**Task: Sentiment Analysis Model Development**

**Time: 72 hours max. (3 days)**

**Objective:**

Develop a sentiment analysis model that can classify user reviews or social media posts into positive, negative, or neutral sentiments. This task will assess your ability to work with NLP techniques and apply machine learning models to a practical problem.

**Task Description:**

1. **Data Collection**: You are provided with a dataset containing user reviews or conversation posts. The dataset is labeled with sentiments (positive, negative, neutral).
2. **Data Preprocessing**:
   * Clean the text data if you think it’s necessary (e.g., removing stop words, punctuation, lowercasing).
   * Perform tokenization and any other necessary preprocessing steps.
3. **Feature Engineering(if necessary)**:
   * Generate features using techniques like TF-IDF or word embeddings (e.g., Word2Vec, GloVe).
4. **Model Development**:
   * Develop a machine learning model using algorithms such as Logistic Regression, Naive Bayes, or an LSTM network or whatever network you would like.
5. **Model Evaluation**:
   * Evaluate the model’s performance using appropriate metrics (e.g., accuracy, F1-score etc.).
6. **Fine Tuning a LLM:**
   * Additionally, Fine tune Llama 3.1 (8b) for the same above described task (you can use [unsloth](https://www.youtube.com/watch?v=rpAtVIZB72U)) and compare the performance with your developed model.
7. **Documentation**:
   * Document the entire process, including challenges faced, methodologies used, and performance analysis.

**Deliverables:**

* Python code (Jupyter notebook or script) with a clear explanation of each step.
* A short document summarizing the process, methods, challenges and any recommendations for improvement.