Assignment 1

Part A: Literature Exploration and Comparison (8 marks)

Team Contribution:

Member1 : 100%/No Contribution

Member2 : 100%/No Contribution

Member3 : 100%/No Contribution

Member4 : 100%/No Contribution

Objective: Explore a specific application within a specific domain, identify three significant papers, and conduct a comparative analysis.

Steps

1. **Choose an Application Area:** Choose any one application area from the list given below. (Not just limited to the following list. You can choose your own application area also) .

List of potential application area:

- CO2 Emission Prediction
- Cyclone prediction
- Traffic Flow Prediction
- Automatic music generation
- Self-Organizing Maps
- Energy Consumption Prediction
- Building Energy Optimization
- Waste Composition Analysis
- Predictive Air Quality Models
- Application for cancer detection
- Gender recognition using voice
- Content Recommendation with Transformers
- Medical Image Diagnosis
- Speech Recognition

- Speech Translation
- Emotion Recognition in Social Media
- Autonomous Navigation for Robots
- Gesture Recognition for Human-Computer Interaction
- Wildlife Classification
- Real-time Language Translation
- Human Activity Recognition from videos
- Expression Recognition from images
- Intrusion Detection System

2. **Identify Three Papers:** Identify three significant journals / conference papers (2023 onwards) that use custom designed Deep Feedforward Neural Network / CNN / RNN / Transformer networks. For example, if the chosen application area is speech translation, then all three papers should be within the speech translation domain. Journals / conference papers should be from reputed sources like IEEE/Springer or ACM. **Upload all three PDFs** as individual files.

3. Compare the architecture and methodologies used in the selected papers using a Comparison Table. Present your findings with the following titles:
    - Group Number, member names, and BITS IDs
    - Applications / Domain
    - PAPER 1, PAPER 2, PAPER 3 (with subheadings: Title, Authors, Year, Architecture of Deep Learning (including the number of layers, types of layers, activation functions, and any unique features). Network application (e.g., feature engineering, classification, regression), Training procedures (e. g, training strategy, including optimization algorithms, learning rates, batch sizes, and regularization techniques) Evaluation/Performance metric, Dataset used, URL if public dataset) [*Reference Comparison Table is given below]

- **Conclude:** End the comparison with a proper conclusion highlighting your observations.
- **Submission:** Upload the comparison table as one PDF and the three selected papers (Filename: DomainName_GroupNumber).

Expected Comparison Table

Group Number, member names and BITS ID

Domain

	PAPER 1	PAPER 2	PAPER 3
Title of the paper			
Authors			
Year of publication			
Architecture of Deep Learning (including the number of layers, types of layers, activation functions, and any unique features)			
How is the network helping the overall task? eg: feature engg or classification or regression or all			
Training procedures (e.g, training strategy, including optimization algorithms, learning rates, batch sizes, and regularization techniques)			
Evaluation / Performance metric used			
Name of Dataset used. If a public dataset, provide the URL.			

Conclusion: You must end the comparison with a proper **conclusion** highlighting your observations.

Part B: Industry DL Product (7 marks)

Team Contribution:

Member1 : 100%/No Contribution

Member2 : 100%/No Contribution

Member3 : 100%/No Contribution

Member4 : 100%/No Contribution

Objective: Identify any industry product and summarize the understanding

Instructions:

- **Identify DL Product:** Identify any product that is used in any industry. Examples -- Product Recommendation in Amazon, Music recommendation in Spotify, ChatGPT, Dall-E, Face tagging in Facebook, Gemini. Ensure that it is a product used in the industry. You can choose your own.
- **Identify the white paper associated with the above product, if any:** Upload the white as PDF.
- **Summarize: I**n your own words, summarize the product.
  - Paragraph 1: What is the objective of the product?
  - Paragraph 2: What is the solution technology used. How is the solution achieving the objective mentioned earlier?
  - Paragraph 3: What are the frameworks, algorithms, tools etc used for the developing the solution.
  - Paragraph 4: What are the issues in the current solution.
  - Paragraph: Do you see any future scope in similar products?
- **Submission:** Write the above within 500 words and upload as PDF (Filename: DomainName_GroupNumber).
- **Plagiarism**: Any plagiarism will result in zero marks.
- **Late Submissions**: Late submissions incur a penalty of **(-2) marks**.

Additional Instructions:

- Journals can be chosen without any restrictions on impact factors or other indices.
- Select three research papers within a single domain, each employing a different algorithm (CNN, RNN, Transformers) for comparative analysis.
- Dataset can be the same or different.
- For any queries, use the discussion forum.