MARWADI UNIVERSITY

Faculty of Technology

Information and Communication Technology

B.Tech   **SEM: VI**   **Mid Sem Exam**   **March 2025**

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Subject: - Artificial Intelligence (01CT0616)   **Date:- 19/03/2025**

Total Marks:-40   **Time: - 1.5 hours**

Note:
1. All questions are compulsory
2. Marks on the right indicates the total marks of the question

Part A: Machine Learning and its evaluation parameters (CO1, CO3)   **[10]**

1	Explain the concept of feature engineering and its significance in improving model performance.	02
2	What is semi-supervised type of machine learning technique? Give example for the same.	02
3	What is the curse of dimensionality, and how does it affect machine learning models?	02
4	Which are the evaluation parameters for regression and classification techniques. Explain each of them giving examples	04

Part B: Deep Learning and Neural Network (CO2, CO5) [Any two]   **[10]**

1	Analyze the vanishing gradient problem in RNNs and discuss how it impacts long-term dependency learning in sequential data processing.	05
2	Design the CNN network architecture with following model summary:	05

```
Layer (type)                 Output Shape              Param #
=================================================================
First_CNN_Layer (Conv2D)     (None, 32, 32, 32)        896

First_MaxPool_Layer (MaxPool (None, 16, 16, 32)        0

Second_CNN_Layer (Conv2D)    (None, 16, 16, 64)        18496

Second_MaxPool_Layer (MaxPoo (None, 8, 8, 64)          0

Third_CNN_Layer (Conv2D)     (None, 8, 8, 128)         73856

Third_MaxPool_Layer (MaxPool (None, 4, 4, 128)         0

flatten_5 (Flatten)          (None, 2048)              0

First_Dense_Layer (Dense)    (None, 64)                131136

Second_Dense_Layer (Dense)   (None, 10)                650
=================================================================
Total params: 225,034
Trainable params: 225,034
Non-trainable params: 0
```

3	Explain why the typical applications dealing with images requires convolutional layer architecture, instead of artificial neural network architecture?	05

Part C: Natural Language Processing (CO2, CO5)   [Any Four]   **[20]**

1   Represent the given set of dialogues of the corpus "MOVIES" in the mathematical vectorized   05
     form:
         A. babu rao ganpat rao apte
         B. yee babu rao ka style hai
         C. style hai to smile hai
         D. style mein rahene ka

     Find out the most similar dialogue from the corpus "MOVIES" to the dialogue C with
     justification.

2   A Named Entity Recognition (NER) model has high precision but low recall. What potential   05
     improvements can be made to enhance its performance?

3   Explain the process of stemming and lemmatization. Analyze the sentence and give its stemmed   05
     as well as lemma form:

     "*The researchers were analyzing the effects of various machine learning algorithms on
     unstructured data, but their findings were unexpectedly influenced by the rapidly changing
     trends in artificial intelligence.*"

4   Design a chatbot that gives the answers to the students, for the questions asked regarding ICT   05
     department

5   Analyze the impact of stopword removal in text preprocessing. How does it affect the accuracy   05
     of various NLP models such as sentiment analysis and text classification?

---Best of Luck---