DSC 680: Project 1 – Report

Reading market sentiment – from VIX

Volatility attempts to measure magnitude of price movements that a financial instrument experiences over a certain period of time. The more dramatic the price swings are in that instrument, the higher the level of volatility, and vice versa.

1 Abstracts:

For financial instruments like stocks, volatility is a statistical measure of the degree of variation in their trading price observed over a period of time. Volatility can be measured using two different methods. First is based on performing statistical calculations on the historical prices over a specific time period. This process involves computing various statistical like mean, variance and final standard deviation in the historical price data sets.

* The Volatility Index, or VIX, measures volatility in the stock market.
* When the VIX is low, volatility is low. When the VIX is high volatility is high, which is usually accompanied by market fear.
* Buying when the VIX is high and selling when it is low is a strategy, but one that needs to be considered against other factors and indicators.

2 Introduction

The Cboe Volatility Index (VIX) is a real-time [index](https://www.investopedia.com/terms/m/marketindex.asp) that represents the market's expectations for the relative strength of near-term price changes of the S&P 500 index (SPX). Because it is derived from the prices of SPX [index options](https://www.investopedia.com/terms/i/indexoption.asp) with near-term expiration dates, it generates a 30-day forward projection of [volatility](https://www.investopedia.com/terms/v/volatility.asp). Volatility, or how fast prices change, is often seen as a way to gauge market sentiment, and in particular the degree of fear among market participants.

The index is more commonly known by its ticker symbol and is often referred to simply as "the VIX." It was created by the [Chicago Board Options Exchange](https://www.investopedia.com/terms/c/cboe.asp) (CBOE) and is maintained by Cboe Global Markets. It is an important index in the world of trading and investment because it provides a quantifiable measure of market risk and investors' sentiments.

3 Business problem

For Option traders, few important strategies are involved correctly predicting the stock price movement within a specific range. Credit spreads or Iron condors are such strategy where it is very important to estimate stock price movement to place trade. Now to predict that VIX could be one of such indicator as based on average market fear index. As various stock price behaves differently , I would like to calculate percentage of change stock based on overall market volatility.

5 Methods

* Stock price historical price will be stored from yahoo finance.
* VIX historial price will be saved from same source.
* Calculate stock price change in every week and create an array
* Create array VIX price.
* Apply linear regression model to fit the training set.
* Calculate accuracy between actual value and predicted value.

6 Experiments/Results/Discussion –

Initial result diagram looks like this –

Chart, scatter chart

Description automatically generated

7 Conclusion/Future Work.

Using linear regression, we are able to find out a linear relationship between current vix price vs percentage of stock price changes. In this diagram amazon stock prices are being used. In the next steps , various other stock prices will be taken into consideration.

8 Appendices

**Iron condor** - The iron condor option strategy is one of the best ways for an option trader to profit from an insignificant move in the price of an underlying asset. Many traders believe that a significant move upward or downward is needed for them to make a profit.

**Credit spread -**

A credit spread is essentially an option selling strategy which allow investors to take advantage of the time premium and [implied volatility](https://www.investopedia.com/terms/i/iv.asp) that are inherent in options. The credit spread is created by buying a far [out-of-the-money](https://www.investopedia.com/terms/o/outofthemoney.asp) (OTM) option and selling a nearer, more expensive option. This creates the credit, with the hope that both options expire worthless, allowing you to keep that credit. As long as the underlying does not cross over the strike price of the closer option, you get to keep the full credit.

**Linear regression** – Linear regression attempts to model the relationship between two variables by fitting a linear equation to observed data. ... A linear regression line has an equation of the form Y = a + bX, where X is the explanatory variable and Y is the dependent variable.

**Sci-kit learn** - Scikit-learn (formerly scikits.learn and also known as sklearn) is a free software machine learning library for the Python programming language.[3] It features various classification, regression and clustering algorithms including support vector machines, random forests, gradient boosting, k-means

9 References/Bibliography-

1. <https://www.investopedia.com/articles/optioninvestor/06/ironcondor.asp>
2. <https://www.investopedia.com/terms/v/vix.asp>
3. https://scikit-learn.org/stable/modules/generated/sklearn.linear\_model.LinearRegression.html