

**PROJECT DESIGN PHASE I****SOLUTION ARCHITECTURE**

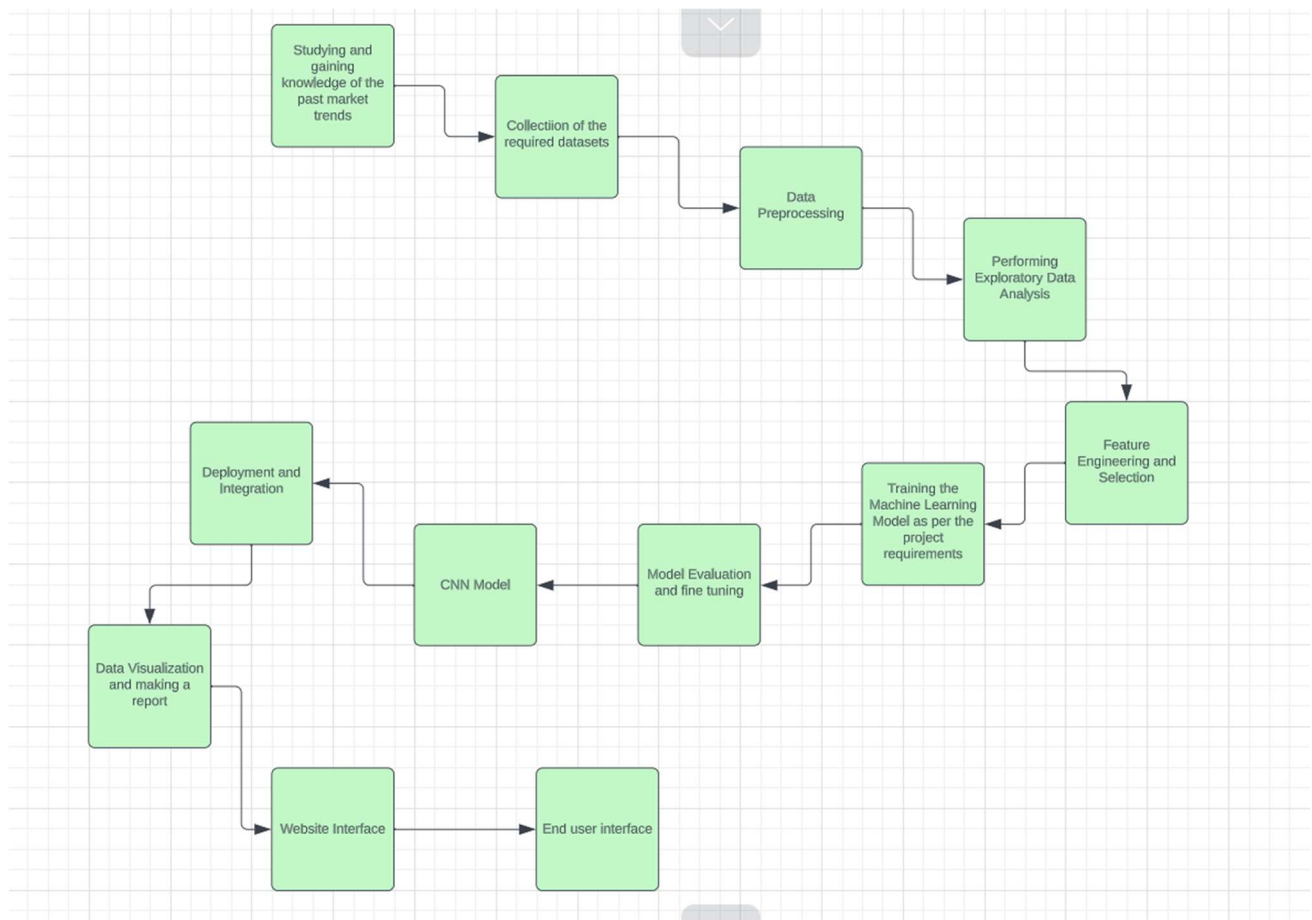
Date	22 <sup>nd</sup> November 2023
Team ID	593111
Project Name	Share Price Estimation of Top 5 GPU Companies
Maximum Marks	4 marks

**Solution Architecture**

Solution architecture is a complex process – with many sub-processes – that bridges the gap between business problems and technology solutions. Its goals are to:

- Find the best tech solution to solve existing business problems.
- Describe the structure, characteristics, behavior, and other aspects of the software to project stakeholders.
- Define features, development phases, and solution requirements.
- Provide specifications according to which the solution is defined, managed, and delivered.

## Solution Architecture Diagram



## Diagram Explanation

### 1. Analysis of Market Trends

Analysing market trends for stock price prediction involves a combination of fundamental analysis, technical analysis, and sometimes sentiment analysis. Here are some key aspects to consider:

#### Fundamental Analysis:

- **Earnings Reports:** Analyse a company's financial statements, especially quarterly and annual reports. Look for trends in revenue, earnings, and profit margins.
- **Industry Trends:** Consider the overall health and trends within the industry. A company's performance is often influenced by the industry it operates in.
- **Economic Indicators:** Monitor economic indicators like GDP growth, inflation rates, and interest rates. These can impact the overall market and specific sectors.

### Technical Analysis:

- Price Patterns: Identify common price patterns like head and shoulders, double tops/bottoms, and trendlines. These can indicate potential reversal or continuation of trends.
- Moving Averages: Use moving averages to smooth out price data and identify trends. Crossovers between short-term and long-term moving averages can signal changes in trend direction.
- Relative Strength Index (RSI): RSI helps assess whether a stock is overbought or oversold. It's a momentum indicator that can signal potential trend reversals.

## 2. Collecting the required dataset

## 3. Data Preprocessing

### Data Cleaning:

- Handling Missing Values: Identify and handle missing data. This might involve imputation (replacing missing values with estimated ones) or removing data points with missing values.
- Outlier Detection and Treatment: Identify and address outliers that could distort the analysis. This may involve removing outliers or transforming the data to reduce their impact.

### Normalization/Scaling:

- Standardization or Min-Max Scaling: Normalize numerical features to bring them to a similar scale. This is important for algorithms sensitive to the scale of input features, such as neural networks.

### Handling Categorical Data:

### One-Hot Encoding:

- If your dataset includes categorical variables (e.g., stock symbols, market segments), convert them into numerical format using one-hot encoding or other suitable methods.

### Handling Multi-Modal Data:

- **Incorporate External Data:** If relevant, integrate external data sources (e.g., economic indicators, news sentiment) into your dataset to enhance predictive power.

#### Train-Test Split:

- **Temporal Split:** If dealing with time series data, split your dataset into training and testing sets chronologically. This helps to simulate a real-world scenario where the model is trained on past data and tested on future data.

#### Handling Imbalanced Data (if applicable):

- If your dataset has imbalanced classes (e.g., significant price changes are rare), consider techniques such as oversampling, undersampling, or using different evaluation metrics.

#### Correlation Analysis:

- **Correlation Matrix:** Analyze the correlation between features to identify highly correlated variables. Redundant features can be removed to improve model efficiency.

### 4. Exploratory Data Analysis

technique that is used to analyze the data through visualization and manipulation.

### 5. Machine Learning Model

- **Predictive Models:** Utilize machine learning algorithms for predictive modeling. Regression analysis, decision trees, and neural networks can be employed to forecast stock prices based on historical data and relevant features.
- **Natural Language Processing (NLP):** Use NLP techniques to analyze financial news, earnings call transcripts, and social media sentiment for predicting market movements.

### 6. CNN Model

A Convolutional Neural Network (CNN)

model is trained using the preprocessed data to predict future stock prices based on historical trends and selected features.

#### 7. Deployment and Integration

The trained model is deployed, and a web app is created to integrate the model for real-time predictions.

#### 8. Data Visualization and Report

The website visualizes and reports the model predictions' findings. Users can examine share price estimates and related insights by interacting with the interface.