Assignment 6

Run on 2021-01-30, 23:30:11

Note: In this exercise, you will implement the following algorithms:

1. 2-Dimensional sorting algorithm.
4. A basic decision tree algorithm.

Note: This assignment is designed to be completed in a single evening.

1. **2-Dimensional sorting algorithm**
   - Description: This algorithm will sort a set of 2-dimensional points in ascending order.
   - Requirements:
     - Time complexity: O(n log n)
     - Space complexity: O(n)
   - Evaluation:
     - Correctness: The points should be sorted correctly.
     - Efficiency: The algorithm should run efficiently for large datasets.

2. **A simple linear regression algorithm**
   - Description: This algorithm will perform linear regression on a given dataset.
   - Requirements:
     - Time complexity: O(n^2)
     - Space complexity: O(n)
   - Evaluation:
     - Correctness: The predicted values should match the actual values.
     - Efficiency: The algorithm should handle large datasets efficiently.

3. **K-means clustering algorithm**
   - Description: This algorithm will perform k-means clustering on a given dataset.
   - Requirements:
     - Time complexity: O(dnkr)
     - Space complexity: O(nk)
   - Evaluation:
     - Correctness: The clusters should be well-defined and compact.
     - Efficiency: The algorithm should handle large datasets efficiently.

4. **A basic decision tree algorithm**
   - Description: This algorithm will perform decision tree learning on a given dataset.
   - Requirements:
     - Time complexity: O(n log n)
     - Space complexity: O(n)
   - Evaluation:
     - Correctness: The decision tree should accurately predict the classes.
     - Efficiency: The algorithm should handle large datasets efficiently.

Note: Submission guidelines:
- All code should be well-documented and easy to understand.
- Submit your code and a brief report discussing your implementation.
- submissions should be submitted by the deadline.
- Late submissions will be penalized.