

## High Level Design(HLD)

### Stock Price Prediction With Relative Strength Index(RSI)

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## Contents

Document Version Control .....	2
Abstract .....	4
1. Introduction.....	5
1.1. Why this High-Level design document? .....	5
1.2. Scope.....	5
1.3. Definitions.....	6
2. General Description.....	7
2.1. Product Perspective.....	7
2.2. Problem statement.....	7
2.3. PROPOSED SOLUTION.....	7
2.4. FURTHER IMPROVEMENT.....	7
2.5.Data Requirement.....	8
2.6. Tool used .....	8
3. Design Details.....	9
3.1. Process Flow .....	9
3.1.1.Collecting stock data.....	9
3.1.2. Data validation .....	9
3.1.3 Data transformation.....	9
3.1.4 Model training.....	10
3.1.5.Model evaluation and Model pushing.....	10
3.1.6. Prediction .....	10
3.2 Event Log.....	10
3.3 Error Handling.....	10
4. Performance .....	11
4.1 Reusability.....	11
4.2 Application compatibility.....	11
4.3 Resource Utilization .....	11
4.4 Deployment.....	11
5 conclusion .....	11



## Abstract

In the dynamic field of financial markets, the ability to accurately predict stock price movements remains a highly sought-after goal. This paper explores the application of machine learning techniques to predict stock price trends, utilizing the Relative Strength Index (RSI) crossover as a primary signal. The RSI is a momentum oscillator that measures the speed and change of price movements, typically used to identify overbought or oversold conditions in a trading asset.

Our methodology involves constructing a predictive model that focuses on the RSI values, specifically monitoring the crossover patterns. We hypothesize that an RSI value crossing above 40 is a bullish signal and likely to continue rising until it reaches 60, after which it may decline back below 40, indicating a bearish trend. The study employs machine learning algorithms to analyze historical stock price data and identify the success rate of the RSI crossover strategy.

We utilize various machine learning models, including but not limited to, logistic regression, decision trees, and neural networks, to evaluate the predictive power of RSI crossover signals. The dataset comprises historical price and volume data of selected stocks, with RSI values calculated accordingly. The models are trained and tested to determine their accuracy in predicting stock price movements based on RSI crossover events.

Our results indicate that the RSI crossover strategy, when integrated with machine learning models, provides a statistically significant prediction of stock price movements. The models demonstrate varying degrees of success, with certain algorithms outperforming others in terms of accuracy and robustness. The findings suggest that incorporating technical indicators like RSI with machine learning can enhance the decision-making process for traders and investors.

This research contributes to the growing body of literature on quantitative finance and the application of artificial intelligence in trading strategies. Future work will explore the integration of additional technical indicators and the refinement of machine learning models to further improve prediction accuracy and trading performance.

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This abstract summarizes the aim, methodology, and findings of the research, providing a concise overview for readers interested in the intersection of machine learning and financial trading strategies.

## **Chapter 1**

### **Introduction**

#### **1,1 Why this High-Level Design Document?**

The purpose of this High- Design (HLD) Document is to add the necessary data current project description to represent a suitable model for coding. This document intended to help detect contradictions prior to coding, and can be used as a reference manual for how the modules interact at a high level.

- Describe the use design aspects and define them in detail
- Describe the user interface being implemented
- Describe the hardware and software interfaces
- Describe the performance requirements
- Include design feature and the architecture of the project
- List and describe the non-functional attribute like:

Security

Reliability

Maintainability

Portability

Reusability

Application compatibility

Resource utilization

Serviceability

#### **1.2 Scope**

The HLD documentation presents the structure of the system, such as the database architecture architecture , application architecture(layers),application flow (Navigation), and technology architecture .The HLD uses non-technical to mildly-technical terms which should be understandable to the administrators of the system

### 1.3 Definitions

Term	Description
RSI	Relative strength index
IDE	Integrated Development Environment
AWS	Amazon Web Services
EMA	Exponential moving average

## **2 General Description**

### **2.1 Product Perspective**

The RSI based stock price prediction is machine learning-based model which will help us to predict Stock price will move upside if RSI crossover success then it have to move RSI 60 then stock price also move high using this concept system designed.

### **2.2 Problem statement**

To create AI solution for stock market prediction and create wealth from it and minimize Loss and avoid wrong entry in trading and do systematic trading not do any gambling

### **2.3 Proposed solution**

The solution proposed here is take historical data of RSI (14),RSI(9),EMA(20),EMA(5) That data should be when RSI(14) cross 40 line and reach 60 without failure and success Output column create as 1 if fail output is 0 and take this data to train machine learning Modal.

### **2.4 FURTHER IMPROVEMENT**

Further improvement can do just take other indicator parameter at RSI(14) crossing 40 at that Time corresponding values of MACD indicator or u can take VWAP values and many more then use that data to build more accurate model



## 2.5 Data Requirements

We need only stock open ,close, high, low values and further data we can derive from this data and

This stock data we can collect from brokers api and I used fyers api to collect data and we have some formula to calculate RSI value and EMA value

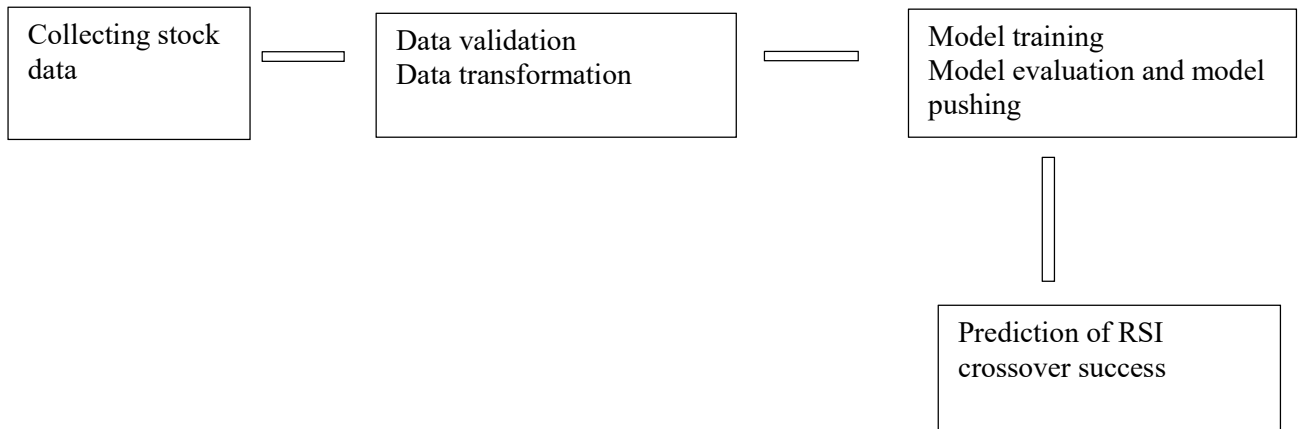
## 2.6 Tools used

Python programming language and frameworks such as NumPy ,pandas,scikit-learn used to build this model

- Pycharm is used as IDE
- Aws is used for deployment
- Casandra is used as database
- Front end developed using html and css
- Flask and python used to crate backend
- Github is used as version control system

## 3 Design Details

### 3.1 Process Flow



#### 3.1.1 Collecting stock data

We are collect datetime, open, close, high, low of stock data from Casandra data base and dump into data\_ingestion folder in artifact

#### 3.1.2 Data validation

Here we are validating our data set is having numerical columns and number of columns present in dataset

#### 3.1.3 Data transformation

Transform validated data we having only open,close,low,high,datetime values from this we are generate RSI(14), RSI(9), EMA(20) ,EMA(5) values

### **3.1.4 Model training**

We are using xgboost classifier for prediction and training transformed data on xgboost classifier and trained model saving artifact directory

### **3.1.5 Model evaluation and model pushing**

Here evaluating trained model and if this model have good accuracy and compare with previous model accuracy if this model have more accuracy than previous model then insert this model to best model folder

### **3.1.6 Prediction**

Prediction on input data and using model from best model directory

## **3.2 Event log**

The system should log every event so that the user will know what process is running internally.

Initial step-by-step Description:

1. The System identify at what step logging required
2. The system should be able to log each and every system flow.
3. Developer can choose logging method as file logging
4. System should not hang even after using so many loggings. Logging just because we can easily debug issues so logging is mandatory to do

## **3.3 Error Handling**

Should errors be encountered an explanation will be displayed as to what went wrong? An error will be defined as anything that falls outside the normal and intended usage.

## 4 Performance

The model work good for prediction but stock market is not always predictable it can beat any one when big money order will come against you so just use non volatile market and train model with huge volume data and if possible to train on same stock data to predict same stock price

### 4.1 Reusability

The code written and the components used should have the ability to be reused with no problems

### 4.2 Application Compatibility

The different components for this project will be using Python as an interface between them. Each component will have its own task to perform and it is the job of the python to ensure proper transfer of information

### 4.3 Resource Utilization

When any task is performed, it will likely use all the processing power available until that function is finished

### 4.4 Deployment

For deployment we used amazon web service

## 5 conclusion

The RSI crossover prediction model can predict rsi crossed 40 and it will reach until 60 without failure by seeing rsi 9,rsi14, ema5,ema20 values so we can use this model for prediction some times it will fail because it the money power game more over we can trade with this in consistently by proper risk management and use double volume if fail once and if fail again then we want to double entire traded quantity and when our model get correct prediction we will recover all previous loss and we can make huge

profit by doubling trade quantity with this model

## 6 References

1 fyers.com for stock data

