

OBJECTIVES:

- To understand the basic ideas and principles of Neural Networks
- To understand the basic concepts of Big Data and Statistical Data Analysis
- To familiarize the student with The Image Processing facilities like Tensorflow and Keras
- To appreciate the use of Deep Learning Applications
- To understand and implement Deep Learning Architectures

UNIT I BASICS OF NEURAL NETWORKS**9**

Basic concept of Neurons – Perceptron Algorithm – Feed Forward and Back Propagation Networks.

Suggested Activities:

- Discussion of role of Neural Networks.
- External learning – Boltzmann Machine and Perceptron.
- Practical – Installation of TensorFlow and Keras.

Suggested Evaluation Methods:

- Tutorial – Perceptron.
- Assignment problems on backpropagation networks.
- Quizzes on Neural Networks.

UNIT II INTRODUCTION TO DEEP LEARNING**9**

Feed Forward Neural Networks – Gradient Descent – Back Propagation Algorithm – Vanishing Gradient problem – Mitigation – ReLU Heuristics for Avoiding Bad Local Minima – Heuristics for Faster Training – Nestors Accelerated Gradient Descent – Regularization – Dropout.

Suggested Activities:

- Discussion of role of Gradient Descent in Deep Learning.
- External learning – Feature extraction and feature learning.
- Survey of Deep Learning Development Frameworks.
- Discussion of Gradient Descent Problem.

Suggested Evaluation Methods

- Tutorial – Gradient descent in deep learning.
- Assignment problems in optimization.
- Quizzes on deep learning regularization and optimization.

UNIT III CONVOLUTIONAL NEURAL NETWORKS**9**

CNN Architectures – Convolution – Pooling Layers – Transfer Learning – Image Classification using Transfer Learning

Suggested Activities:

- Discussion of role of Convolutional Networks in Machine Learning.
- External learning – Concept of convolution and need for Pooling.

Suggested Evaluation Methods:

- Tutorial – Image classification and recurrent nets.
- Assignment problems in image classification performances.
- Quizzes on Convolutional Neural Networks.

UNIT IV MORE DEEP LEARNING ARCHITECTURES

9

LSTM, GRU, Encoder/Decoder Architectures – Autoencoders – Standard- Sparse – Denoising – Contractive- Variational Autoencoders – Adversarial Generative Networks – Autoencoder and DBM

Suggested Activities:

- Discussion of role of Deep Learning architectures.
- External learning – Compression of features using Autoencoders.

Suggested Evaluation Methods:

- Tutorial – LSTM and Autoencoders.
- Assignment problems in deep generative models, Deep Belief Networks.
- Quizzes on deep learning architectures.

UNIT V APPLICATIONS OF DEEP LEARNING

9

Image Segmentation – Object Detection – Automatic Image Captioning – Image generation with Generative Adversarial Networks – Video to Text with LSTM Models – Attention Models for Computer Vision – Case Study: Named Entity Recognition – Opinion Mining using Recurrent Neural Networks – Parsing and Sentiment Analysis using Recursive Neural Networks – Sentence Classification using Convolutional Neural Networks – Dialogue Generation with LSTMs.

Suggested Activities:

- Discussion of role of Deep Learning in Image and NLP applications.
- External learning – NLP concepts.

Suggested Evaluation Methods:

- Tutorial – Image segmentation.
- Assignment problems in parsing and sentiment analysis.
- Quizzes on deep learning architectures.

PRACTICAL EXERCISES:

1. Implement Simple Programs like vector addition in TensorFlow.
2. Implement a simple problem like regression model in Keras.
3. Implement a perceptron in TensorFlow/Keras Environment.
4. Implement a Feed-Forward Network in TensorFlow/Keras.
5. Implement an Image Classifier using CNN in TensorFlow/Keras.
6. Implement a Transfer Learning concept in Image Classification.
7. Implement an Autoencoder in TensorFlow/Keras.
8. Implement a SimpleLSTM using TensorFlow/Keras.
9. Implement an Opinion Mining in Recurrent Neural network.
10. Implement an Object Detection using CNN.
11. Mini Project

TOTAL: 75 PERIODS

OUTCOMES:

On completion of the course, the students will be able to:

1. Understand the role of Deep learning in Machine Learning Applications.
2. To get familiar with the use of TensorFlow/Keras in Deep Learning Applications.
3. To design and implement Deep Learning Applications.
4. Critically Analyse Different Deep Learning Models in Image Related Projects.
5. To design and implement Convolutional Neural Networks.
6. To know about applications of Deep Learning in NLP and Image Processing.

REFERENCES:

1. Ian Good Fellow, Yoshua Bengio, Aaron Courville, "Deep Learning", MIT Press, 2017.
2. Francois Chollet, "Deep Learning with Python", Manning Publications, 2018.
3. Phil Kim, "Matlab Deep Learning: With Machine Learning, Neural Networks and Artificial Intelligence", Apress, 2017.
4. Ragav Venkatesan, Baoxin Li, "Convolutional Neural Networks in Visual Computing", CRC Press, 2018.
5. Navin Kumar Manaswi, "Deep Learning with Applications Using Python", Apress, 2018.
6. Joshua F. Wiley, "R Deep Learning Essentials", Packt Publications, 2016.

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	2	1	1	1	1	1
CO2	1	1	1	1	3	1
CO3	1	1	1	1	1	3
CO4	1	2	1	2	1	1
CO5	2	1	1	1	3	3
CO6	1	3	1	1	1	2

CP5089**WEB CONTENT DESIGN AND MANAGEMENT****L T P C
3 0 2 4****OBJECTIVES:**

- Understand the design principles and interaction.
- To explore the detailed design practices, standards.
- To gain an insight into Content Management System for content design.
- To use any Content Management System tool for better content management.
- To get familiarized with Web Analytics for better management.

UNIT I PRINCIPLES OF WEB DESIGN**9+6**

User Centered Design, Web Medium, Information Architectures, Site Types and Architectures, Page Structure, Site Maps, Navigation, Search, Web Design Process, Designing for Multiple Screen Resolutions, Creating A Unified Site Design, Evaluating Web Sites.

UNIT II ELEMENTS OF PAGE DESIGN**9+6**

Elements Of Page Design, Adding Styles With CSS, Pages And Layout, Typography, Color, Images, GUI Widgets and Forms, Responsive Web Designs, User Input Forms, Working With Data Tables, Web Standards And Styles.

UNIT III WEB CONTENT DESIGN**9+6**

Features – Automated Templates – Template Processor –Front Controller Pattern – Content Modeling – Content Aggregation – Plug-Ins – Search Engine Optimization – Recommended Usage Of Tools – WORDPRESS

UNIT IV WEB CONTENT MANAGEMENT**9+6**

Work Flow Management – Document Management – Collaboration – Versioning – Recommended Usage Of Tools – WORDPRESS