DATA DRIVEN ARTIFICIAL INTELLIGENT SYSTEMS 2023-2024 EVEN SEMESTER

Virtual Lab -1

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Computer Science and Engineering

Introduction

Objective

List of experiments

Target Audience

Course Alignment

Feedback

Artificial Neural Networks

The objective of this lab is to provide hands-on experience in understanding the basics of ANN models, and the pattern recognition tasks they perform. Some applications of ANN for problems in optimization and image processing will also be explored through these lab experiments.

Important Notes :

If some or all of the tabs in this page or the experiment page are not visible, kindly try reloading or refreshing the page.

Some of the content uses MathJax for rendering equations. Rendering maybe slow on some systems. If the equations are not visible, you may have to refresh or reload the page.

Internet explorer is not supported in the current release. ANN Lab has been checked on Firefox and Opera.

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Artificial Neural Networks

1. Parallel and distributed processing - I: Interactive activation and competition models
2. Parallel and distributed processing - II: Constraint satisfaction neural network models
3. Perceptron learning
4. Multi layer feed forward neural networks
5. Hopfield model for pattern storage task
6. Hopfield model with stochastic update
7. Competitive learning neural networks for pattern clustering
8. Solution to travelling salesman problem using self organizing maps
9. Solution to optimization problems using Hopfield models
10. Weighted matching problem: Deterministic, stochastic and mean-field annealing of an Hopfield model

Aim

Theory

Procedure

Simulation

Observations

Assignment

References

Feedback

Perceptron learning

The objective of this experiment is to illustrate the concept of perceptron learning in the context of pattern classification task. Following are the goals of the experiment:

To demonstrate the perceptron learning law.

To illustrate the convergence of the weights for linearly separable classes.

To observe the behaviour of the neural network for two classes which are not linearly separable.

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Perceptron learning

Select problem type

Linearly separable   ⇕

No. of samples per class: No. of iterations: Sample Step Size:

20   20   1

Iteration Step Size:

1

[Init perceptron]   [Next sample]   [Next Iteration]

Information

1. Samples of class 1 and class 2 are shown in blue and red, respectively.
2. The line described by weights of the perceptron is shown in black.
3. The sample point presented to the perceptron is shown by a black star symbol.
4. The lines described by weights, before and after a sample is presented to the perceptron, are shown in the two subplots.