B. Tech. (Seventh Semester) Mid- Semester Examination

Dept: Department of Information Technology **Subject:** Internet of Things (IT107101IT)

Duration: 2 Hours **Max. Marks:** 30

Note: Answer all the Questions from each unit.

Unit-I

1. Define Internet of Things (IoT). Describe seven layers reference architecture in IoT stack? **[5M]**
2. Explain four levels in architectural framework for a smart city in detailed. Described the Challenges issues in IOT? **[5M]**
3. Describe the Aspect of Device-to-Cloud (D2C) Integration and Sensor-to-Cloud Integration in detailed with example. **[5M]**

Unit-II

4. Explain Infrastructure Protocols in IoT in detailed. **[5M]**
5. Describe network architecture of Low-Power Wireless Personal Area Networks? **[5M]**
6. Described the Protocols for IoT Service Discovery in detailed. What prominent IoT Service Discovery Products Available in the Market? **[5M]**

Animesh Tiwari

CBCS Scheme

Roll No | 2 | 0 | 1 | 1 | 8 | 0 | 1 | 1 | | |

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B.Tech.(Seventh Semester) Mid-Semester Examination, September-2023
Subject: Neural Network and Fuzzy Logic (Open Elective), Code No.: IT107301IT
Department of Information Technology

Time: Two Hours **Max Marks: 30**

Note:

1. *Attempt any three questions from each unit. 2. Notations have their usual meanings. 3. Assume default values if required.*

Unit - I

a) Describe major historical development of Artificial Neural Network (ANN). Compare and correlate biological neuron with artificial neuron and explain them. **[2.5+2.5]**

b) Explain the various types of training in ANN with their flowcharts. Explain Perceptron and Competitive Learning rules. **[2.5+2.5]**

c) Explain McCulloch-Pitts Neuron model. Generate the output of logic AND function (with suitable parameter val.) & OR function (w1=5, w2=5) (take 2 inputs, 1 output for both function) by using the McCulloch Model. **[2+3]**

d) Explain the following: **[2.5+2.5]**

(i) ANN as a directed graph

(ii) AI vs ANN.

P.T.O.

CBCS

Roll No | 2 | 0 | 1 | 1 | 8 | 0 | 1 | 1 |

Code No.: IT107301IT

B.Tech.(Seventh Semester) Examination, Dec 2023
Subject: Neural Network and Fuzzy Logic (OPEN ELECTIVE)
Department of Information Technology

Time: Three Hours **Max Marks: 50**

Note:

i. *Attempt all UNITS, internal choice(s) are provided.*
ii. *All parts of a question should be answered together.*
iii. *Answer should be brief and to the point.*
iv. *Figures on the right-hand side margin indicate break marks for that question.*
v. *Notations have their usual meanings.*
vi. *Assume default values if required.*

UNIT – I (Attempt anyone)

1. What is the working principle of a feed-forward neural network? Differentiate between single-layered feed-forward Networks and multi-layered feed-forward Networks. What is the role of hidden layers in a multilayer feedforward network? **[2+2+1]**

OR

2. Explain Mc-Culloch's Pitts model of ANN. What are the characteristics of the McCulloch-Pitts neuron model? What is the relationship between a biological neuron and a McCulloch-Pitts neuron? **[2+2+1]**

UNIT – II (Attempt anyone)

1. Construct and test the BAM network to associate the letters **'O'** and **'F'** with simple bipolar input-output vectors. The target output for 'O' is (-1,1) and for 'F' is (1,1). (The display matrix size is 5 X3). **[5]**

*	*	*
*	.	*
*	.	*
*	.	*
*	*	*

'O': Target (-1,1)

*	*	*
*	.	.
*	*	*
*	.	.
*	.	.

'F': Target (1,1)

OR

2. Discuss 'Linear separability and XOR problem' with an example. Explain MADALINE network with its basic architecture and algorithm. **[2.5 X 2.5]**

P.T.O.

UNIT – III (Attempt any Four)

1. Explain ART with its fundamental concepts, architecture, and basic training steps of ART1. **[2+2+1]**
2. Describe Support Vector Machine (SVM) with suitable illustration and example. What types of problems SVM can be used for? **[4+1]**
3. Explain Kohonen's Self Organizing Feature Maps (KSOM) along with its concept, architecture, and training algorithm. **[5]**
4. Consider full CPN with weights between input and cluster layer V_{ij} = [0.7 0.5; 0.7 0.5; 0.5 0.7; 0.5 0.7] and weights between cluster layer to output layer W_{jk} = [0.2 0.2; 0.2 0.2] using input pair x = (0 1 1 0), and y = (0 1) perform the phase I of training (one step only). Find the activation of the cluster layer units and update the weights using learning rates α=0.2 and β =0.3. **[5]**
5. Write short note on:
   i. Neo-cognitron architecture
   ii. Learning Vector Quantization **[2.5 X 2.5]**

UNIT – IV (Attempt any Four)

1. Discuss Fuzzy Set and Membership function with suitable examples. **[2.5+2.5]**
2. Three fuzzy sets are given as follows:

   A = {(2, 0.1), (4, 0.3), (6, 0.7), (8, 0.4), (10, 0.2)}

   B = {(0.1, 0.1), (0.2, 0.3), (0.3, 0.3), (0.4, 0.4), (0.5, 0.5), (0.6, 0.2)}

   C = {(0, 0.1), (0.5, 0.7), (1, 0.3)}

   Find the fuzzy relations **R** as fuzzy Cartesian product A X B and **S** as fuzzy Cartesian product B X C. Then obtain the relation **T** as R o S using max-min composition. **[5]**
3. For a speed control of DC motor, the membership functions of series resistance ($\mathbf{R_{se}}$), armature current ($\mathbf{I_a}$) and speed (**N**) are given as follows:

   $\mathbf{R_{se}}$ = {(30, 0.4), (60, 0.6), (100, 1.0), (120, 0.1)}

   $\mathbf{I_a}$ = {(20, 0.2), (40, 0.3), (60, 0.6), (80, 0.8), (100, 1.0), (120, 0.2)}

   N= {(500, 0.35), (1000, 0.67), (1500, 0.97), (1800, 0.25)}

   Compute the relation **T** for relating series resistance to motor speed i.e. $\mathbf{R_{se}}$ to **N**. Perform max-min composition. **[5]**
4. What do you understand by Defuzzification? Discuss different methods of Defuzzification. How do you choose a defuzzification method? **[2+2+1]**
5. Write short notes on:
   a. Fuzzy Relations
   b. Probability vs. Fuzzy Logic **[2.5 X 2]**

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20118011

Branch/ Semester: IT /VII
Subject Code: IT107101IT
Subject Name: Internet of Things (IoT)

Date: 18/09/2023
Duration: 120 Minutes
Max.Marks: 30

28

Instructions:
1. Please write your name, roll no, subject name & code on the answer sheet.
2. Answer the following all the questions.

Unit-I

1. What is the Difference between Internet of Things (IoT) and Internet? [2M]
2. What are the different challenges in IoT? [3M]
3. Design and explain architectural view of a Cloud-based IOT platform for Driver Assistance Application? [5M]
4. Discuss about IoT stacks in detailed? [5M]

Unit-II

5. Discuss the Infrastructure Protocols in detailed? [5M]
6. Discuss the Protocols for IoT Service Discovery in detailed? [5M]
7. Explain Protocol Stack of 6LoWPAN and Bluetooth Low Energy in detailed. [5M]

********** **All the Best** **********

Roll No: | 2 | 0 | 1 | 8 | 0 | 1 | 1 |

राष्ट्रीय प्रौद्योगिकी संस्थान रायपुर
NATIONAL INSTITUTE OF TECHNOLOGY RAIPUR

B.Tech. (Seventh Semester) End Semester Examination, Autumn 2023

Branch: Information Technology

Subject: Internet of Things (IoT) (Code: IT107101IT)

CBCS SCHEME

45

Time Allowed: 3 hours **Max. Marks: 50**

Note: Answer all the following Questions. Assume suitable data if, necessary.

QUESTION 1

A (i) Design and explain architectural view of a Cloud-based IOT platform for Driver Assistance Application? [5]

QUESTION 2

B (i) Explain Infrastructure Protocols in IoT in detailed. [5]

QUESTION 3

C (i) Explain Advanced Message Queuing Protocol (AMQP) and CoAP Protocols in IoT in detailed. [5]

(ii) Explain LoRa and LoRaWAN and CoAP Protocols in IoT in detailed. [5]

D (i) Discuss about Routing Protocol for Low Power and Lossy Networks (RPL) in detailed. [5]

(ii) Explain the Device Integration Protocols and Middleware in detailed. [5]

QUESTION 4

E (i) Discuss IoT and M2M Sensor Data Platform by Splunk Software for IoT Data with suitable example. [5]

(ii) Explain IBM Watson IoT Platform and its key features in detailed. [5]

F (i) Explain IoT Data Virtualization Platforms and their key capabilities data virtualization delivers. [5]

(ii) Discuss Cognitive Cloud and its key features in IOT detailed. [5]

**********All the Best**********

Department of Information Technology

National Institute Of Technology Raipur

B.Tech (VIIth Semester), September 2023 **Subject:** Ad-hoc & Sensor Networks

Note: Attempt any five questions. Each question carries equal marks

Question1: What are the issues in designing a medium access scheme for ad hoc wireless networks? Classify the routing protocols based on different criteria.

Question 2: Explain the hidden and exposed terminal problem in adhoc network. How you can solve this problem.

Question 3: Describe the zone based and cluster based routing protocol with a suitable example.

Question 4: Classify the routing protocol based on routing information update mechanism

Question 5: What is Temporally Ordered Routing Algorithm (TORA). Describe the following Route Maintenance properties of TORA with suitable example

Case1: Link is broken and node in network do not have any downstream link

Case2: Propagate: Node in network do not have any down-stream link

Question 6: Describe the Better approach to mobile ad-hoc network (BATMAN) routing protocol.

20118011

NATIONAL INSTITUTE OF TECHNOLOGY RAIPUR

B.Tech. (7th Semester) End Semester Examination, Autumn 2023

Branch: Information Technology

Subject: Adhoc & Sensor Network (Code: IT107250IT)

CBCS SCHEME

Time: 3 hours **Max. Marks: 50**

Note:

i. All parts of a question should be answered together. Internal choice is given with each question.

ii. Answer should be brief and to the point.

iii. Figures on the right-hand side margin indicate maximum marks assigned for that question.

UNIT I (Attempt Any 1)

A. Describe the common method used in alleviating the hidden terminal problem at the MAC layer in ad hoc networks. (5)

B. How the loop free property is ensured in on-demand and table-driven routing protocol. Also describe one on-demand and one table driven routing protocol. (5)

UNIT II (Attempt Any 1)

A. What is the lightweight mobile routing algorithm? Describe any two light weight routing algorithms. (5)

B. What is Associativity-Based Routing Protocol in ad hoc networks? How the path is established between two nodes? (5)

UNIT III (Attempt Any 4)

A. What is a wireless sensor network? Discuss on Issues and Challenges in designing a Sensor Networks? (5)

B. Explain Sensor Network Architecture Elements. List down the functionality for each of the elements. (5)

C. Present an elaborate note on the energy consumption rate for sensors in a wireless sensor network. (5)

D. "The sensor network is the backbone of Internet of Things". Justify this statement and discuss any two applications of wireless sensor networks. (5)

E. Present a wireless sensor network design that can be used for surveillance and environment monitoring in a zoo. A zoo is a facility in which animals are confined within enclosures, displayed to the public, and in which they may also be bred. State the functional requirements you are considering. (5)

UNIT IV (Attempt Any 4)

A. What is energy efficient routing? Present an outline of energy efficient routing in wireless sensor networks. (5)

B. Present an outline of LEACH and SPIN for wireless sensor networks. (5)

PTO

C. Design the approaches and performance of S-MAC protocol. (5)

D. Write a short note on (5)

i) Design goal of MAC protocol in wireless sensor network.

ii) Major issues to design MAC protocol in WSN.

E. Discuss contention-based protocols with reservation mechanism for wireless sensor networks. (5)

—END—

2011 BO 11

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NATIONAL INSTITUTE OF TECHNOLOGY RAIPUR

30

Mid Sem Exam-2023, 7th Semester
B.Tech, Information Technology
Text Mining

Duration: 2 Hours **Max Marks: 30**

Roll No. | | | | | | | | |

Note:-All questions are compulsory.

Q.1. Briefly discuss the pre-processing steps of textual documents. **(5)**

Q.2. Consider a very small corpus C that consists following three documents: d1: "new york times" d2: "new york post" d3: "los angeles times". Given the following query: "new new times" rank the documents of C using TF-IDF method. **(5)**

Q.3. Give Bayes' theorem. Describe Naive Bayes classification for both discrete and continuous valued features. Consider the following training examples of PlayTennis and apply Naive Bayes classification for predicting the class label of new instance *X''=(Outlook=Sunny, Temperature=Cool, Humidity=High, Wind=Strong).* **(10)**

PlayTennis: training examples

Day	Outlook	Temperature	Humidity	Wind	PlayTennis
D1	Sunny	Hot	High	Weak	No
D2	Sunny	Hot	High	Strong	No
D3	Overcast	Hot	High	Weak	Yes
D4	Rain	Mild	High	Weak	Yes
D5	Rain	Cool	Normal	Weak	Yes
D6	Rain	Cool	Normal	Strong	No
D7	Overcast	Cool	Normal	Strong	Yes
D8	Sunny	Mild	High	Weak	No
D9	Sunny	Cool	Normal	Weak	Yes
D10	Rain	Mild	Normal	Weak	Yes
D11	Sunny	Mild	Normal	Strong	Yes
D12	Overcast	Mild	High	Strong	Yes
D13	Overcast	Hot	Normal	Weak	Yes
D14	Rain	Mild	High	Strong	No

Q.4. Make the decision tree for above PlayTennis training example using ID3 decision tree classifier. Show your all workings in making decision tree and predict the class label of new instance *X''=(Outlook=Sunny, Temperature=Cool, Humidity=High, Wind=Strong)* using ID3 classifiers. **(10)**

CBCS Scheme

Code: IT107202IT

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NATIONAL INSTITUTE OF TECHNOLOGY RAIPUR

B.Tech (7th Sem), ESE, Dec 2023

Subject: Text Mining

Branch: Information Technology

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Time: 3 hrs

Roll No.: 2 0 1 1 8 0 1 1

Max Marks: 50

Note: (1) Attempt any two parts from question (1) and (4).

(2) Attempt any one part from question (2) and (3).

(3) All parts of a question must be written in one place.

Q.1. **(a)** Briefly explain the different pre-processing steps to be carried out for textual data with examples? Also explain the different problems associated with textual dataset? **(10)**

(b) What is confusion matrix? Briefly explain any four evaluation parameters based on confusion matrix for document classification. **(10)**

(c) Discuss the following: **(10)**

i. Feature Selection
ii. K-means clustering

Q.2. **(a)** Consider the following training examples of PlayTennis and apply Naive Bayes classification for predicting the class label of new instance *X'=(Outlook=Sunny, Temperature=Cool, Humidity=High, Wind=Strong)*. **(5)**

PlayTennis: training examples

Day	Outlook	Temperature	Humidity	Wind	PlayTennis
D1	Sunny	Hot	High	Weak	No
D2	Sunny	Hot	High	Strong	No
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D5	Rain	Cool	Normal	Weak	Yes
D6	Rain	Cool	Normal	Strong	No
D7	Overcast	Cool	Normal	Strong	Yes
D8	Sunny	Mild	High	Weak	No
D9	Sunny	Cool	Normal	Weak	Yes
D10	Rain	Mild	Normal	Weak	Yes
D11	Sunny	Mild	Normal	Strong	Yes
D12	Overcast	Mild	High	Strong	Yes
D13	Overcast	Hot	Normal	Weak	Yes
D14	Rain	Mild	High	Strong	No

(b) Make the decision tree for above PlayTennis training example using ID3 decision tree classifier. Show your all workings in making decision tree and predict the class label of new instance *X'=(Outlook=Sunny, Temperature=Cool, Humidity=High, Wind=Strong)* using ID3 classifiers. **(5)**

Q.3. **(a)** Consider a very small collection C that consists following three documents: d1: "new york times" d2: "new york post" d3: "los angeles times". Given the following query: "new new times" rank the documents of C using TF-IDF method. **(5)**

(b) Give the brief summary of text summarization techniques with suitable example. **(5)**

Q 4. (a) What are the different probabilistic models for text mining? Explain topic modeling for text mining. **(10)**

(b) Briefly explain the text mining application in context of sentiment analysis and opinion mining. **(10)**

(c) Discuss the following: **(10)**

i. Mixture models for text mining
ii. Latent Semantic Indexing

-:All the Best:-