# Riphah International University Lahore, Pakistan



**Riphah School of Computing & Innovation**

## FINAL YEAR PROJECT

**PROJECT PROPOSAL & PLAN**

# [Title of Project]

Project ID: **[Issued by FYP Manager]**

### Project Team

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| --- | --- | --- | --- | --- |
| **Student Name** | **Student ID** | **Program** | **Contact Number** | **Email Address** |
| ABDUL QUDDOUS | 36154 | BSCS | 03457228219 | imquddous@gmail.com |
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**[Project Supervisor]**

([Designation])

# [Title of Project]

**Change Record**

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| --- | --- | --- | --- | --- |
| **Author(s)** | **Version** | **Date** | **Notes** | **Supervisor’s Signature** |
|  | 1.0 |  | Original Draft |  |
|  |  |  | Changes Based on Feedback from Supervisor |  |
|  |  |  | Changes Based on Feedback From Faculty |  |
|  |  |  | Added Project Plan |  |
|  |  |  | Changes Based on Feedback from Supervisor |  |
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# Project Proposal

**Project Title:** [14 pt, Calibri]

### Executive Summary

The stock market is influenced by various factors, including public sentiment, news, and global economic trends. Traditional prediction models often miss this crucial aspect, leading to inaccurate forecasts and trading decisions. This project, **"Sentiment Analysis for Stocks,"** combines deep learning models with real-time sentiment analysis from news, social media, and financial reports. By integrating multiple data sources, our system will provide more accurate predictions and enable automated stock trading on NASDAQ. The goal is to help traders make more informed and profitable decisions through an intuitive platform.

## Introduction

Stock price prediction is a challenging task due to the volatility of financial markets. Investors rely heavily on market sentiment and external events. This project aims to develop a deep learning-based system that incorporates sentiment analysis into traditional financial data to enhance stock price forecasting. The tool will empower both novice and professional investors by providing reliable predictions and automated trading options.

## Existing System / Competitive Analysis

Traditional stock prediction models mostly rely on historical price data and technical indicators. These models, including ARIMA, LSTM, and GRU, fail to account for real-time sentiment from external factors. Competitors like **Alpaca Trading**, **Kavout**, and **Trefis** use technical indicators for predictions, but they lack robust sentiment analysis integration. Our system will surpass these models by using a fusion of **Bi-LSTM** and **Bi-GRU** models and sentiment data from **news articles, social media,** and **financialreports**.

## Problem Statement

Existing stock prediction systems do not incorporate real-time sentiment, leading to suboptimal predictions. Moreover, investors often struggle with manual decision-making due to a lack of user-friendly interfaces and actionable insights. There is a need for an integrated solution that combines sentiment analysis with financial data to improve stock price forecasts and offer an automated trading system.

## Proposed Solution

Our proposed system, **"Sentiment Analysis for Stocks,"** will use deep learning techniques to forecast NASDAQ stock prices. The system will fuse **Bi-LSTM** and **Bi-GRU** models to capture both long-term and short-term dependencies in stock price movements. Real-time sentiment analysis will be incorporated using data from **news**, **social media**, and **financial reports**. The platform will provide stock price predictions with a user-friendly interface, allowing both manual and automated trading using **Alpaca API**. Investors can set predefined rules for automated trades based on sentiment data.

## Scope of the Project

 **Sentiment Data Collection**: Collect sentiment data from social media, financial news, and other online sources.

 **Deep Learning Models**: Use Bi-LSTM and Bi-GRU models for stock price predictions.

 **Automated Trading**: Implement an automated trading feature using predefined rules via the **Alpaca API**.

 **User Interface**: Develop a clean, intuitive interface for users to view predictions and control automated trades.

 **Excluded Features**: Features like mobile app development and real-time portfolio management will be considered for future release

## System Architectural Design

The architecture will consist of the following components:

* **Data Collection Module**: Gathers historical price data from **Yahoo Finance** and sentiment data from online sources.
* **Deep Learning Prediction Engine**: Processes data using Bi-LSTM and Bi-GRU models.
* **Trading Module**: Executes manual or automated trades via the **Alpaca API**.
* **Frontend Interface**: Allows users to interact with the system, visualize predictions, and manage trades.

## Implementation Tools and Techniques

**Data Collection**: Use **yfinance** for historical price data and **news API** for sentiment analysis.

**Deep Learning**: Implement using **TensorFlow** and **Keras** for Bi-LSTM and Bi-GRU models.

**Frontend Development**: Utilize **React.js** for a responsive web interface.

**Backend Development**: Use **Django** for server-side logic and **Alpaca API** for trade execution.

**Deployment**: Use **AWS** for hosting and **Vercel** for frontend deployment.

## Project Plan

* + Data Collection and Preprocessing
  + Model Development (Bi-LSTM, Bi-GRU)
  + Sentiment Data Integration
  + Trading System Development
  + Frontend Interface Development
  + Testing and Validation
  + Final Deployment and Maintenane

### Work Breakdown Structure

Here is a detailed **Work Breakdown Structure (WBS)** for your project **"Sentiment Analysis for Stocks"**. This WBS decomposes the project scope into manageable deliverables and assigns roles and responsibilities to the team members.

#### 

**1. Project Management**

1.1 **Work Breakdown Structure (WBS)**

* Develop the overall WBS and monitor progress.
* **Assigned to**: **ABDUL QUDDOUS** (Team Lead)

1.2 **Roles & Responsibility Matrix**

* Define the roles and allocate tasks for each team member.
* **Assigned to**: **ABDULLAH BIN ATA /ABUDL QUDDOUS**

1.3 **Change Control System**

* Manage and track all changes to project scope and timeline.
* **Assigned to**: : **ABDULLAH BIN ATA /ABUDL QUDDOUS**

#### 2. Reports / Documentation

#### 2.1 Final Documentation Introduction

#### Prepare and compile final project documentation.

#### Responsible: ABUDL QUDDOUS

#### 2.2 Literature / Market Survey

#### Research and analyze current market trends and existing solutions.

#### Responsible: ABUDL QUDDOUS /ABDULLAH BIN ATA

#### 2.3 Requirements Analysis

#### Gather and define system requirements.

#### Responsible: ABUDL QUDDOUS /ABDULLAH BIN ATA

#### 2.4 System Design

#### Design system architecture, components, and data flow.

#### Responsible: ABUDL QUDDOUS /ABDULLAH BIN ATA

#### 2.5 Implementation

#### Code the system, ensuring each module functions correctly.

#### Responsible: ABUDL QUDDOUS /ABDULLAH BIN ATA

#### 2.6 Testing & Performance Evaluation

#### Test system modules and evaluate performance.

#### Responsible: ABUDL QUDDOUS /ABDULLAH BIN ATA

#### 2.7 Conclusion & Outlook

#### Summarize project outcomes and propose future improvements.

#### Responsible: ABUDL QUDDOUS /ABDULLAH BIN ATA

#### 2.8 End User Documentation

#### Prepare documentation for users of the system.

#### Responsible: ABUDL QUDDOUS /ABDULLAH BIN ATA

#### 2.9 Application Administration Documentation

#### Create administration-level documentation for managing the system.

#### Responsible: ABUDL QUDDOUS

#### 2.10 System Administrator Documentation

#### Document procedures for system administrators.

#### Responsible: ABUDL QUDDOUS /ABDULLAH BIN ATA

**3. System**

3.1 **Development Environment**

* Set up the environment for development, including tools and libraries.
  + 3.1.1 **IDE**: Choose an IDE for development (e.g., Visual Studio Code).
  + **Responsible**: ABDUL QUDDOUS / ABDULLAH BIN ATA
  + 3.1.2 **Version Control**: Implement GitHub for version control.
  + **Responsible**: ABDUL QUDDOUS / ABDULLAH BIN ATA
  + 3.1.3 **Server**: Configure cloud server (AWS) for deployment.

**Responsible**: ABDUL QUDODUS/ABDULLAH BIN ATA

* + 3.1.4 **Database**: Design and deploy the database (MySQL).
* **Responsible**: ABDUL QUDODUS/ABDULLAH BIN ATA

Here’s a **Work Breakdown Structure (WBS)** for your project, **"Sentiment Analysis for Stocks,"** including division of responsibilities and duties among team members.

**1. Project Management**

1.1 **Work Breakdown Structure (WBS)**

* Responsible for defining all work components, breaking them down into manageable tasks.
* **Team Lead**: ABDUL QUDODUS/ABDULLAH BIN ATA

1.2 **Roles & Responsibility Matrix**

* Identify and assign roles for each team member based on skillsets.
* **Team Lead**: ABDUL QUDODUS/ABDULLAH BIN ATA

1.3 **Change Control System**

* Implement a system for tracking and approving changes to the project.
* **Responsible**: ABDUL QUDODUS/ABDULLAH BIN ATA

**2. Reports / Documentation**

2.1 **Final Documentation Introduction**

* Prepare and compile final project documentation.
* **Responsible**: ABDUL QUDODUS

2.2 **Literature / Market Survey**

* Research and analyze current market trends and existing solutions.
* **Responsible**: ABDUL QUDODUS/ABDULLAH BIN ATA

2.3 **Requirements Analysis**

* Gather and define system requirements.
* **Responsible**: ABDUL QUDODUS/ABDULLAH BIN ATA

2.4 **System Design**

* Design system architecture, components, and data flow.
* **Responsible**: ABDUL QUDODUS/ABDULLAH BIN ATA

2.5 **Implementation**

* Code the system, ensuring each module functions correctly.
* **Responsible**: ABDUL QUDODUS/ABDULLAH BIN ATA

2.6 **Testing & Performance Evaluation**

* Test system modules and evaluate performance.
* **Responsible**: ABDUL QUDODUS/ABDULLAH BIN ATA

2.7 **Conclusion & Outlook**

* Summarize project outcomes and propose future improvements.
* **Responsible**: ABDUL QUDODUS/ABDULLAH BIN ATA

2.8 **End User Documentation**

* Prepare documentation for users of the system.
* **Responsible**: ABDUL QUDODUS/ABDULLAH BIN ATA

2.9 **Application Administration Documentation**

* Create administration-level documentation for managing the system.
* **Responsible**: ABDUL QUDODUS

2.10 **System Administrator Documentation**

* Document procedures for system administrators.
* **Responsible**: ABDUL QUDODUS

**3. System**

3.1 **Development Environment**

* **Tools and Technologies:**
* **Development Platforms**: Google Collab, Visual Studio Code, Jupyter Notebook
* **Language:** Python (Keras, NumPy, Pandas, Scikit-learn, TensorFlow etc.)
* **Model:** LSTM, GRU, ARIMA and others.
* **API:** yfinance
* **Front-end:** React, HTML, CSS, JavaScript, Next.js, Three.js, Django
* **Deployment:** AWS clouds
* .

3.2 **Presentation Layer**

* 3.2.1 **Frontend Development**: Design the user interface using React.js.
* **Responsible**: ABDULLAH BIN ATA
* 3.2.2 **Frontend Testing**: Test frontend functionality and responsiveness.
* **Responsible**: ABDUL QUDODUS

3.3 **Business Logic Layer**

* 3.3.1 **Deep Learning Models**: Implement Bi-LSTM and Bi-GRU models.
* **Responsible**: ABDUL QUDODUS/ABDULLAH BIN ATA
* 3.3.2 **Model Integration**: Integrate models with frontend predictions.
* **Responsible**: ABDUL QUDODUS/ABDULLAH BIN ATA

3.4 **Data Management Layer**

* 3.4.1 **Data Collection**: Gather and preprocess stock price and sentiment data.
* **Responsible**: ABDUL QUDODUS/ABDULLAH BIN ATA
* 3.4.2 **Data Normalization**: Perform feature scaling and normalization.
* **Responsible**: ABDUL QUDODUS/ABDULLAH BIN ATA

3.5 **Physical Layer**

* 3.5.1 **AWS Cloud Deployment**: Deploy the system on AWS.
* **Responsible**: ABDUL QUDODUS/ABDULLAH BIN ATA
* 3.5.2 **Trading API Integration**: Integrate **Alpaca API** for real-time trading.
* **Responsible**: ABDUL QUDODUS/ABDULLAH BIN AT

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### Gantt Chart



**Key Milestones:**

* **Project Planning Completed**: Oct 31, 2024
* **Requirements Analysis Completed**: Nov 30, 2024
* **System Design Completed**: Jan 31, 2025
* **Data Collection Completed**: Feb 28, 2025
* **Model Development Completed**: Mar 31, 2025
* **Frontend Development Completed**: Apr 30, 2025
* **Backend Development Completed**: May 31, 2025
* **API Integration Completed**: Jun 15, 2025
* **Testing & Evaluation Completed**: Jun 30, 2025

## References

https://neptune.ai/blog/predicting-stock-prices-using-machine-learning

# List of Faculty Proposed Changes

### Project Title

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| --- | --- | --- |
| **Proposed Change** | **Proposed By** | **Supervisor’s Decision** |
|  | Name of Faculty Member(s) who proposed this change | Approved/Disapproved and/or Comments |
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**Date: Supervisor’s Signature:**

## APPROVAL

#### Project Supervisor

Comments:

Name:

Date: Signature:

#### Project Manager

Comments:

Date: Signature: