

VELAGAPUDI RAMAKRISHNA
SIDDHARTHA ENGINEERING COLLEGE::VIJAYAWADA
(AUTONOMOUS)
DEPARTMENT OF INFORMATION TECHNOLOGY
MICRO LEVEL SYLLABUS

Program	B.Tech	Regulation	VR20
Subject Code	20IT7301	Year & Semester	IV&VII
Title of the Subject	DEEP LEARNING		

Unit No	Content/Topics Covered (mention Sub Topics as found in books)	Text Book	Chapter/ Section No.	Page Number
Unit I	The Neural Network	[T1]	1	1
	Building Intelligent Machines		1	1-2
	The limits of Traditional Computer Programs		1	2-3
	The Mechanics of Machine Learning		1	3-7
	The Neuron		1	7-8
	Expressing Linear Perception as Neurons		1	8-9
	Feed-Forward Neural Networks		1	9-12
	Linear Neurons and their Limitations		1	12-13
	Sigmoid,Tanh, and ReLU Neurons		1	13-15
	Softmax output layers		1	15-15
	Training Feed-Forward Neural Networks		2	17
	The Fast-Food problem		2	17-18
	Gradient Descent		2	19-20
	The Delta Rule and Learning Rates		2	21-22
	Gradient descent with sigmoidal Neurons		2	22-23
	The Backpropagation algorithm		2	23-25
	Stochastic and Minibatch Gradient		2	25-27
	Test sets, Validation sets, and Overfitting		2	27-34
	Preventing Overfitting in Deep neural Networks		2	34-37
Unit II	Convolutional Neural Networks	[T1]	5	85
	Neurons in Human Vision		5	85-85
	The shortcomings of Feature Selection		5	86-88
	Vanilla Deep Neural Networks don't Scale		5	89-90
	Filters and Feature Maps		5	90-94
	Full Description of the Convolutional Layer		5	95-98
	Max Pooling		5	98-99
	Full Architectural Description of Convolutional Layer		5	99-101
	Image preprocessing Pipelines Enable More Robust Models		5	103-103
	Accelerating Training with Batch Normalization		5	104-105
	Embedding and Representation Learning		6	117
	Learning Lower-Dimensional Representations		6	117-118
	Principal Component Analysis		6	118-120
	Motivating the Autoencoder Architecture		6	120-121
	Denoising to Force Robust Representations		6	134-137
	Sparsity in Autoencoders		6	137-140
Unit III	Sequence Modeling: Recurrent and Recursive nets:	[T2]	10	363
	Unfolding Computational Graphs		10.1	365-368

	Recurrent Neural Networks		10.2	368-372
	Teacher forcing and networks with output recurrence		10.2.1	372-374
	Computing the gradient in a Recurrent Neural Network		10.2.2	374-376
	Recurrent Networks as directed graphical models		10.2.3	376-380
	Modelling sequences conditioned on context with RNNs		10.2.4	380-383
	Bidirectional RNNs		10.3	383-384
	Encoder-Decoder sequence-to –sequence architectures		10.4	385-386
	Deep Recurrent networks		10.5	387-388
	Recursive neural networks		10.6	388-390
	The Challenge of Long-Term Dependencies		10.7	390-392
	Echo State Networks		10.8	392-395
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	The Long short-Term memory -LSTM		10.10.1	397-399
Unit IV	Advanced Topics in Deep Learning	[T3]	Chapter 10	419
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	Attention Mechanisms		10.2	421-422
	Recurrent Models of Visual Attention		10.2.1	422-424
	Application to Image Captioning		10.2.1.1	424-425
	Attention Mechanisms for Machine Translation,		10.2.2	425-429
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	A Fantasy Video Game: Sorting by Example		10.3.1	430-431
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	Training a Generative Adversarial Network		10.4.1	439-442
	Using GANs for Generating Image Data		10.4.3	442-444
	Conditional Generative Adversarial Networks		10.4.4	444-448
	Competitive Learning		10.5	449-449
	Vector Quantization		10.5.1	450-450
	Kohonen Self-Organizing Map		10.5.2	450-453
	Limitations of Neural Networks		10.6	453-456

Text Book(s):

- [1].Nikhil Buduma, Nicholas Locascio, “Fundamentals of Deep Learning: Designing Next-Generation Machine Intelligence Algorithms”, O'Reilly Media, 2017
- [2]. Ian Goodfellow, YoshuaBengio, Aaron Courville, ”Deep Learning(Adaptive Computation and Machine Learning series”,MIT Press, 2017
- [3].Charu C. Aggarwal, Neural Networks and Deep Learning, c Springer International Publishing AG, part of Springer Nature 2018, ISBN 978-3-319-94462-3 ISBN 978-3-319-94463-0 (eBook)

Reference Books:

- [1].Li Deng and Dong Yu, “Deep learning Methods and Applications”, Now publishers,2013
- [2].Michael Nielsen,“Neural Networks and Deep Learning”, Determination Press 2015
- [3].Vaswani A, Shazeer N, Parmar N, Uszkoreit J, Jones L, Gomez AN, Kaiser Ł, Polosukhin I. Attention is all you need. Advances in neural information processing systems. 2017; 30.

E-resources and other digital material

- [1]. Mitesh Khapra, “Deep Learning”, Sep 20, 2018
https://www.youtube.com/watch?v=4TC5s_xNKSs&list=PLH-xYrxjfO2VsvyQXfBvsQsufAzvlqdg9
- [2]. AfshineAmidi and ShervineAmidi ,”Deep Learning cheatsheets for Stanford's CS 230”, 2018, <https://github.com/afshinea/stanford-cs-230-deep-learning>
- [3]. YoshuaBengio, Deep learning: “Theoretical Motivations, Canadian Institute for Advanced Research”, 2015
http://videlectures.net/deeplearning2015_bengio_theoretical_motivations/
- [4]. Geoffrey Hinton’s GoogleTech Talk, ”Recent developments on Deep Learning” March 2010 <https://www.youtube.com/watch?v=VdIURAu1-aU>