

# Report of FDP on Deep Learning



## **Session 1**

Date: 29/01/2019, 9.30am-12.30pm

This session was handled by Ms.Gayathri R Rajendran. Session deals with Python fundamentals and Scientific Python.

SciPy is a free and open-source Python library used for scientific computing and technical computing. SciPy contains modules for optimization, linear algebra, integration, interpolation, special functions, FFT, signal and image processing, ODE solvers and other tasks common in science and engineering.

## **Session 2**

Date: 29/01/2019, 1.00pm-4.00pm

This session was handled by Dr.Ram Prasad K. Session deals with:

Multivariate Linear Regression:

Linear regression is a linear approach to modelling the relationship between a scalar response and one or more explanatory variables. The case of one explanatory variable is called simple linear regression. For more than one explanatory variable, the process is called multiple linear regression. This term is distinct from multivariate linear regression, where multiple correlated dependent variables are predicted, rather than a single scalar variable.

Ridge/ Lasso Regularizations:

In machine learning, lasso (least absolute shrinkage and selection operator, also Lasso or LASSO) is a regression analysis method that performs both variable selection and regularization in order to enhance the prediction accuracy and interpretability of the statistical model it produces.

Perceptrons:

In machine learning, the perceptron is an algorithm for supervised learning of binary classifiers. A binary classifier is a function which can decide whether or not an input, represented by a vector of numbers, belongs to some specific class. It is a type of linear classifier, i.e. a classification algorithm that makes its predictions based on a linear predictor function combining a set of weights with the feature vector.

Gradient Descent:

Gradient descent is a first-order iterative optimization algorithm for finding the minimum of a function. To find a local minimum of a function using gradient descent, one takes steps proportional to the *negative* of the gradient (or approximate gradient) of the function at the current point. If, instead, one takes steps proportional to the *positive* of the gradient, one approaches a local maximum of that function; the procedure is then known as gradient ascent.

### **Session 3**

Date: 30/01/2019, 9.30am-12.30pm

This session was handled by Ms.Gayathri R Rajendran. Session deals with :

Introduction to Tensor flow:

The central unit of data in TensorFlow is the tensor. A tensor consists of a set of primitive values shaped into an array of any number of dimensions. A tensor's rank is its number of dimensions, while its shape is a tuple of integers specifying the array's length along each dimension.

Deep Neural Network:

Deep learning (also known as deep structured learning or hierarchical learning) is part of a broader family of machine learning methods based on learning data representations, as opposed to task-specific algorithms. Learning can be supervised, semi-supervised or unsupervised.

Deep Learning Optimization and Regularization:

The role of regularization is to modify a deep learning model to perform well with inputs outside the training dataset. Specifically, regularization focuses on reducing the test or generalization error without affecting the initial training error.

### **Session 4**

Date: 30/01/2019, 1.00am- 4.00pm

This session was handled by Dr.Ram Prasad K. Session deals with :

Convolutional Neural Network:

In deep learning, a convolutional neural network (CNN, or ConvNet) is a class of deep neural networks, most commonly applied to analysing visual imagery. CNNs use a variation of multilayer perceptrons designed to require minimal preprocessing.<sup>[1]</sup> They are also known as shift invariant or space invariant artificial neural networks (SIANN), based on their shared-weights architecture and translation invariance characteristics.

### **Session 5**

Date: 31/01/2019, 9.30am- 12.30pm

This session was handled by Dr.Anjana P Das. The Session deals with :

Role of Deep Learning in Autonomous Vehicle Navigation:

Main algorithms for Autonomous Driving are typically Convolutional Neural Networks(or CNN, one of the key techniques in Deep Learning), used for object classification of the car's preset database. A fusion of sensors data, like LIDAR and RADAR cameras, will generate this 3D database. Results will be used as input to direct the car. Meanwhile, additional sensors inside the car itself monitor the driver's behavior and awareness to events, ready to take over in case of human fatigue.

### **Session 6**

Date: 31/01/2019, 1.00am- 4.00pm

Feedback session and Valedictory function.