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B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

January 2024 Semester End Main Examinations

Programme: B.E.   Semester: VII
Branch: Artificial Intelligence and Machine Learning   Duration: 3 hrs.
Course Code: 22AM7HSGAL   Max Marks: 100
Course: Generative AI with Large Language Models

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

				CO	PO	Marks
			UNIT - I	*CO*	*PO*	**Marks**
1	a)		List out the significance of Generative AI.	*CO1*	*PO1*	**5**
	b)		Illustrate the transformers architecture with suitable diagrams.	*CO1*	*PO2*	**8**
	c)		Analyze the steps in Generative AI project Life cycle.	*CO1*	*PO1*	**7**
			UNIT - II			
2	a)		Draw the structure of LLM pre-training at a high level.	*CO1*	*PO1*	**4**
	b)		Illustrate the computational challenges of training LLMs.	*CO1*	*PO3*	**8**
	c)		Apply the training of BloombergGPT parameters with data sizes and measure tokens to plot the graph.	*CO1*	*PO1*	**8**
			UNIT - III			
3	a)		Mention the limitations of in-context learning.	*CO1*	*PO1*	**5**
	b)		How to apply Fine-tuning on a Single task process to avoid catastrophic forgetting? Explain in detail.	*CO1*	*PO2*	**7**
	c)		Analyze the techniques used in the Parameter efficient fine-tuning using LoRA.	*CO1*	*PO2*	**8**
			OR			
4	a)		Categorize the evaluation benchmarks in fine tuning.	*CO2*	*PO1*	**4**
	b)		Illustrate the multi-task instruction fine-tuning with FLAN-T5 model.	*CO2*	*PO1*	**8**
	c)		Describe the techniques used in the Parameter efficient fine-tuning using soft prompts.	*CO2*	*PO2*	**8**
			UNIT - IV			
5	a)		Suppose you are tasked with fine-tuning a pre-trained model on a new dataset with limited labeled examples. How would you	*CO2*	*PO3*	**10**

			strategically utilize Parameter Efficient Fine tuning to achieve optimal results?			
		b)	In the context of fine-tuning large language models, describe a scenario where RLHF is particularly beneficial for addressing challenges like domain shifts or changes in user preferences. Illustrating the steps involved in implementing RLHF in such situation.	CO2	PO3	**10**
			OR			
	6	a)	How Reinforcement learning supports fine-tuning with human feedback? Explain with an example.	CO2	PO1	**4**
		b)	Examine the Proximal Policy Optimization updating process and its rewards maximize strategies.	CO2	PO2	**8**
		c)	Identify the methods to scale human feedback using scale supervision.	CO2	PO1	**8**
			UNIT - V			
	7	a)	How ReAct enhances the capabilities of Large Language models by integrating reasoning and action? Explain.	CO3	PO1	**5**
		b)	How to improve the efficiency of the model Program-aided language. Explain.	CO3	PO1	**10**
		c)	Design a Retrieval-Augmented Generation (RAG) system considering an example of "Searching legal documents". Specify the retrieval sources and how the generated summary is constructed.	CO3	PO2	**5**

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