

SECA4002 – DEEP LEARNING NEURAL NETWORKS

Question Bank

UNIT-1:

PART-A - 2 Mark Questions

S. No	Questions (2marks)	CO	Level
1	The Human brain has a better signal transmission capacity. Illustrate how the signals are carried out in biological Neural Network?	CO1	2
2	Summarize the concept Activation functions used in Artificial Neural networks.	CO1	2
3	Interpret the need for weight and Bias in Artificial Neural networks	CO1	5
4	Justify the need for Artificial Neural Networks	CO1	5
5	Categorize the different training/learning process involved in Machine Learning	CO1	4
6	Illustrate the different loss functions used in neural networks?	CO1	2
7	Global minima are a drawback in multilayer networks. Interpret how Gradient Descent concept is used to overcome this issue?	CO1	5
8	In today's scenario we need Intelligent machines. In this regard Appraise the concept of Machine Learning.	CO1	5
9	Biological Neural Networks is superior to Artificial networks. Comment on the factors where biological systems is superior and where it fails when compared with Artificial neural systems	CO1	4
10	Artificial Neural Networks are best Approximators. Justify how this universal approximation is performed by ANN with suitable explanation & necessary expressions.	CO1	2

PART-B - 10 Mark Questions

S. No	Questions (2marks)	CO	Level
1	<p>Dimensionality Curse is a major bottle neck in Machine Learning. As a Machine Learning expert suggest how this Dimensionality reduction can be solved by using Maximum Margin classifier concept with necessary diagrams and expressions PAGE 55-88 UNIT-1 CUT SHORT YOUR ANSWER</p>	CO1	5
2	<p>When more non-linearities are present then the neural networks fail. Illustrate how Multi-Layer Perceptron is used to overcome the issues of Linear Inseparability with necessary examples and diagrams PAGE 42-45 UNIT-1</p>	CO1	2
3	<p>An image processing engineer working in a disaster monitoring and mitigating agency is involved in identifying the water bodies and marking the boundaries of these water resources from satellite images. Help him by suggesting an appropriate Single-layer feed forward procedure which classifies the water bodies from other regions. Also comment on the pros and cons of the algorithm used in this process. PAGE 35-37 UNIT-1 <i>Advantages</i></p> <ul style="list-style-type: none"> • Single Layer Perceptron is quite easy to set up and train. • The neural network model can be explicitly linked to statistical models which means the model can be used to share covariance Gaussian density function. 	CO1	5

	<ul style="list-style-type: none"> The SLP outputs a function which is a sigmoid and that sigmoid function can easily be linked to posterior probabilities. 		
4	<p>A Real Estate company has developed a multi-story apartment building. As a Machine Learning Expert your tasked with the identification of potential buyers. Suggest a suitable regression-based classifier for the company</p> <p>PAGE 88-95 UNIT-1</p>	CO1	5
5	<p>When the weights in Neural networks is being updated, most of the time it gets trapped in a local minimum point. This disadvantage has to be removed. Recommend a suitable stochastic based algorithm to avoid this disadvantage.</p> <p>PAGE 108,109, 110</p>	CO1	5
6	<p>Without training, the Neural Networks cannot converge. As an Artificial Intelligence expert explain the different training procedures used for structured and unstructured data along with the concept of penalty-based training method.</p> <p>PAGE 30, 31, 32</p>	CO1	5

UNIT-2:
PART-A - 2 Mark Questions

S. No	Questions (2marks)	CO	Level
1	Deep networks can solve complex problems better than Shallow networks. Interpret on the factors where Shallow Networks and Deep networks differ.	CO2	5

2	Suggest a suitable procedure which is implemented in Deep Learning Networks to standardize the real-world data with undesirable characteristics and redundancies.	CO2	5
3	Illustrate the effects of VC dimensions in detail	CO2	2
4	Outline the usefulness of Deep Learning in classification applications.	CO2	2
5	As a neural Network expert explore the need for Pooling in CNN networks.	CO2	4
6	Elucidate the helpfulness of Semi Supervised learning.	CO2	5
7	Regularization is used to remove overfitting. In this regard compare L1 and L2 Regularisations.	CO2	5
8	In Deep neural Networks Normalization is an important procedure. Explain how Batch Normalization is used in Deep Learning networks	CO2	5
9	With a neat diagram examine the working process of shallow networks	CO2	4
10	Identify the usefulness of Probability in Deep Learning Networks.	CO2	3

PART-B - 10 Mark Questions

S. No	Questions (2marks)	CO	Level
1	Appraise on how the Generative Adversarial Networks (GAN's) are used to develop generative model for unsupervised learning in detail. PAGE 57-62	CO2	5
2	Activation function is used to provide the output response in a neural network. Explain the different activation functions used in Deep Learning Networks in detail. ANS: https://www.upgrad.com/blog/types-of-activation-function-in-neural-networks/#Types_of_Activation_Functions	CO2	5
3	Consider an Image data set having 1000 images of four legged animals like cat, dog, horse etc. The size of the images 1024 X 786 pixels. Examine how a Convolution Neural Network (CNN) is used in the classification of cat from the given set of four-legged animals image dataset. PAGE: 63-70	CO2	4

4	As a Deep Learning Network expert, you are tasked with design and development of a facial recognition system for a high security facility. Apply a suitable back propagation-based procedure for the above-mentioned task. PAGE 18-26 WE CAN SKIP DELTA LEARNING LAW	CO2	3
5	As a data analyst you were assigned to develop a software package for detection of cancer cells from the breast regions. The data provided to you has lot of outliers and traditional algorithms leads to overfitting. Suggest an appropriate technique which is used to pre-process data so that the effect of overfitting is removed in detail.	CO2	5
6	As an AI expert you are tasked with the development of a Breast cancer classification algorithm. Suggest a suitable feed forward supervised gradient-based procedure with necessary diagram, expressions and also specify how it guarantees a fast convergence? PAGE 18-26 WE CAN SKIP DELTA LEARNING LAW	CO2	5

UNIT-3:
PART-A - 2 Mark Questions

S. No	Questions (2marks)	CO	Level
1	Illustrate the concept of Inception	CO3	2
2	Differentiate VGG net with Alex net with respect to image classification application.	CO3	4
3	Illustrate how metric learning process is performed?	CO3	2

S. No	Questions (2marks)	CO	Level
4	Comment on the concept of Hyperparameter optimization.	CO3	3
5	Illustrate the concept of fully connected network which are used in Convolution Neural network (CNN).	CO3	4
6	Summarize on the merits and demerits of ResNet architectures	CO3	2
7	Interpret on the helpfulness of Relu activation function with respect to deep neural structures	CO3	3
8	Linear discriminant Analysis (LDA) is used to overcome to issue of VC dimension. Distinguish LDA with PCA.	CO3	5
9	Examine the usage of Residual Block in ResNet	CO3	4
10	In a CNN, if the input size 5 X 5 and the filter size is 7 X 7, Determine the size of the output layer. Assume padding =1.	CO3	5

PART-B - 10 Mark Questions

S. No	Questions (2marks)	CO	Level
1	Principle Component Analysis (PCA) is used to reduce the dimensionality issue Appraise on the various steps involved in Principle Component analysis (PCA) in detail. PCA PAGE 9-24	CO3	5
2	In Medical CT images, segmented outcomes can be split into further or can be merged to give new information's which helps us to make a good Decision. Enumerate how Alexnet can be used for the detection and identification of cancer cells from the given CT images. ALEXNET PAGE 47-50	CO3	5
3	Appraise on how Autoencoders are used to learn efficient coding's of unlabelled data by assuming suitable example. AUTOENCODERS PAGE 43-46	CO3	4
4	Deep neural networks are complex networks with more hidden layers. Discuss in detail the use of Resnet in training deep networks with more than 150 plus layers successfully with neat diagram. RESNET PAGE 47-50	CO3	3

S. No	Questions (2marks)	CO	Level
5	Explain how VGG net outperforms Alex net or Google net by just replacing the large kernel filters with necessary diagrams? VGG PAGE 51-52	CO 3	5
6	Elucidate on the process involved in the training and batch normalization of a convnet in detail. BATCH NORMALIZATION https://www.analyticsvidhya.com/blog/2021/03/introduction-to-batch-normalization/	CO 3	5

UNIT-4:
PART-A - 2 Mark Questions

S. No	Questions (2marks)	CO	Level
1	Identify how LSTM solves the Vanishing Gradient Challenge?	CO4	3
2	Discuss the concept of Non-Convex Optimization in Deep learning Networks.	CO4	2
3	Examine the concept of artificial Neuro Science.	CO4	4
4	Summarize how Deep Reinforcement Learning unites function approximation and target optimization concepts?	CO4	2
5	Transformer architecture is better than Recurrent Neural Networks (RNN). Justify?	CO4	5
6	Outline the idea behind Deep Reinforcement learning.	CO4	2
7	Examine the generalization achieved by stochastic optimization in Deep Learning Neural Networks.	CO4	4
8	Compare gradient descent optimization with stochastic gradient based optimization procedures.	CO4	5
9	Infer on how the issue of Exploding Gradients can be solved?	CO4	2
10	Explain the pros and cons of LSTM networks	CO4	2

PART-B - 10 Mark Questions

S. No	Questions (2marks)	CO	Level
1	Explain the Architecture and working procedure of Recurrent Networks with neat diagram. RNN PAGE 14,15,16	CO4	5
2	Deep networks are used in Natural Language processing for developing models which can recognize texts in a more efficient way. In this regard exemplify the Word Level Recurrent Neural architecture for generating text. RNN PAGE 14,15,16	CO4	2
3	Interpret and elaborate the architecture and working of LSTM networks for image recognition application PAGE 16-21	CO4	5
4	A French national is invited to speak at a school function. He delivers his lecture in French. His speech has to be translated automatically to the regional language by machines. Suggest a suitable language translational model for the above-mentioned purpose. PAGE 16-21	CO4	5
5	As a Deep learning Expert suggest a suitable model which is an adaptation of RNN's and is better than RNN and performs spatial transformation on the given input images. PAGE 11,12,13	CO4	4
6	Appraise on the various optimization schemes used by Deep learning architectures to obtain a better accuracy rate in detail PAGE 8,9,10 CONVEX AND NON CONVEX OPTIMIZATION	CO4	5

UNIT-5: PART-A - 2 Mark Questions

S. No	Questions (2marks)	CO	Level
1	Justify the need for Deep learning-based face recognition system.	CO5	5

2	Illustrate the concept of ImageNet and also specify its usefulness in computer vision-based system developments.	CO5	2
3	Infer on the concept of Bag of Words.	CO5	2
4	Identify the various applications of Deep Learning Networks	CO5	3
5	Deep Learning procedures are effective than normal Neural methodologies. Justify?	CO5	5
6	Outline the concept of image frame matching.	CO5	2
7	Identify the merits and demerits of Word2Vec	CO5	2
8	Justify the need for WaveNet models	CO5	5
9	Compare WaveNet and RNN models	CO5	2
10	Illustrate the various applications of Deep learning models in the field of Bio Informatics	CO5	2

PART-B - 10 Mark Questions

S. No	Questions (2marks)	CO	Level
1	Suggest a suitable network using by which the audio signals are used to generate relatively realistic-sounding human-like voices by modelling waveforms trained with recordings of real speech? WAVENET: UNIT -5 PDF PAGE: 4-5	CO5	5
2	As an AI expert, Comment on a suitable Deep learning methodology involved in human knee joint detection application. WRITE ABOUT CNN	CO5	2
3	As a forensic expert you are tasked with matching two different crime scenes. Appraise on a suitable Deep Learning model for scene matching application in detail with necessary architecture diagrams. EXPLAIN LSTM	CO5	4
4	A medical MRI image of a patient is annotated and text captions are inserted for helping the physicians. As a Deep Learning Expert suggest a suitable procedure to identify these text captions and to classify them. LSTM REFER ABOVE	CO5	5
5	Explain the architecture and the merits of a Deep learning model which can be used to convert the	CO5	5

	given texts into speech NLP EXPLANATION PAGE 6-7		
6	Illustrate how deep learning procedures can be used in the field of Natural Language Processing(NLP). Also list the pros and cons of using DL methods in NLP area. RNN PAGE 14-16 IN UNIT 5	CO5	5