**Assignment No: 6**

**Problem Statement:**

Perform sentiment analysis using an LSTM or GRU network.

**Theory:**

Sentiment analysis involves identifying the emotional tone behind a given text. It is widely used to analyze customer feedback, social media posts, and any text expressing subjective opinions.

* LSTM (Long Short-Term Memory) and GRU (Gated Recurrent Unit) are types of Recurrent Neural Networks (RNNs) that are effective in handling long-term dependencies in sequential data like text.

**Methodology:**

1. Data Collection:
   * Use a labeled dataset, such as the IMDB movie reviews dataset or Twitter sentiment datasets.
   * Preprocess the text data by tokenizing and padding the sequences to ensure uniform input lengths.
2. Model Architecture:
   * Build an LSTM or GRU-based RNN using Keras or TensorFlow.
   * Utilize embedding layers to convert words into dense vectors before feeding them into the LSTM/GRU layers.
3. Training:
   * Train the model on the labeled dataset using the binary\_crossentropy loss function for binary sentiment classification (e.g., positive vs. negative).
   * Evaluate the model using metrics like accuracy and F1-score.
4. Prediction:
   * Test the model on new, unseen text data to predict its sentiment.

**Conclusion:**

We successfully developed an LSTM/GRU-based sentiment analysis model, accurately classifying text as either positive or negative based on the input.

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