# Assignment

As a part of selection process, please complete the following assignment.

**Assignment Title:** Natural Language Processing for Sentiment Analysis

**Assignment Description:**
Thank you for your interest in the AI Engineer position at Techdome Solutions Pvt. Ltd. As part of our hiring process, we would like to assess your skills and expertise in the field of Artificial Intelligence. This assignment is designed to gauge your ability to work on a practical AI project that aligns with the responsibilities of the role you are applying for.

**Assignment Objectives:**
In this assignment, you will be required to build a sentiment analysis model using Natural Language Processing (NLP) techniques. Sentiment analysis, also known as opinion mining, is a critical component in many AI applications, including customer feedback analysis, social media monitoring, and more. Your task is to create a sentiment analysis model capable of accurately classifying text data into positive, negative, or neutral sentiments.

**Assignment Instructions:**

1. **Data Collection:** You are provided with a dataset containing text data from various sources (e.g., product reviews, social media comments, news articles). The dataset is divided into two categories: positive sentiment and negative sentiment. Download the dataset [provide a link to the dataset].
2. **Data Preprocessing:** Clean and preprocess the text data to prepare it for model training. This may include tasks such as tokenization, stemming, and removing stop words.
3. **Model Selection:** Choose an appropriate NLP model for sentiment analysis. You can use pre-trained models like BERT, GPT-3, or train your own model using libraries like TensorFlow or PyTorch.
4. **Model Training:** Train your selected model on the preprocessed data. Split the dataset into training and testing sets to evaluate the model's performance accurately.
5. **Evaluation:** Assess the performance of your sentiment analysis model using appropriate evaluation metrics (e.g., accuracy, precision, recall, F1-score). Provide a detailed analysis of the model's strengths and weaknesses.
6. **Deployment:** If possible, deploy your model as a web service or API to demonstrate its real-world usability. Include instructions on how to interact with the deployed model.
7. **Documentation:** Create a detailed report that includes the following:
    - Data preprocessing steps.
    - Model architecture and parameters.
    - Training process and hyperparameters.
    - Evaluation results and analysis.
    - Instructions for using the deployed model (if applicable).

**Submission Guidelines:**

1. Submit your assignment as a comprehensive report, including code, documentation, and any necessary instructions for evaluation.
2. Include a link to your code repository (e.g., GitHub) for review.
3. Ensure that your code is well-organized, commented, and follows best practices.

**Grading Criteria:**

Your assignment will be evaluated based on the following criteria:

- Data preprocessing (15%)
- Model selection and architecture (20%)
- Model training and performance (20%)
- Deployment (if applicable) (10%)
- Documentation and report quality (15%)
- Code organization and best practices (10%)
- Overall analysis and insights (10%)

**Note:** Plagiarism is strictly prohibited. Any use of external sources or code must be properly cited.
This assignment aims to assess your technical skills, problem-solving abilities, and your capacity to work on a practical AI project. We appreciate your effort and look forward to reviewing your submission. If you have any questions or require clarification, please feel free to reach out to us. Good luck!

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