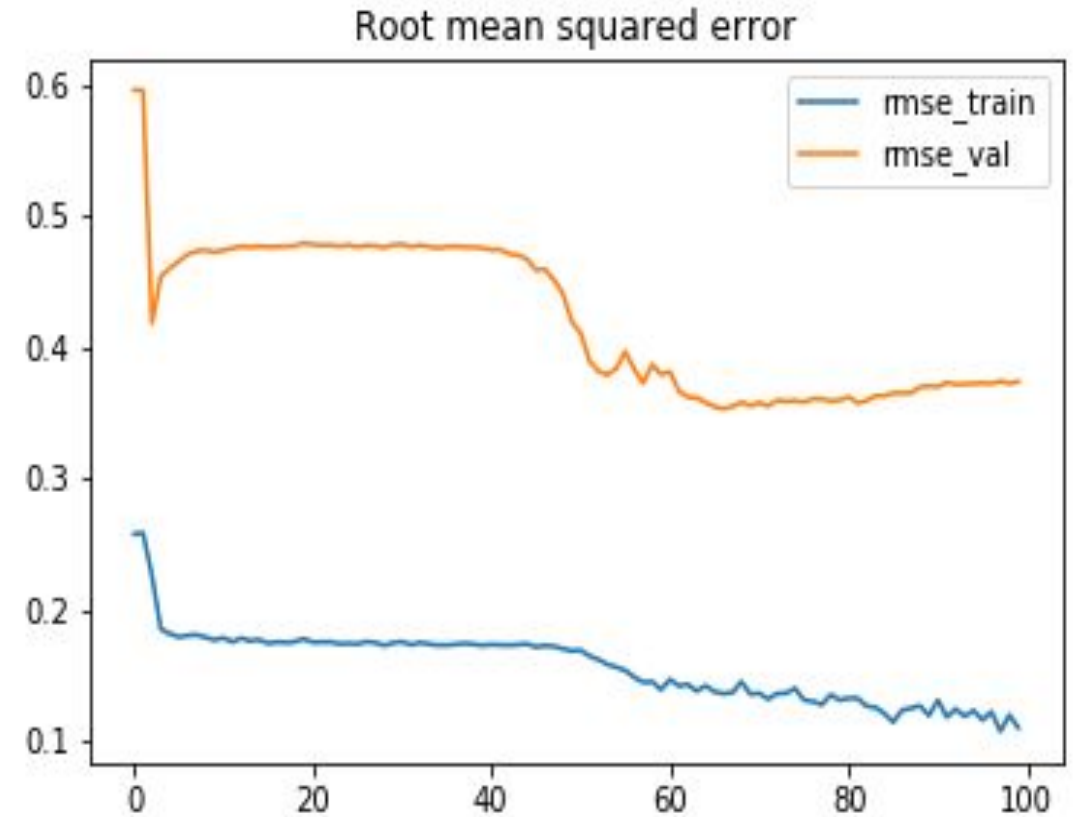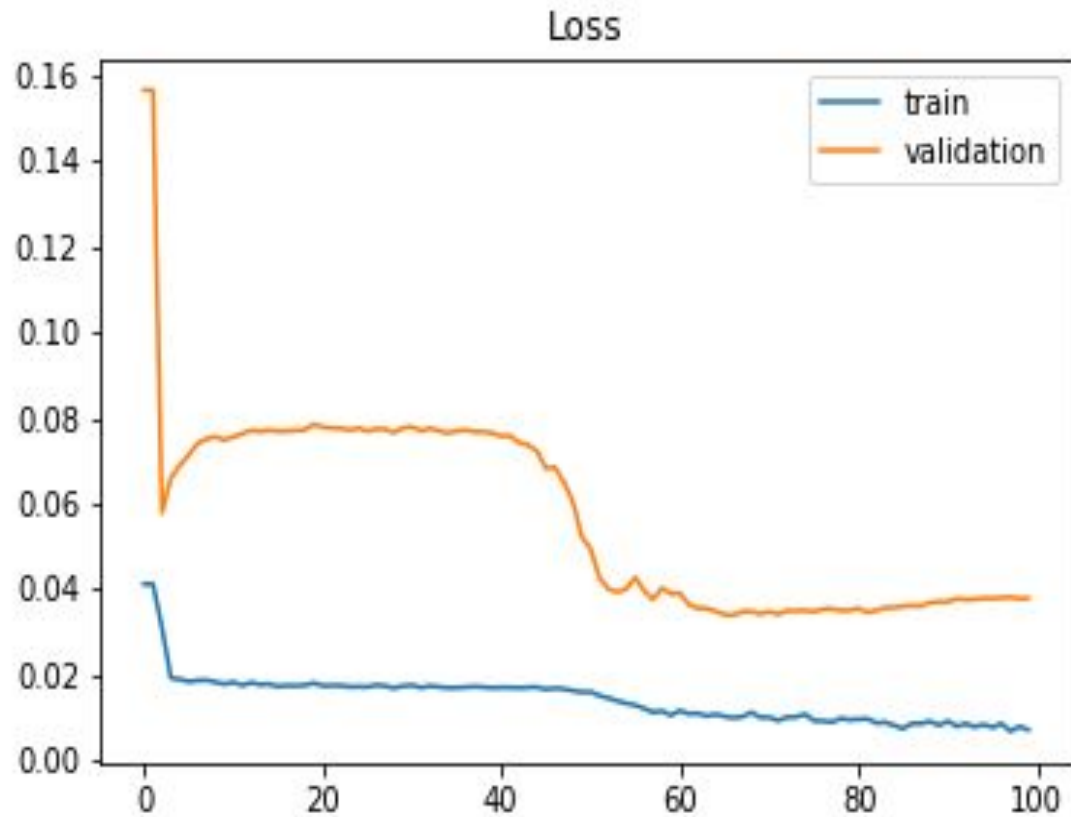
- Dynamic Momentum Index(DYMI)

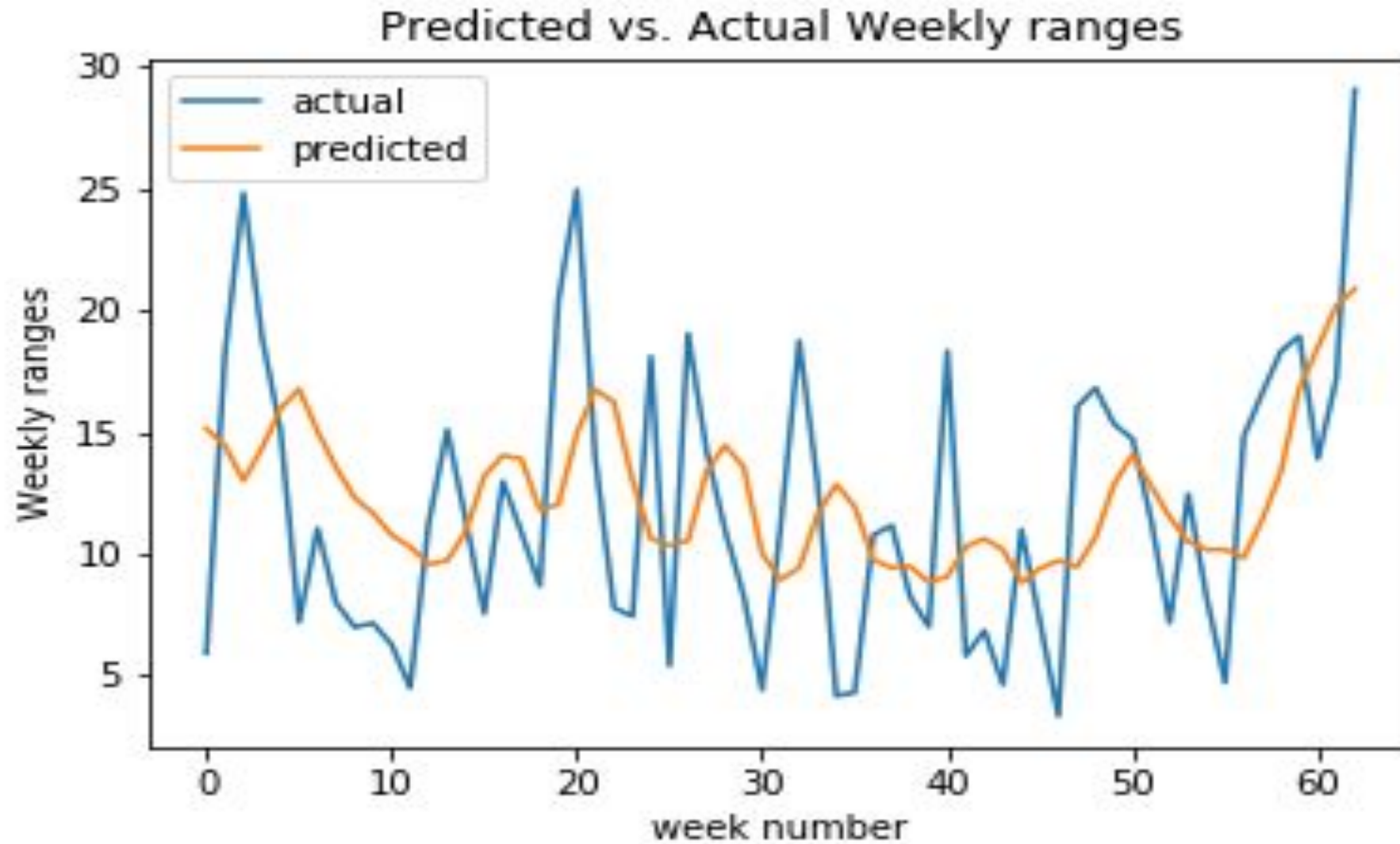-Adaptive Price Zone (APZ)

Moving Average indicators:

-BBands

-KAMA

Target

Target: weekly range

Model Evaluation

Data findings

Predicted vs. Actual Weekly ranges

Implications of Findings: Trading Strategy

Weekly Iron Condors: Example

Expected Return: (Profit * W%) + (-Risk * L%)

Example ER: (1115 * 74.69%) + (-1385* 25.31%)

Example ER: $482

Profit: $1,115

Risk: $1,385