CBCS SCHEME

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20SCS/SAM31

Third Semester M.Tech. Degree Examination, Jan./Feb. 2023
Deep Learning

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, choosing ONE full question from each module.***

Module-1

1 a. Define Learning. Name any five learning tasks. Explain linear regression in detail. **(10 Marks)**

b. Explain the forms capacity, regularization and hyper parameters in a learning model. **(10 Marks)**

OR

2 a. Define supervised and unsupervised algorithms. Describe KNN and K-means algorithms. **(10 Marks)**

b. Describe essentials components in building ML algorithm. What are the challenges that motivate Deep Learning? **(10 Marks)**

Module-2

3 a. Given $W = \begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}$, $C = \begin{bmatrix} 0 \\ -1 \end{bmatrix}$, $W = \begin{bmatrix} 1 \\ -2 \end{bmatrix}$ and $b = 0$ draw feed forward network and evaluate XOR function. **(10 Marks)**

b. Explain universal approximation theorem. Describe RLU hidden unit and sigmoid output unit. **(10 Marks)**

OR

4 a. Explain computational graph. Describe the steps to train neural network with back propagation. **(10 Marks)**

b. Define regularization. Describe $l2$ and $l1$ parameter regularization. **(10 Marks)**

Module-3

5 a. Define optimization. Describe batch and mini batch algorithms. List the optimization challenges. **(10 Marks)**

b. Describe stochastic gradient descent and momentum algorithms. What are the challenges in neural network optimization? **(10 Marks)**

OR

6 a. Give a list of adaptive learning rates algorithms. Write the Ada Grad algorithm. **(10 Marks)**

b. Describe convolution operation. How that can improve machine learning system? With diagram show the components of convolutional network layer. **(10 Marks)**

Module-4

7 a. Explain Recurrent Neural Network (RNN). Illustrate unfolding of computational graphs. How is RNN different from CNN? **(10 Marks)**

b. Describe encoder-decoder sequence-to-sequence architectures. **(10 Marks)**

OR

8 a. Discuss the architecture of Long Short Term Memory (LSTM). **(10 Marks)**

b. Write a note on : (i) Optimization in RNN (ii) Explicit memory. **(10 Marks)**

Module-5

9 a. Write the practical design steps of deep learning. Describe performance metrics. **(10 Marks)**

b. Describe the recommendations for baseline models. **(10 Marks)**

OR

10 a. Discuss the criteria for gathering training data and hyperparameters. Also a note on debugging strategy. **(10 Marks)**

b. Briefly describe the processing steps in computer vision and NLP applications. **(10 Marks)**

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20SCS323

Third Semester M.Tech. Degree Examination, Jan./Feb. 2023
Soft and Evolutionary Computing

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. List and explain various properties of crisp relations. **(10 Marks)**
b. Define ANN. Explain types of hybrid systems. **(10 Marks)**

OR

2 a. Explain the operations and properties over a fuzzy relation. **(10 Marks)**
b. Define membership function. State its importance in fuzzy logic. **(10 Marks)**

Module-2

3 a. Explain with suitable diagram and examples of fuzzy equivalence relations. **(10 Marks)**
b. What are the different methods of defuzzification? **(10 Marks)**

OR

4 a. What are steps involved in fuzzy decision making process? Explain. **(10 Marks)**
b. Explain multi attribute decision making in detail. **(10 Marks)**

Module-3

5 a. Discuss in detail about the various types of genetic algorithms. **(10 Marks)**
b. Compare and contrast traditional algorithm and genetic algorithm. **(10 Marks)**

OR

6 a. With a neat flow chart, explain the operation of a simple genetic algorithm. **(10 Marks)**
b. Differentiate between messy GA and parallel GA. What is the importance of hybrid GA? **(10 Marks)**

Module-4

7 a. What is Swarm Intelligent systems? Explain the working of ant colony optimization. **(10 Marks)**
b. List and explain different applications of Swarm Intelligence **(10 Marks)**

OR

8 a. Describe the concept of ant colony to solve Travelling Salesman Problem (TSP). **(10 Marks)**
b. Write a note on back ground SI. **(10 Marks)**

Module-5

9 a. Write a note on particle swarm optimization. **(10 Marks)**
b. Explain the working of artificial bee colony system. **(10 Marks)**

OR

10 a. Explain the working of Cuckoo search system. **(10 Marks)**
b. Explain unit commitment problem with example. **(10 Marks)**

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20SCS334

Third Semester M.Tech. Degree Examination, Jan./Feb. 2023
Wireless Sensor Networks

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. What are sensor parameters? What are the general requirements for basic functionality of a Wireless Network? **(10 Marks)**

b. Explain with a neat diagram the hardware components of Wireless Networks. **(10 Marks)**

OR

2 a. Explain five basic software subsystems of a sensor. **(10 Marks)**

b. Briefly explain the design constraints for WSNs and WNs. **(10 Marks)**

Module-2

3 a. Explain in detail about fixed assignment protocols and demand assignment protocols. **(10 Marks)**

b. Explain Random Access protocols with a neat diagram. **(10 Marks)**

OR

4 a. With neat diagram explain Schedule-Based MAC protocol SMACS. **(10 Marks)**

b. Explain IEEE 802.15.4 MAC protocol and ZigBee reference model with neat diagrams. **(10 Marks)**

Module-3

5 a. Briefly discuss about

i) Forwarding **(02 Marks)**

ii) Controlled flooding **(02 Marks)**

iii) Gossiping **(02 Marks)**

iv) Routing tables **(04 Marks)**

b. What is data-centric routing? Why is data-centric routing feasible compared to routing based on identifier? Explain. **(10 Marks)**

OR

6 a. Explain sensor protocols for information via negotiation. **(10 Marks)**

b. With a neat diagram explain Power-Efficient gathering in sensor information systems. **(10 Marks)**

Module-4

7 a. Explain in detail about Operating System design issues. **(10 Marks)**

b. Discuss Mate, Magnetos, MANTIS, OSPM and EYES OS of operating system in detail. **(10 Marks)**

OR

8 a. What is process-based concurrency and Event-based programming? How the models can be built from them. **(10 Marks)**

b. Explain TinyOS and nesC in detail. **(10 Marks)**

Module-5

9 a. Discuss Category-1 wireless sensor network application that have a strong research scientific focus. **(10 Marks)**

b. Explain Military application for Condition-Based Monitoring. **(10 Marks)**

OR

10 a. Write short notes on recent development in WSN standard. Also briefly explain software applications. **(10 Marks)**

b. Write short notes on Habitat Monitoring and Nanoscopic Sensor Applications. **(10 Marks)**

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