SRM VALLIAMMAI ENGINEERING COLLEGE

(An Autonomous Institution) SRM Nagar, Kattankulathur – 603 203

DEPARTMENT OFCOMPUTER SCIENCE ANDENGINEERING

QUESTION BANK



VII SEMESTER

1904706 INTRODUCTION TO MACHINE LEARNING AND ALGORITHMS Regulation – 2019

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SUBJECT : 1904706 INTRODUCTION TO MACHINE LEARNING AND ALGORITHMS SEM / YEAR: VII/IV

	UNIT I – INTRODUCTION								
Learning	Learning Problems – Perspectives and Issues – Concept Learning – Version Spaces and Candidate Eliminations								
- Induct	- Inductive bias – Decision Tree learning – Representation – Algorithm – Heuristic Space Search.								
PART-A (2 MARKS)									
Q. No	QUESTIONS	Competence	BT Level						
1.	Why Machine learning is important?	Remember	BTL1						
2.	Classify positive and negative examples for the target concept.	Apply	BTL3						
2	Mention the summary of choices in designing the checkers learning	Apply	BTL3						
5.	program.								
4.	List applications of machine learning.	Analyze	BTL4						
5.	Illustrate terms of machine learning.	Remember	BTL1						
6.	Sketch a decision tree for an example of play tennis.	Analyze	BTL4						
7	Summarize the various steps in designing a program to learn to play	Evaluate	BTL5						
7.	checkers.								
8.	Write short notes on concept learning as a search.	Remember	BTL1						
9.	Mention the issues in machine learning.	Understand	BTL2						
10.	Describe the four modules of final design in checkers learning problem.	Remember	BTL1						
11	Explain the useful perspective on machine learning.	Evaluate	BTL5						
12.	State the inductive Learning Hypothesis.	Remember	BTL1						
13.	List the algorithms of concept learning.	Remember	BTL1						
14.	Summarize the concept of Biased Hypothesis Space.	Create	BTL6						
15.	Write about the Decision tree learning.	Analyze	BTL4						
16.	Discuss the effect of reduced Error pruning in decision tree algorithm.	Understand	BTL2						
17.	What are the instances for the EnjoySport concept learning task?	Create	BTL6						
	Examine how we use the more-general-than partial ordering to organize	Apply	BTL3						
18.	the search for a hypothesis consistent with the observed training								
	examples.								
19	Express how three Hypotheses h1, h2, h3 from EnjoySport example are	Understand	BTL2						
17.	related by the >=g relation?								
20.	Label the set of instances with an example.	Understand	BTL2						
21.	Give professor Mitchell definition for Machine learning.	Understand	BTL2						
22.	What are the three attributes for choosing the training experience?	Evaluate	BTL5						

23.	Write the LIST-THEN-ELIMINATE algorithm.		Analyze	BTL4
24.	Show 'Enjoysport' concept learning algorithm.		Apply	BTL3
	PART-B (13- MARKS)			
1.	State the three features to have a well-defined learning problem		Remember	BTL1
	for the following	(A)		
	(i)A checkers learning problem.	(4)		
	(ii)A handwritten recognition learning problem.	(4) (5)		
	(iii)A robot driving learning problem.	(5)		
2.	Summarize the steps in detail about how to design a program to	(13)	Understand	BTL2
	learn to play checkers.			
3.	(i)Describe in detail the rule for estimating training values.	(7)	Remember	BTL1
	(ii)State the final design of checkers learning system.	(6)		
4.	Explain the useful perspectives of machine learning in different	(13)	Apply	BTL3
	applications.			
5.	Discuss about the different issues in Machine Learning.	(13)	Understand	BTL2
6.	(i)Generalize the concept of Learning task.	(7)	Create	BTL6
	(ii)With the help of training example explain the Inductive	(6)		
	Learning Hypothesis.			
7.	(i)Explain the concept learning as search.	(7)	Remember	BTL1
	(ii)Describe the General-to-Specific Ordering of Hypotheses.	(6)		
8.	(i)Illustrate with a diagram the decision tree representation for	(7)	Apply	BTL3
	the concept of play tennis.			
-	(ii)List the appropriate problems for Decision tree learning.	(6)		
9.	(i)Explain in detail the FIND-S: Finding a Maximally Specific	(7)	Evaluate	BTL5
	Hypothesis.			
10	(1) Assess and write the key properties of FIND-S algorithm.	(6)	. 1	
10.	Explain the following :	(7)	Analyze	BTL4
	(1)Compact Representation for Version Spaces.	(6)		
11	(1) The LIST-THEN-ELIMINATE Algorithm.	(12)	A	DTI 2
11.	Survey and the Cardidate Elizabetic Algorithm with an example.	(13)	Apply	BIL3
12.	Summarize the Candidate–Elimination Algorithm with an	(13)	Understand	BIL2
10	example.			
13.	(1)Define Inductive Bias.	(3)	Remember	BILI
1.4	(1) Write short notes on biased Hypothesis Space.	(10)		
14.	(1) Explain in detail an Unbiased Learner for Enjoy sport learning	(7)	Analyze	BTL4
		$(\cap $		
15	(1) Point out the Futility of Blas-Free Learning.	(6)	A 1	
15.	Analyze and write the steps involved in Designing a learning	(13)	Analyze	BIL4
16	system. Explain each step in detail.	(7)	F 1 (
16.	(1) Summarize the concept of decision tree representation.	(/)	Evaluate	BILD
	(ii)List appropriate problems for decision tree learning.	(0)		

17.	(i)Wi	ll the C	andid	ate-Elimiı	nation A	lgorith	m Co	nverge	to the	e (7)	Create	BTL2
	Corre	ct Hypot	thesis	? Explain.								
	(ii) Su	ımmariz	e you	r view on	how can	partia	lly Lea	arned co	oncept	s (6)		
	be use	ed.										
	-1				PAI	RT-C	(15- l	MARK	()	1		1
1.	Sketc	h and ex	plain †	the decision	on tree to	repres	sent th	e follow	ing	(15)	Create	BTL6
	Boole	an funct	ions:									
	a) $A \cap$		רי									
	$[D] A \cup [B \cap C]$											
	c) A y	KOT B	<u>а</u> . г									
	d)[A	$\cap B$] \cup [$C \cap L$	/]								
2.	Draw	and solv	ve the	decision t	rees for t	he foll	owing	set of t	raining	g (15)	Create	BTL6
	exam	ples			T T : : : :	N/L	. d	Dlass	7			
	Day	Outioo	K len	nperature	Humidity	y wir		Play				
	D1	Cuppy	,	Hot	High	Wa	Jr.	No	_			
		Sunny	,	П01 Цот		Stro	1K	No				
	D2	Overee	at	Hot		- Suo	ng 1	NO Vos	-			
	D3	Dverca	si	Mild	High	Wea	ak ak	Ves	-			
	D4	Rain		Cool	Normal	Wee	ak ak	Ves	-			
	D5	Rain			Normal	Stro	nσ	No	-			
	D7	Overca	st	Cool	Normal	Stro	nσ	Yes				
	D7	Sunny	,	Mild	High	We	ak	No				
	D0	Sunny	,	Cool	Normal	We	ak	Yes				
	D10	Rain		Mild	Normal	Wea	ak	Yes				
	D11	Sunny	,	Mild	Normal	Stro	ng	Yes				
	D12	Overca	st	Mild	High	Stro	ng	Yes				
	D13	Overca	st	Hot	Normal	Wea	ak	Yes				
	D14	Rain		Mild	High	Stro	ng	No				
	•	•			U							
3.	Write	short no	otes ab	out the fo	llowing:						Evaluate	BTL5
	(i)Wi	ll the Ca	andida	ate –Elim	ination A	Algoritl	hm Co	onverge	to the	e (7)		
	Corre	ct Hypot	thesis	?								
	(ii)W	hat Trair	ning E	xample Sl	nould the	Learn	er Rec	quest Ne	ext?	(8)		
4.	(i) As	sess abo	ut the	Candidate	e-Elimina	ation a	lgorith	ım.		(7)	Evaluate	BTL5
	(ii)Explain the Candidate Elimination algorithm. Apply th								oly the	e		
	algori	thm to	obtai	n the fin	al versio	on spa	ice fo	r the t	raining	g (8)		
	example.											
	SINSky Air Humidit Wind Water Foregoet Enjoy											
	о 0	эку <i>Г</i>	MI emn	v	wind V	water	rorec	asi Elijo	Jy rt			
	1	Suppy N	Varm	y Normal	Strong N	Narm	Same	spoi Vac	l l			
	$\frac{1}{2}$	Sunny V	Varm	High	Strong N	Narm	Same	Vec				
	3	Rainv C	Cold	High	Strong N	Warm	Chan	pe No				
	4	Sunnv V	Varm	High	Strong (Cold	Chang	ge Yes				

5.	Consid	er the	following se	et of train	ning exam	ples:			
	In	stanc	Classificati	X1	X2				
		e	on						
	1		+	Т	Т			Evaluate	BTL5
	2		+	Т	Т				
	3		-	Т	F				
	4		+	F	F				
	5		-	F	Т				
	6		-	F	Т				
	(i) Wh	nat is	the entropy	(8)					
	with re	spect	to the target						
	(ii) Assess the information gain of a2 relative to these training								
	exampl	les?							

UNIT II - NEURAL NETWORKS AND GENETIC ALGORITHMS

Neural Network Representation – Problems – Perceptrons – Multilayer Networks and Back Propagation Algorithms – Advanced Topics – Genetic Algorithms – Hypothesis Space Search – Genetic Programming – Models of Evaluation and Learning.

	PART-A (2 - MARKS)									
Q.No	QUESTIONS	BT Level	Competence							
1.	Define the biological motivation for studying ANN.	Create	BTL6							
2.	State the concept of Artificial neural network.	Remember	BTL1							
3.	Describe with an example Neural network representation.	Remember	BTL1							
4.	Label the linearly separable sets of examples.	Remember	BTL1							
5.	List out the characteristic to which the back propagation algorithm is used.	Remember	BTL1							
6.	Compare and contrast the gradient descent and Delta rule.	Analyze	BTL4							
7.	What are all the Boolean functions represented by perceptron?	Remember	BTL1							
8.	Assess about the Back propagation algorithm.	Evaluate	BTL5							
9.	What type of unit we can use as the basis for constructing multilayer network?	Understand	BTL2							
10.	why perceptron is important to represent AND, OR, NAND and NOR.	Analyze	BTL4							
11.	How hypothesis in Genetic Algorithm is represented?	Create	BTL6							
12.	Describe about Genetic Algorithm.	Understand	BTL2							
13.	What are the advantages of genetic algorithm?	Understand	BTL2							
14.	Examine about the Baldwin Effect.	Apply	BTL3							
15.	Distinguish between crossover and mutation.	Analyze	BTL4							
16.	Write short notes on crowding.	Remember	BTL1							
17.	Explain about the genetic programming.	Evaluate	BTL5							
18.	Illustrate the Lamarckian Evolution.	Apply	BTL3							
19.	Summarize about the Schema in GA.	Understand	BTL2							
20.	Explain the program tree representation in genetic programming.	Apply	BTL3							
21.	Define Percerptron.	Apply	BTL3							
22.	Give some common operators for genetic algorithm.	Understand	BTL2							

23.	Assess and Write Gradient Descent algorithm for training a linear	unit.	Evaluate	BTL5					
24.	Compare key differences between standard gradient descent stochastic gradient descent	t and	Analyze	BTL4					
PART-B (13 MARKS)									
1.	Explain the multi-layer perceptron model with a neat diagram.	(13)	Analyze	BTL4					
2.	Assess for which problems is ANN learning is well suited and write down the characteristics.	(13)	Create	BTL6					
3.	(i)Illustrate the diagram for visualizing the Hypothesis space. (ii) Analyze about the derivation of the Gradient Descent Rule.	(7) (6)	Analyze	BTL4					
4.	(i)Summarize the derivation of the Back propagation Algorithm. (ii)Explain in detail about theGradient Descent algorithm.	(7) (6)	Evaluate	BTL5					
5.	 (i) Examine Perceptron with a neat diagram. (ii)Describe about perceptron with an example and draw the decision surface represented by a two-input perceptron. 	(7) (6)	Remember	BTL1					
6.	(i)What is Perceptron Training rule? (ii)Enumerate about the Back propagation algorithm.	(3) (10)	Remember	BTL1					
7.	(i)Distinguish between Gradient descent and Delta rule. (ii)Describethe delta training rule with an example.	(5) (8)	Understand	BTL2					
8.	(i)Explore how the hypothesis in GAs are represented by bit strings. (ii)Write about the IF-THEN rules and the reason why it can be encoded.	(7) (6)	Analyze	BTL4					
9.	(i)List out the Genetic algorithm steps with example.(ii) Illustrate the prototypical genetic algorithm.	(8) (5)	Remember	BTL1					
10.	(i)List and explain the common operators for Genetic Algorithm. (ii)State about the various crossovers with diagram.	(7) (6)	Apply	BTL3					
11.	(i)Define fitness function.(ii)Examine how genetic algorithm searches large space of candidate objects according to fitness function.	(3) (10)	Understand	BTL2					
12	(i)Explain hypothesis space search of GAs with neural network back propagation. (ii)Illustrate what is Add Alternative and Drop Condition	(7)	Apply	BTL3					
13.	Write in detail the Population Evolution and the Schema Theorem.	(13)	Understand	BTL2					
14.	(i)Label the genetic programming and draw the program tree representation in genetic programming.(ii) Explain the genetic programming with an example.	(7) (6)	Remember	BTL1					
15.	Summarize instantiation of the Genetic algorithm in GABIL.	(13)	Evaluate	BTL5					
16.	Discuss Genetic algorithm with example.	(13)	Understand	BTL2					
17.	(i) Illustrate in detail about Differentiable Threshold Unit. (ii) Explain Back propagation Algorithm.	(7) (6)	Apply	BTL3					
	PART-C (15 -MARKS)	(~)							
1.	Outline the concepts of Inductive Bias and Generalize the Hidden	(15)	Create	BTL6					
2.	Explain in detail the following		Evaluate	BTL5					

	(i)Alternative Error Functions.	(8)								
	(ii) Alternative Error Minimization Procedures.	(7)								
2	Formulate the models of evolution and learning in Genetic	(15)	Creata							
5.	algorithm.	(13)	Create	DILO						
4.	Assess the parallelizing Genetic Algorithms with an example.	(15)	Evaluate	BTL5						
5	Design a genetic algorithm to learn conjunctive classification	(15)	Create	DTI 6						
5.	rules for the Play Tennis problem.	(13)	Cleate	BILO						
UNIT-III BAYESIAN AND COMPUTATIONAL LEARNING										
Bayes Theorem – Concept Learning – Maximum Likelihood – Minimum Description Length Principle – Bayes										
Optimal	Optimal Classifier – Gibbs Algorithm – Naïve Bayes Classifier – Bayesian Belief Network – EM Algorithm –									
Probabi	lity Learning – Sample Complexity – Finite and Infinite Hypothesis	s Spac	es – Mistake Bo	ound Model.						
	PART-A (2 - MARKS)									
1.	List the advantages of studying Bayesian learning methods.		Remember	BTL1						
2.	Define Bayes Theorem.		Remember	BTL1						
3.	DescribeMaximum likelihood.		Remember	BTL1						
4.	What is Minimum Description Length principle?		Remember	BTL1						
5.	Name the Bayes optimal classification.		Remember	BTL1						
6.	State about the Gibbs Algorithm.		Remember	BTL1						
7.	Write the formulas of basic probability		Understand	BTL2						
8.	Differentiate Bayes theorem and concept learning.		Analyze	BTL4						
9.	Explain Bayesian belief networks.		Evaluate	BTL5						
10.	Find the formula for probability density function.		Understand	BTL2						
11.	Generalize the Probably Approximately Correct (PAC) learning m	odel.	Create	BTL6						
12.	Illustrate the mistake bound model of learning Apply BTL3									
13.	Assess about the true error.		Analyze	BTL4						
14.	Formulate the term sample complexity.		Create	BTL6						
15.	Summarize the advantages of EM algorithm.		Understand	BTL2						
16.	Deduce €-exhausting the version space		Evaluate	BTL5						
17.	Describe Brute-Force Map Learning Algorithm.		Understand	BTL2						
18.	Explain about the EM algorithm.		Analyze	BTL4						
19	List the set of three instances shattered by eight hypotheses		Apply	BTL3						
20	Illustrate about Shattering a Set of Instances		Understand	BTL2						
201	Show the formula to calculate posterior probability in Brute-Force		Apply	BTL3						
21.	MAP learning algorithm	,	r ippij	DIL						
22	Pointout the equation for Minimum Description Length principle.		Analyze	BTL4						
23	Classify the types of Bayes optimal classification		Apply	BTL3						
23.	Define Gibbs Algorithm		Evaluate	BTL5						
21.	$\frac{PAPT P(13 MAPKS)}{PAPT P(13 MAPKS)}$		Lituluite	DIL						
	(i)Examine the detail about Payos theorem with an Example	(7)	Understand							
1.	(ii)Outline the features of Bayesian learning method	(1)	Understand	DILZ						
	(1) Curine the reactives of Dayesian learning method.									
	(1)Summarize in detail the relationship between Bayes theorem	(7)	Evaluate	BTL5						
2.	and Concept learning.									
	(1) write down the Brute force Bayes Concept Learning.	(6)								
3.	Explain in detail aboutmaximum likelihood algorithm.	(13)	Analyze	BTL4						

Bayes Optimal classifier. (i) What is minimum description length principle? (i) Understand BTL2 6. (i) Elaborate the Bayes optimal classifier. (7) Create BTL6 7. (i)Illustrate the naïve Bayes classifier. (7) Analyze BTL4 (ii) Explain naive Bayes classifier with example. (6) (6) BTL4 (ii) Explain naive Bayes classifier with example. (6) (6) BTL1 (ii) Describe the conditional Independence. (6) BTL1 (6) 8. (i)Illustrate about the Bayesian belief networks (7) Remember BTL1 (ii) Describe the conditional Independence. (6) BTL1 (6) BTL1 (ii) Write short notes onEstimating Means of k-Gaussians. (6) BTL1 (7) Remember BTL1 (ii) Write about sample complexity for finite hypothesis Spaces. (7) Remember BTL2 (ii) Write about the Learning and Inconsitent Hypotheses. (6) (6) 11. (ii) Write about the Learning and Inconsitent Hypotheses. (6) (6) 11. (ii) Write about the Learning and Inconsitent Hypotheses. (6) 11. (10) Un	4.	Illustra	ate with a	n example wh	iy Gibbs A	lgorithm	is better	than the	(13)	Apply	BTL3
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5. (ii)Describe the concepts of Minimum Description Length (10) principle. (i)Write about the Bayes optimal classifier. (7) Create BTL6 6. (ii)Elaborate the Bayes optimal classifier. (7) Analyze BTL4 (ii)Explain naive Bayes classifier with example. (6) 6 BTL4 (ii)Explain naive Bayes classifier with example. (6) BTL1 (ii)Explain naive Bayes classifier with example. (6) BTL1 (ii)Explain naive Bayes classifier. (7) Remember BTL1 (ii)Explain naive Bayes classifier. (6) 6 BTL1 (ii)Explain naive Bayes classifier. (6) 6 BTL1 (ii)Write about the Bayesian belief networks (7) Remember BTL1 (ii)Write short notes onEstimating Means of k-Gaussians. (6) 6 BTL1 (i)Write short notes onEstimating Means of k-Gaussians. (6) 6 BTL1 (i)Define theError of a Hypothesis. (6) 11 Explain detail about the PAC Learnability. (13) Analyze BTL4 (i)Write about sample complexity for finite hypotheses. (6) (6) 11 11 In	-	(1)What	at is minir	num descript	ion length	principle	?	т .1	(3)	Understand	BTL2
a. principle. For the second principle. For the second principle. b. (i)Write about the Bayes optimal classification. (f) Create BTL6 ci)Write about the Bayes optimal classification. (f) Create BTL4 ci)Elaborate the Bayes classifier with example. (f) Analyze BTL4 ci)Elaborate the bayes classifier with example. (f) Remember BTL1 ci)Elaborate the conditional Independence. (f) Remember BTL1 (ii)Describe the conditional Independence. (f) Remember BTL1 (ii)Write short notes onEstimating Means of k-Gaussians. (f) Remember BTL1 (ii)Write short notes onEstimating Means of k-Gaussians. (f) Remember BTL1 (ii)Define theError of a Hypothesis. (f) Remember BTL2 (i)Write about sample complexity for finite hypothesis Spaces. (f) Understand BTL2 (ii)Write about the Learning and Inconsistent Hypotheses. (f) Apply BTL3 (ii)Write about the the sample complexity for infine hypothesis spaces. (f) Apply BTL3 (ii)Write about the Learning and Inconsistent Hypotheses.	5.	(11)Des	scribe the	e concepts	of Minin	num De	scription	Length	(10)		
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7. (1)Illustrate the halve Bayes classifier. (7) Analyze B1L4 (ii)Explain naive Bayes classifier with example. (6) (6) BTL1 8. (i)Illustrate about the Bayesian belief networks (7) Remember BTL1 (ii)Describe the conditional Independence. (6) (7) Remember BTL1 (i)Write about the about the EM algorithm. (7) Remember BTL1 (ii)Write short notes onEstimating Means of k-Gaussians. (6) 0 BTL1 (ii)Define theError of a Hypothesis. (7) Remember BTL1 (ii)Write about sample complexity for finite hypothesis Spaces. (7) Understand BTL2 12. (ii)What is the 6-exhausting the version space? (7) Remember BTL1 (ii)Write about the Learning and Inconsistent Hypothesis spaces. (7) Apply BTL3 14. (ii)Illustrate the sample complexity for infinite hypothesis spaces. (7) Apply BTL3 15. Discuss in detail about Brute-Force MAP Learning Algorithm. (13) Understand BTL2 16. (i)GIBBS algorithm. (6) (6) 13) Evaluate	7	(i) Illustrate the mainer Dense alocatifier								A	
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(ii)Write short notes onEstimating Means of k-Gaussians.(6)10.(i)Examine the detail of probability learning. (ii)Define theError of a Hypothesis.(7)RememberBTL111.Explain detail about the PAC Learnability.(13)AnalyzeBTL412.(i)Write about sample complexity for finite hypothesis Spaces. (ii)Outline the mistake bound model of learning.(7)UnderstandBTL213.(i)What is the €-exhausting the version space? (ii)Write about the Learning and Inconsistent Hypotheses. (ii)Write a short note on vapnik-chervonenkis dimension.(7)Remember (6)BTL314.(i)Illustrate the sample complexity for infinite hypothesis spaces. (ii)Write a short note on vapnik-chervonenkis dimension.(7)ApplyBTL315.Discuss in detail about Brute-Force MAP Learning Algorithm. (ii) Naive Bayes classifier.(13)UnderstandBTL216.(i)GIBBS algorithm. (ii) Naive Bayes classifier.(7)EvaluateBTL5PART-C (15 -MARKS)Interstep the stand the result comes back positive. The test returns a correct positive result in only 98% of the cases in which the disease is actually present, and a correct negative result in only(15)CreateBTL6	9.	(i)Stat	e about th	e about the E	M algorith	ım.			(7)	Remember	BTL1
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(ii) Outline the histage bound model of idaming. (b) 13. (ii) What is the €-exhausting the version space? (7) Remember BTL1 (ii) Write about the Learning and Inconsistent Hypotheses. (6) (6) BTL3 14. (i)Illustrate the sample complexity for infinite hypothesis spaces. (7) Apply BTL3 (ii) Write a short note on vapnik-chervonenkis dimension. (6) (6) BTL3 15. Discuss in detail about Brute-Force MAP Learning Algorithm. (13) Understand BTL2 Demonstrate the following: Apply BTL3 (i) GIBBS algorithm. (6) (6) (ii) Naive Bayes classifier. (7) Apply BTL3 16. (i)GIBBS algorithm. (6) (7) Apply BTL3 17. Explain Bayesian belief network with an example. (13) Evaluate BTL5 PART-C (15 -MARKS) Does the patient have cancer, or does he not? A patient takes a lab test and the result comes back positive. The test returns a correct positive result in only 98% of the cases in which the disease is actually present, and a correct negative result in only State BTL6	12.	(ii)Outline the mistake bound model of learning						uccs.	(')	Onderstand	DILZ
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16. (1)GIBBS algorithm. (6) (ii) Naive Bayes classifier. (7) 17. Explain Bayesian belief network with an example. (13) Evaluate BTL5 PART-C (15 -MARKS) Does the patient have cancer, or does he not? A patient takes a lab test and the result comes back positive. The test returns a correct positive result in only 98% of the cases in which the disease is actually present, and a correct negative result in only Create	16	Demo	nstrate the	e following:						Apply	BTL3
(ii) Naive Bayes classifier. (7) 17. Explain Bayesian belief network with an example. (13) PART-C (15 -MARKS) Does the patient have cancer, or does he not? A patient takes a (15) Create BTL6 lab test and the result comes back positive. The test returns a correct positive result in only 98% of the cases in which the disease is actually present, and a correct negative result in only	16.	(1)GIB	BS algori	thm.					(6)		
17. Explain Bayesian belief network with an example. (13) Evaluate BTL5 PART-C (15 -MARKS) Does the patient have cancer, or does he not? A patient takes a (15) Create BTL6 lab test and the result comes back positive. The test returns a correct positive result in only 98% of the cases in which the disease is actually present, and a correct negative result in only Image: Constant Co	17	(11) Na	ive Bayes	s classifier.	1 1		1		(/)		
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1. lab test and the result comes back positive. The test returns a correct positive result in only 98% of the cases in which the disease is actually present, and a correct negative result in only		Does t	the patien	t have cancer	r, or does	he not?	A patient	takes a	(15)	Create	BTL6
1. Correct positive result in only 98% of the cases in which the disease is actually present, and a correct negative result in only		lab tes	st and the	e result come	s back pc	ositive. T	he test re	eturns a			
disease is actually present, and a correct negative result in only	1.	correct	t positive	result in on	ily 98% o	of the cas	ses in wh	inch the			
		disease is actually present, and a correct negative result in only									
9/% of the cases in which the disease is not present.		9/%	of the o	cases in wr	11ch the	disease	1s not	present.			
(i) Assass the Devesion halief network [15] Evolution DTL 5		Furthe	rinore, U.	ussion halisf	ne popula	tion nave	e unis canc	er.	(15)	Evoluoto	DTI 5
(1)Assess medayesian benefine work. (13) Evaluate B1L5 2 (ii)Mention the Importance of Bayesian network is used to infer	2	(I)ASS (ii)Mo	ntion the	Importance of	f Ravesian	network	is used to	infor	(13)	Evaluate	DILJ
2. (ii) Wention the importance of Dayesian network is used to inter values of target variable?	۷.	(1) Mention the Importance of Bayesian network is used to infer									
Day Outlook Temperature Humidity Wind Play (15) Create BTI 6		Day	Outlook	Temperature	Humidity	Wind	Play		(15)	Create	BTL6
Tennic Tennic DILO		Day	JULIOUK	remperature	runnun y	** 11U	Tennis		(15)	Create	DILO
D1 Sunny Hot High Weak No		D1	Sunny	Hot	Hioh	Weak	No				
3. D2 Sunny Hot High Strong No	3.	D^{1}	Sunny	Hot	High	Strong	No				
D3 Overcast Hot High Weak Ves		D3	Overcast	Hot	High	Weak	Yes				
D4 Rain Mild 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				
	A set	of 14 trai	ning example	s of the ta	arget con	cept Play	Tennis,			
	where	e each d	lay is descr	ribed by	the attr	ributes (Dutlook,			
	Temp	erature, I	Humidity, an	d Wind.	use t	he naive	Bayes			
	classi	fier and t	he training d	lata from	this table	e to clas	sify the			
	follow	ving novel	instance:	_						
	(Outlo	$\operatorname{pok} = \operatorname{sunr}$	iy, Temperatu	re = cool,	Humidity	y = high,	Wind $=$			
	strong	g)	~ 1.7					(0)		
4	(i)Sur	nmarize th	e General Sta	atement of	EM Algo	orithm.		(8)	Evaluate	BTL5
	(11) De	educe k -N	leans Algorit	hm.				(7)		
5	Asses	s the prac	ctical importa	ance of B	ayesian l	earning 1	nethods	(15)	Evaluate	BTL5
5.	with a	ın Exampl	e.							
UNIT IV- INSTANT BASED LEARNING										
K-NearestNeighbourLearning-LocallyweightedRegression-RadialBasisFunctions-Case Based learning										
		<u> </u>		PAR	T-A (2	-MARK	(S)			0
1.	Defin	e the form	ula for the dis	stance bety	ween two	instances			Remember	BTL1
2.	Predic	t the accu	racy of radial	basis fund	ction netv	vork.			Apply	BTL3
3.	Descr	ibe the k-1	nearest neight	or learnin	g algorith	ım.			Remember	BTL1
	Illustr	ate how th	ne Instance-ba	ased learni	ing metho	ds differ	from fur	nction	Apply	BTL3
4.	appro	ximation.			U				11.2	
5	Expla	in the the	e k-nearest n	eighbour	algorithm	n for app	oroximat	ing a	Analyze	BTL4
5.	discre	te-valued	function.	-	-			-	·	
6	What	is the nat	ure of the hy	pothesis s	pace H ii	nplicitly	consider	ed by	Remember	BTL1
0.	the k-	nearest ne	ighbour algor	ithm?						
7.	Write	about the	locally weigh	nted regres	sion.				Remember	BTL1
8.	Identi	fy the dist	ance-weighte	d nearest r	neighbour	algorithr	n.		Remember	BTL1
9.	State	about thec	urse of dimer	sionality.					Remember	BTL1
10.	Differ	entiate Re	gression, Res	idual, Ker	nel funct	ion.			Analyze	BTL4
11.	Give	the advant	ages of instan	ce –based	methods	•			Understand	BTL2
12	Sumn	narize the	e advantage	and disa	dvantage	of Loca	ally wei	ghted	Understand	BTL2
12.	Regre	ession.								
13.	Distin	guish bety	ween lazy ver	sus eager l	learning.				Understand	BTL2
14.	Pointo	out three p	roperties that	are shared	l by the I	nstance-b	ased met	hods.	Analyze	BTL4
15.	Asses	s the three	lazy learning	g methods.					Evaluate	BTL5
16	Sketc	h the voro	noi diagram f	or k-Neare	est Neigh	bor.			Apply	BTL3

17.	Explain radial basis functions.		Evaluate	BTL5
18.	Write the formula for Locally Weighted Linear -Regression.		Create	BTL6
19.	What is the inductive bias of k-Nearest Neighbor?		Analyze	BTL4
20.	Distinguish between CADET and k-Nearest Neighbor.		Understand	BTL2
21	Show the k-Nearest Neighbor algorithm for approximating a dis	crete-	Apply	BTL3
21.	valued function.			
22.	Give the definition for Kernel function.		Understand	BTL2
23.	Assess about Locally Weighted Regression.		Evaluate	BTL5
24.	Draw a radial basis function network.		Create	BTL6
	PART-B (13- MARKS)			
1.	(i) Illustrate the disadvantages of Instance –based methods.	(7)	Apply	BTL3
	(ii) Examine the k-nearest learning algorithm.	(6)		
2.	Assess the detail about distance-weighted nearest neighbour	(13)	Evaluate	BTL5
	algorithm.			
3.	(i)Explain Locally weighted linear regression.	(7)	Create	BTL6
	(ii)Illustrate Locally Weighted Linear Regression with an	(6)		
	example.			
4.	(i)Outline the concepts of the radial basis functions.	(7)	Analyze	BTL4
	(ii)Describe the two stage process of the RDF networks.	(6)		
5.	(i)Summarize the detail about locally weighted regression	(7)	Understand	BTL2
	(ii)Summarize the pros and cons of Locally weighted regression.	(6)		
6.	Explain the inductive bias of k-Nearest Neighbor algorithm with	(13)	Analyze	BTL4
	example.	(10)		
7.	List and explain the generic properties of case-based reasoning	(13)	Understand	BIL2
0	systems. State the prototymical example of assa based reasoning system	(12)	Domomhor	DTI 1
<u>ð.</u>	State the prototypical example of case-based reasoning system.	(13)	Remember	
9.	now the fazy learning unfers from other learning model explain with exemple?	(13)	Remember	DILI
10	Examine in detail about the Instance based learning methods	(12)	Domombor	Р ТІ 1
10.	(i) Emploin in detail about the instance-based learning methods.	(13)		
11.	(1)Explain in detail about eager learning.	(1)	Analyze	BIL4
12	Illustrate several generic properties of ease based Bassening	(0)	Apply	DTI 2
12.	systems	(13)	Аррту	DILJ
13	Outline the concepts of CADET system with an example	(13)	Understand	BTL2
13.	Describe the disadvantages and advantages of Lazy and Eager	(13)	Domombor	DTL2 DTL1
14.	learning.	(15)	Kemember	DILI
15.	(i)Explain Distance-Weighted Nearest Neighbor Algorithm.	(7)	Evaluate	BTL5
	(ii) Assess and write about the Remarks on k- Nearest Neighbor	Ϋ́Υ.		
	Algorithm.	(6)		
16.	Demonstrate about Locally Weighted Regression.	(13)	Apply	BTL3
17.	Summarize radial basis function network with neat diagram.	(13)	Understand	BTL2
	PART-C (15-MARKS)			
1.	Explain in detail about the Case-based reasoning (CBR).	(15)	Evaluate	BTL5
2.	Compare the difference between the Lazy and Eager learning	(15)	Evaluate	BTL5

	algorithms.			
3.	Illustrate the Generalize the Locally weighted regression model.	(15)	Create	BTL6
4.	Predict the error $E(x,)$ to emphasize the fact that now the error is	(15)	Create	BTL6
	being defined as a function of the query point x.			
5.	Derive the gradient descent rule for a distance-weighted local	(15)	Create	BTL6
	linear approximation to the target function.			

UNIT V- ADVANCED LEARNING

Learning Sets of Rules – Sequential Covering Algorithm – Learning Rule Set – First Order Rules – Sets of First Order Rules – Induction on Inverted Deduction – Inverting Resolution – Analytical Learning–Perfect Domain Theories–Explanation Base Learning – FOCL Algorithm – Reinforcement Learning – Task – Q-Learning – Temporal Difference Learning.

	PART-A (2 -MARKS)								
1.	What is explanation based learning?		Remember	BTL1					
2.	Interpret the concepts of first-order Horn clauses.		Apply	BTL3					
3.	State the learn-one-rule.		Remember	BTL1					
4.	Illustrate what is Sequential Covering Algorithm.		Apply	BTL3					
5.	Examine the Prolog-EBG.		Apply	BTL3					
6.	Describe Inverting resolution.		Remember	BTL1					
7.	List out the terminology in Horn clause.		Remember	BTL1					
8.	Define Turing-equivalent programming language.		Remember	BTL1					
9.	Explain about the Reinforcement learning model.		Remember	BTL1					
10.	How the learn rule sets differ from genetic algorithm?		Analyze	BTL4					
11.	Interpret the importance of Temporal learning.		Understand	BTL2					
12.	Write about the sequential covering algorithm for learning a disjunce of rules	nctive	Understand	BTL2					
13	Distinguish between the FOIL and the other algorithm		Understand	BTL2					
13.	Generalize induction as inverted deduction	Create	BTL6						
15	Explain inductive logic programming	Evaluate	BTL5						
16.	Outline the concept of O learning algorithm.	Analyze	BTL2						
17.	Compare Inductive and Analytical Learning Problems		Evaluate	BTL5					
18.	Assess a Proportional form if clauses C1 and C2 are given.		Create	BTL6					
19.	Define the Horn clause.		Analyze	BTL4					
20.	Summarize about the FOIL algorithm.		Understand	BTL2					
21.	Predicts equential covering algorithm.		Understand	BTL2					
22	Compare the two most substantial differences between FOIL and		Analyze	BTL4					
22.	Sequential-Coverage Algorithm.		2						
23.	Write Q learning algorithm.		Apply	BTL3					
24.	Rewrite the resolution rules in Inverting Resolution.		Evaluate	BTL5					
	PART-B(13 MARKS)								
1.	Assess the learning sets of rules and how it differs from other	(13)	Evaluate	BTL5					
	algorithms.								
2.	(1)Summarize the steps involved in Sequential Covering	(7)							
	Algorithm.		Analyze	BTL4					
	(11)Explain the Learn one rule on one example.	(6)							

3.	Outline the concepts of learning task and temporal difference	(13)	Understand	BTL2
4	(i)Write in detail sequential –covering algorithm	(7)	Remember	BTL1
	(ii)State about the AO algorithm.	(6)		DILI
5.	Elucidate the detail the first order logic basic definitions.	(13)	Analyze	BTL4
6.	Illustrate the diagram for the search for rule preconditions as	(13)	Apply	BTL3
	learn-one-rule proceeds from general to specific.	Ň,	11 5	
7.	(i)Write about the learning Rule sets.	(7)		
	(ii)Write some common evaluation functions in the learning rule	(1)	Analyze	BTL4
	sets.	(0)		
8.	Demonstrate the concepts of induction as inverted deduction.	(13)	Apply	BTL3
9.	Discuss in detail Learning First-order rules.	(13)	Understand	BTL2
10.	(i)List the learning sets of first-order rules: FOIL	(7)	Remember	BTL1
	(ii)Memorize about the Basic Foil algorithm.	(6)		
11.	(i)Describe about learning with perfect domain theories:	(7)	Remember	BTL1
	PROLOG-EBG			
	(ii)Identify any training with example for PROLOG-EBG.	(6)		
12.	Summarize about the Q-learning model and explain with diagram.	(13)	Understand	BTL2
13.	(i)Explain Reinforcement learning with an example.	(7)	Craata	DTI 6
	(ii)Prove the theory of Temporal difference learning.	(6)	Cleate	DILO
14.	Describe about the Analytical learning model with example.	(13)	Remember	BTL1
15.	Summarize the implementation for LEARN-ONE-RULE specific	(13)	Understand	BTL2
	for beam search.	(13)		
16.	Illustrate about the explanation-based learning algorithm	(13)	Apply	BTL3
	PROLOG-EBG.	(13)		
17.	Assess and explain an analytical learning problem:	(13)	Evaluate	BTI 5
	SafeToStack(x,y)	(13)	Lvaluate	DILS
PART-C (15 MARKS)				
1.	Assess the following horn clauses	(8)		
	(i) First-Order Horn Clauses	(0) (7)	Create	BTL6
	(ii) Basic terminology in horn clauses.			
2.	Generalize the concept of inverting resolution model.	(15)	Create	BTL6
3.	Summarize the merits and demerits of FOCL Algorithm	(15)	Evaluate	BTL5
4.	Describe the Temporal Difference Learning model with an	(15)	Evaluate	BTL5
	example.		<u>L</u> , aluato	2110
5.	Analyze in detail about Reinforcement Learning.	(15)	Evaluate	BTL5