

# RUSMALAI

## Reinforcement Unsupervised Supervised Machine Learning and Artificial Intelligence

This journal club will meet every week to talk about recent developments in the field of Machine Learning (M.L) and Artificial Intelligence (A.I.). We will start with fundamental papers and move on to more contemporary papers and techniques (such as deep learning) used in the field. The objective of the first three months of the J.C. will be to have preparatory lectures and corresponding group coding sessions in order to attain sufficient understanding to start discussing cutting edge research in the field. After the preparatory 3 months, we will invite lecturers, discuss papers and hold group coding sessions applying M.L to open datasets.

Members of the J.C. are expected to volunteer to lead paper discussions and the order will be decided by an organizational meeting held every 2 months. J.C. coordinators will rotate every 3 months from the list of members. A quorum of 5 (attendees) +1 (speaker) is necessary for RUSMALAI to proceed.

## Lectures:

1. Neural Networks (NN): McCulloch and Pitts neuron, Perceptron, Feedforward Neural Networks.
2. Hopfield Nets and Recurrent NNs
3. Support Vector Machines (SVM)
4. Unsupervised learning: clustering, associations, etc.
5. Dimension reduction and Ensemble methods PCA, ICA, Decision Trees, Random Forests, Hierarchical methods, Adaboost, etc.
6. Reinforcement learning (Q learning and other paradigms)
7. Convolutional NNs and Boltzmann machines
8. Deep learning
9. State of the art algorithms like deep-Q learning, deep-clustering etc.

## Group coding sessions:

1. Implementation of NN
2. SVMs
3. Unsupervised learning
4. Dimension reduction and Ensemble methods: PCA, ICA, Decision Trees, Random Forests, Hierarchical methods, Adaboost, etc.
5. Reinforcement learning
6. Deep learning

## **Applications:**

1. Participate in online competitions on Kaggle and other open data contests.
2. Replicate papers from available data.
3. Implement reinforcement learning on small robots.

The programming language of choice for RUSMALAR coding sessions is **Python**.

Organizational meeting will be held in the **3rd week of November**.

**PI Incharge: Sandeep Krishna**

## **Organizers:**

Aalok Varma

Dinesh Natesan

Sahil Moza

Sriram Narayanan

Venkatakrishnan Ramaswamy