Class: DATS 6202– Machine Learning|.
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Project Proposal

Human Activity Recognition with Smartphones using MLP and LVQ algorithms

Introduction:
The problem we have selected is human activity recognition using smartphones. With the increasing usage of smartphones, it is essential to identify the activities performed by the users through their smartphones. By analyzing the sensor data from the smartphone, we can accurately classify the activity being performed by the user.

Database:
We will be using the Human Activity Recognition with Smartphones dataset, which contains sensor data collected from the accelerometer and gyroscope of the smartphones. The dataset contains 10,299 instances of 6 different activities performed by 30 subjects. The dataset is large enough to train the machine learning algorithms.

Machine Learning Algorithms:
We will be using two different algorithms to classify the human activity. First, we will use the Multi-Layer Perceptron (MLP) algorithm, which is a standard feedforward neural network. Secondly, we will use the Learning Vector Quantization (LVQ) algorithm, which is a type of unsupervised neural network. Additionally, we will be using other machine learning algorithms such as K-Nearest Neighbor (KNN) and Decision Tree (DT) for comparison purposes.

Software:
We will use Python as the programming language and implement the MLP and LVQ algorithms using the scikit-learn library. The library provides an efficient implementation of the algorithms and makes it easy to experiment with different parameters. We will also use Jupyter Notebook to develop and run the code.

Performance Metrics:
We will judge the performance of the network based on the accuracy of the classification. We will also use other metrics such as precision, recall, and F1 score to evaluate the performance of the algorithms.

Project Schedule:

Day 1-3: Data preprocessing and exploratory data analysis
Day 3-6: Implementing MLP algorithm and optimizing hyperparameters
Day 6-9: Implementing LVQ algorithm and optimizing hyperparameters
Day 9-12: Comparing the performance of different algorithms and preparing the project report