# Stock Market Prediction

## Abstract

This project is an attempt to accurately predict stock market prices. This is accomplished using technical analysis and machine learning techniques.

## Introduction

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Predicting the stock market has been a goal that has been the bane of many researchers and prospective investors for decades. The problem is ubiquitous across the financial sector and re-enters the public imagination after every economic crash.

The results of this spill over to pop culture can be found in such films as Pi (1998) and the spate of financial crisis themed films of recent years. Inevitably, anyone seen to be trying and tackle the problem of predicting the market is portrayed either as crazy or daft.

It is with this in mind that we approach the problem in a considered manner, and be careful not to overlook the null hypothesis in any of our experiments.

### Motivation for the project

Although the problem has been a topic of research for such a long time, surprisingly little of the research is made public. This is due to the obvious financial motivation to develop the best methods privately. If everyone were to use the same completely accurate strategy, it would be self-defeating.

With more public knowledge available on the behaviour of the stock market, economists might be better able to predict and prevent events like the 2008 crisis.

### Importance and prevalence of the problem

Buy / Sell side market size

### Projects aims

This project aims to increase the amount of public knowledge available on the subject of predicting and understanding the stock market. We hope to show what does and what does not hold predictive power over the stock market.

### Project outline

Predictive methods for the stock market fall into roughly three categories. For each category we will evaluate its predictive power.

The first is fundamental analysis. Fundamental analysis involves evaluating the performance of a company which underlies the stock and extrapolating a fair stock price. The general idea is that a company’s stock price will gradually move towards this fair price.

Technical analysis takes a different approach. In technical analysis we treat the stock price as a time series and attempt to spot trends in the data using classical statistical techniques.

Machine Learning methods generally treat the data similarly to Technical analysis methods but instead of a statistical approach, use modern AI and Machine Learning techniques to spot trends.

## Background

### The Stock Market

### Analysis of the problem

#### Separation of profitability and accuracy

#### Temporal reach of prediction

#### Formal definition of the problem

### Review of existing work

## Methodology and Data

### Tools Used

### Data Used

Google Finance

Yahoo Finance

Quandl

### Simulation of strategies

### Defining a successful model

## Attacking the Problem – Fundamental Analysis

## Attacking the Problem – Technical Analysis

### Hobbyist Approaches

### Metrics

### Review of Metrics

### KNN on metrics

### OLMAR algorithm

### Technical Analysis Models

## Attacking the Problem – Machine Learning