**Vasala vasu yadav**

**Project work**

Phase-5

Document Submission

Project title:  Machine Learning Model Deployment Project Documentation

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Machine Learning Model Deployment Project Documentation

Project Overview:

\*\*Objective:\*\* The objective of this project is to deploy a machine learning model for sentiment analysis. The model will classify text data into positive, negative, or neutral sentiments, enabling businesses to analyze customer feedback and social media comments effectively.

# Design Thinking Process:

1. \*\*Empathize:\*\* Understand the need for sentiment analysis and its impact on business decision-making. Gather input from stakeholders, including marketing, customer support, and data analysts.

2. \*\*Define:\*\* Clearly define the problem and project objectives. Determine the project's scope, timeline, budget, and available resources.

3. \*\*Ideate:\*\* Brainstorm predictive use cases and select sentiment analysis as the primary use case.

4. \*\*Prototype:\*\* Create a data prototype to assess data availability and quality. Explore potential data sources and their relevance to sentiment analysis.

5. \*\*Test:\*\* Test the data prototype and gather feedback from stakeholders to refine the project scope and data requirements.

## Development Phases:

1. \*\*Data Collection:\*\*

- Gather text data from various sources, such as customer reviews, social media comments, and support tickets.

- Ensure data is representative of the target sentiment classes (positive, negative, neutral).

2. \*\*Data Preprocessing:\*\*

- Clean and preprocess the text data, including tokenization, removing stopwords, and text normalization.

- Label the data with the corresponding sentiment classes.

3. \*\*Dataset Selection:\*\*

- Split the preprocessed data into training, validation, and test sets.

- Ensure balanced class distribution in each dataset.

4. \*\*Model Selection:\*\*

- Choose a natural language processing model for sentiment analysis, such as a Recurrent Neural Network (RNN) or a pre-trained transformer model like BERT.

5. \*\*Model Training:\*\*

- Train the selected model using the training dataset.

- Evaluate the model's performance on the validation dataset and fine-tune hyperparameters for optimal results.

6. \*\*Deployment Process:\*\*

- Set up a cloud-based deployment environment (e.g., AWS, Azure, or Google Cloud) to host the sentiment analysis model.

7. \*\*Model Deployment:\*\*

- Deploy the trained sentiment analysis model in the cloud environment.

8. \*\*Integration:\*\*

- Integrate the deployed model with business applications and data pipelines, allowing real-time or batch processing of text data.

# Access and Utilization of the Deployed Model:

Stakeholders and applications can access and utilize the deployed model as follows:

1. \*\*API Access:\*\*

- Create an API endpoint that allows external applications to send text data for sentiment analysis.

2. \*\*Data Input:\*\*

- Collect text data from various sources, such as customer feedback forms, social media streams, or support chat logs.

3. \*\*Prediction Request:\*\*

- Send a prediction request to the deployed model's API, providing the text data for sentiment analysis.

4. \*\*Model Inference:\*\*

- The deployed model processes the text data and predicts the sentiment, classifying it as positive, negative, or neutral.

5. \*\*Decision Making:\*\*

- Stakeholders use the sentiment predictions to make data-driven decisions, such as assessing customer satisfaction, identifying trends, or flagging potential issues.

6. \*\*Real-time Monitoring:\*\*

- Continuously monitor the model's performance and retrain it as needed to maintain high accuracy.