

Project Design Phase-I

Solution Architecture

Date	01 November 2023
Team ID	592679
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.

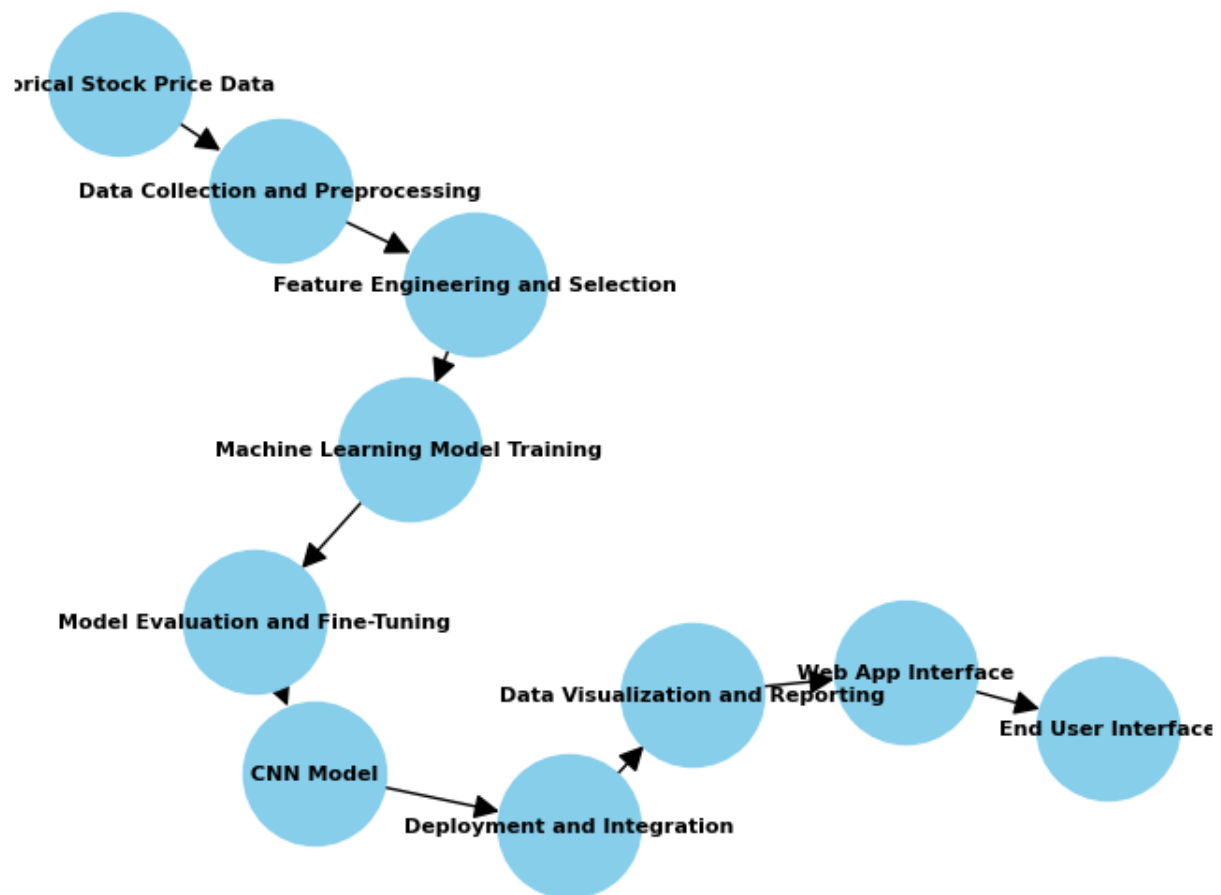
Explanation:

1. **Historical Stock Price Data:** This is the starting point, where historical stock price data for the top 5 GPU companies is collected.
2. **Data Collection and Preprocessing:** The collected data is processed and cleaned to remove any inconsistencies or missing values. This step ensures that the data is ready for analysis.
3. **Feature Engineering and Selection:** Relevant features are selected or engineered to improve the model's predictive performance. This step may involve transforming the data to extract meaningful insights.
4. **Machine Learning Model Training:** A Convolutional Neural Network (CNN) model is trained using the preprocessed data to predict future stock prices based on historical trends and selected features.
5. **Model Evaluation and Fine-Tuning:** The trained model is evaluated using validation data, and fine-tuning is performed to improve its accuracy and generalization.
6. **Deployment and Integration:** The trained model is deployed, and a web app is created to integrate the model for real-time predictions.
7. **Data Visualization and Reporting:** The results of the model predictions are visualized and reported in the web app. Users can interact with the interface to explore share price estimations and relevant insights.

This architecture provides a high-level overview of the key components and their interactions in the Share Price Estimation project, incorporating machine learning (CNN) and a web app for user interaction. Keep in mind that this is a simplified

representation, and the actual implementation may involve additional details and considerations based on the specific requirements of your project.

Example - Solution Architecture Diagram:



Code for the above Image:

```
import networkx as nx
import matplotlib.pyplot as plt

# Create a directed graph
G = nx.DiGraph()

# Add nodes
nodes = [
    "Historical Stock Price Data",
    "Data Collection and Preprocessing",
    "Feature Engineering and Selection",
    "Machine Learning Model Training",
    "Model Evaluation and Fine-Tuning",
    "CNN Model",
    "Deployment and Integration",
    "Data Visualization and Reporting",
    "Web App Interface",
    "End User Interface",
]
```

```

    "End User Interface",
]

G.add_nodes_from(nodes)

# Add edges
edges = [
    ("Historical Stock Price Data", "Data Collection and Preprocessing"),
    ("Data Collection and Preprocessing", "Feature Engineering and Selection"),
    ("Feature Engineering and Selection", "Machine Learning Model Training"),
    ("Machine Learning Model Training", "Model Evaluation and Fine-Tuning"),
    ("Model Evaluation and Fine-Tuning", "CNN Model"),
    ("CNN Model", "Deployment and Integration"),
    ("Deployment and Integration", "Data Visualization and Reporting"),
    ("Data Visualization and Reporting", "Web App Interface"),
    ("Web App Interface", "End User Interface"),
]

G.add_edges_from(edges)

# Draw the graph
pos = nx.spring_layout(G, seed=42)
nx.draw(G, pos, with_labels=True, font_weight='bold', node_size=3000,
node_color='skyblue', font_size=8, arrowsize=20)

# Display the graph
plt.show()

```

Reference image:

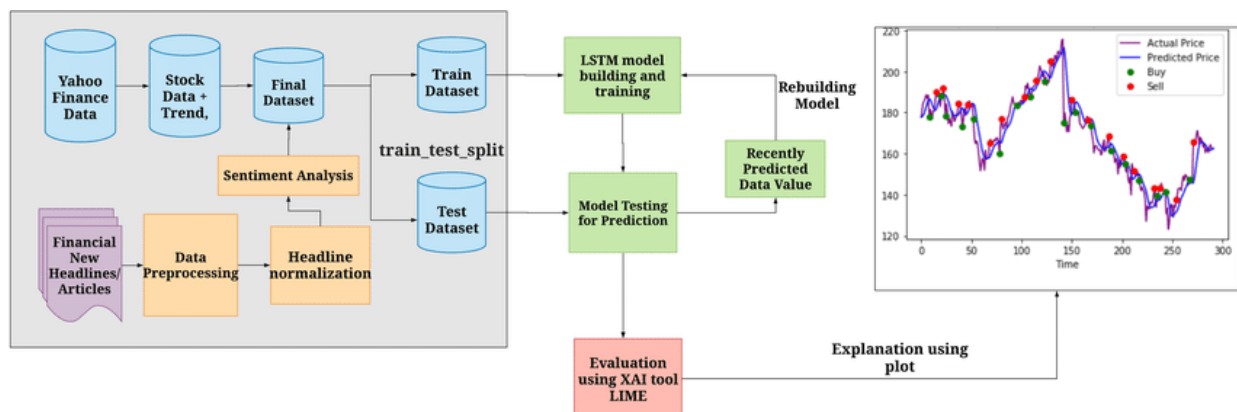


Figure 1: Architecture and data flow of the Share price estimation of TOP 5 GPU Companies sample application

Reference: https://www.researchgate.net/figure/System-Architecture-of-Stock-Market-Prediction-using-LSTM-and-XAI-Shows-how-the-data-is_fig2_348847477