Project
ECE 469-568 – Machine Learning

Posted date: 10/30/2024
Report due by: 11.59 PM on 12/06/2024
Policy: Late submissions will not be accepted

Requirement:

1. A five minute presentation of the proposed designs, solutions, and numerical results.

2. A 5-page written technical report constaining the following sections:

   - Abstract
   - Introduction
       - Literature review
       - Motivation for the proposed design
       - Summary of the contribution
   - Problem formulation
   - Proposed design and solutions
   - Numerical results containing the performance of the proposed design
   - Conclusion
   - List of references

Project topics:

1. The impact of different distance metrics on the performance of clustering based on K-means algorithm for MNIST and Fashion-MNIST datasets.

2. The impact of different distance metrics on the performance of classification based on KNN algorithm for MNIST and Fashion-MNIST datasets.

3. Impact of different Kernels on the performance of classification based on SVM for IRIS dataset.

4. Impact of different Kernels on the performance of softmax classification for IRIS dataset.

5. A performance comparison between softmax classification and KNN for Fashion-MNIST dataset.

6. Implementation of kernalized-KNN for classification with Fashion-MNIST dataset.

7. Design of a feed-forward ANN for classification for MNIST and Fashion-MNIST datasets.

8. Implementation of PCA to reduce the dimensionality of MNIST and Fashion-MNIST datasets, and impact of reduced dimensionality for classification based on K-means algorithm.

9. Implementation of PCA to reduce the dimensionality of MNIST and Fashion-MNIST datasets, and impact of reduced dimensionality for classification based on feed-forward ANNs.

10. Impact of different activation functions for classification performance of feed-forward ANNs based on MNIST and Fashion-MNIST datasets.

11. Investigating the vanishing/exploding gradients problems in feed-forward ANNs based on MNIST and Fashion-MNIST datasets.

12. Impact of reusing pretrained layers for classification performance in feed-forward ANNs based on MNIST and Fashion-MNIST datasets.