



Introduction-1.pdf

Introduction to Machine Learning

- Why machine learning?
- Overview of regression, classification, clustering
- Features
- Training and test data
- Model selection
- Probabilistic modelling


Linear_Regression-1.pdf

Linear Regression

- Modelling using basis functions
- Least squares algorithm
- Probabilistic approach
- Mean least squares algorithm
- Geometrical interpretation


Logistic_Regression_2.pdf

Logistic Regression

- Binary classification
- Sigmoid function, probabilistic modelling
- Log-likelihood, training and prediction
- Confusion matrix, recall, precision
- Softmax regression -- modelling, training and prediction


Bias-variance-trade-off.pdf

Bias-Variance trade-off

- Error vs model complexity
- Bias-variance decomposition -- variance, bias, noise
- Bias, variance vs model complexity
- Underfitting and Overfitting


Regularization.pdf

Regularization

- Polynomial curve fitting
- Ridge regression (L2 Regularization)
- LASSO (L1 Regularization)
- K-fold cross-validation


Minimum_distance_classifier.pdf

Minimum distance classifier

- Mean (centroid) of each class
- Assigning class to new examples
- Decision boundary


Bayes_decision_theory.pdf

Bayes decision theory

- Bayes rule in classification problems
- Class-likelihood, prior, posterior probability
- Average probability of error
- Reducible error
- Bayes decision rule
- General theory
- Zero-one loss function


Naive_Bayes.pdf

Naive Bayes

- Bernoulli Model
- Gaussian Model
- Multinomial Model
- Laplace Smoothing


Linear_Discriminant_Function.pdf

Linear Discriminant Function

- What is discriminant function?
- 2 classes linear discriminant
- Multiple classes
- Decision boundary from Gaussian distribution


Decision_Trees.pdf

Decision Trees

- Entropy
- Information Gain
- Binary classification problem
- Gini Index
- Gain Ratio
- Pruning
- Regression Trees


k-NN.pdf

*K*-NN

- Distance metric
- Procedure
- *K* values
- Weighted *K*-NN


PCA.pdf

Principal Component Analysis


k-means_and_k-medoids.pdf

*K*-means


SVM.pdf

Support Vector Machines

- Hard-margin SVM
- Soft-margin SVM
- Constrained optimization problem
- Solution to hard- and soft-margin SVM


Perceptron.pdf

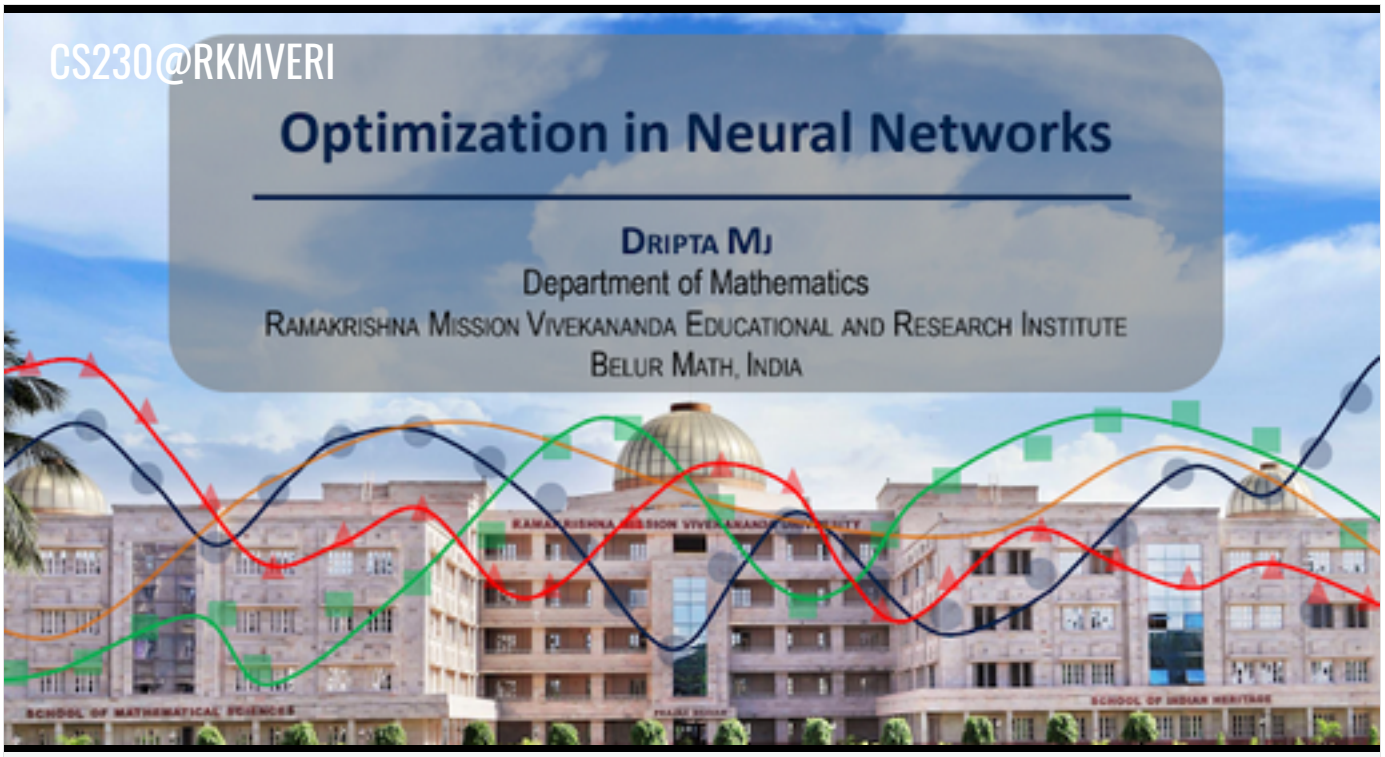
Perceptron Learning


multi-layer_perceptron.pdf

Multi-layer Perceptron


Backpropagation.pdf

Backpropagation




Optimization_in_Neural_networks.pdf

Optimization in neural networks


CNN.pdf

Convolutional neural networks


Dropout-batch.pdf

Dropout, Batch normalization


RNN-2.pdf

Recurrent Neural Networks


Kernel_methods.pdf

Kernel methods


Gaussian_process.pdf

Gaussian Process