# Quant Research Project - Anshuman

Following the Research Thesis I first created a base model using the Formulae provided:

```
{Spread} = {Bank Nifty IV} - {Nifty IV}
```

```
{P/L} = {Spread} ({Time To Expiry})^{0.7}
```

Profit is calculated using this and calculated the sharpe ratio using:

```
base_model_sharpe_ratio = np.mean(data['Base_Model_PL']) / np.std(data['Base_Model_PL'])
```

For better model firstly I used linear Regression and the results were not up to the mark so I considered using Random Forest Regressor and still the results were not great

So next I considered using Bollinger Bands technical analysis tool:

- Bollinger Bands is a technical analysis tool to generate oversold or overbought signals and was developed by John Bollinger.
- Three lines compose Bollinger Bands: A simple moving average, or the middle band, and an upper and lower band.
- The upper and lower bands are typically 2 standard deviations +/- from a 20-day simple moving average and can be modified.
- When the price continually touches the upper Bollinger Band, it can indicate an overbought signal.
- If the price continually touches the lower band it can indicate an oversold signal.

These are the results I got:

Base Model Profit: 317676.73675057775
Better Model Profit: 32622.375272698653
Base Model Sharpe Ratio: 1.7557162648689497
Better Model Sharpe Ratio: 0.27109720648368724