Scope

The idea of this project is to build a model for predicting CNX Nifty movements. Algorithms used will try to predict the direction of tomorrow's exchange closing price, whether it is going to be lower or higher with respect to today's price. Decision process involves CNX Nifty daily returns over the period of time. My target is to develop a trading strategy based on our predictions and back-test it against a benchmark.

Problem Statement

The aim of the project is to predict whether future daily returns of CNX Nifty is going to be positive or negative. This problem can be considered as a binary classification.

Daily return is computed as follows:

$$Return_i = \frac{AdjClose_i - AdjClose_{i-1}}{AdjClose_{i-1}}$$

The return on the i-th day is equal to the Adjusted Stock Close Price on the i-th day minus the Adjusted Stock Close Price on the (i-1)-th day divided by the Adjusted Stock Close Price on the (i-1)-th day. Adjusted Close Price of a stock is its close price modified by taking into account dividends. It is common practice to use this formula in Returns computations.

Since the beginning I decided to focus only on CNX Nifty(also called Nifty 50), a stock market index based on the market capitalization of 50 large companies having common stock listed on the NSE (National Stock Exchange of India Ltd.). Being such a diversified portfolio, the CNX Nifty index is typically used as a market benchmark, for example to compute betas of companies listed on the exchange.

Feature Selection and Analysis

In the era of globalization each financial exchanges across the world are highly correlated. None of the financial market isolated and intact from another. Movement of one stock market impacts another. Financial decision of one country impacts all other stock exchanges. Recently Chines governments depreciated of its RMB which impacted whole world. It can be considered as the best example of my assumption above. Idea behind this is to use world major stock indices as input features for the machine learning algorithms and try to predict CNX Nifty.

Based on the above considerations the I have selected a few Financial Indices:

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NASDAQ Composite
Frankfurt DAX
London FTSE-100
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Tokyo Nikkei-225
Hong Kong Hang Seng
Australia ASX-200
Shanghai Composite Index
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In order to get historical daily prices of above indices I used Quandl as data source because it has easy to use Python library. Downloaded data-frame contains the following columns:

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Date      :  in days
Open      :  price of the stock at the opening of the trading
High      :  highest price of the stock during the trading day
Low       :  lowest price of the stock during the trading day
Close     :  price of the stock at the closing of the trading
Volume    :  amount of stocks traded
Adj Close :  price of the stock at the closing of the trading
               adjusted with dividends
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Output of Prediction

As I mentioned earlier, I am using binary classifier to predict close price movement. -ve represents downward movement of stock price and +ve upward. Using Machine Learning Algorithms SVM, K-Nearest Neighbors, Random Forest and various Time Series analysis I will try to get best possible algorithm which gives most promising result.

Based on the best forecasting algorithm I will develop a very basic strategy if the probability of the day being up exceeds 50%, the strategy purchases 500 shares of CNX Nifty and sells it at the end of the day. if the probability of a down day exceeds 50%, the strategy sells 500 shares of CNX Nifty and then buys back at the close. The idea is that I start with Rs 4000000/- and buy and sell only playing with this amount of money. After a certain period I will compare the net price difference in benchmark and net gain made by my simple strategy.