Marios Pafitis (mpafit02)

Decision Tree Vs MPL Classifier

1. Multilayer Perceptron Classifier

The Multilayer Perception Classifier is a supervised learning algorithm which takes as input m number of dimensions for input to generate o number of dimensions for output. We specify the number m and o. The goal is to learn a non-linear function and between the input and output layer it can exists a number of hidden layers. This method uses neurons.

Advantages:

1. It can learn non-linear models
2. It can learn in real-time

Disadvantages:

1. Because it generates different random weights for initialization, they can lead to different validation accuracy.
2. Needs the number of hidden neuros, layers and iterations
3. Is sensitive to scaling

2. Decision Tree Classifier

The Decision Tree is not a parametric supervised learning method. Its goals are to create a model that predicts the value of a variable based on simple decision rules. This method uses a decision tree to represent the variables of the problem as nodes of the tree and the relation between them based on their values.

Advantages:

1. It is easy to understand it
2. Little data preparation
3. Logarithmic search on the tree, as it can only follow a path to find the value of a variable.
4. Handles numerical and categorical data
5. Multioutput problems
6. White box model, you can easily see and understand the path

Disadvantages:

1. Overfitting, trees can become specific than more generalize
2. Decision trees can be unstable in small variations
3. NP-complete problem to learn the optimal decision tree
4. Not all concepts can be easily expressed in a decision tree (e.g. XOR, parity)
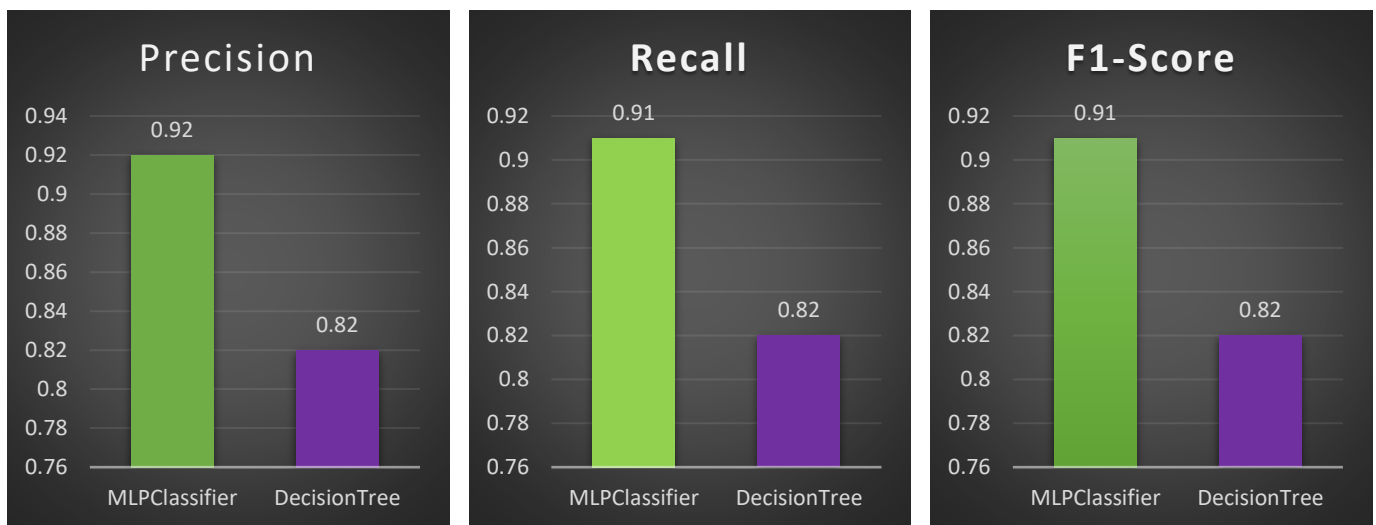
3. IRIS Test
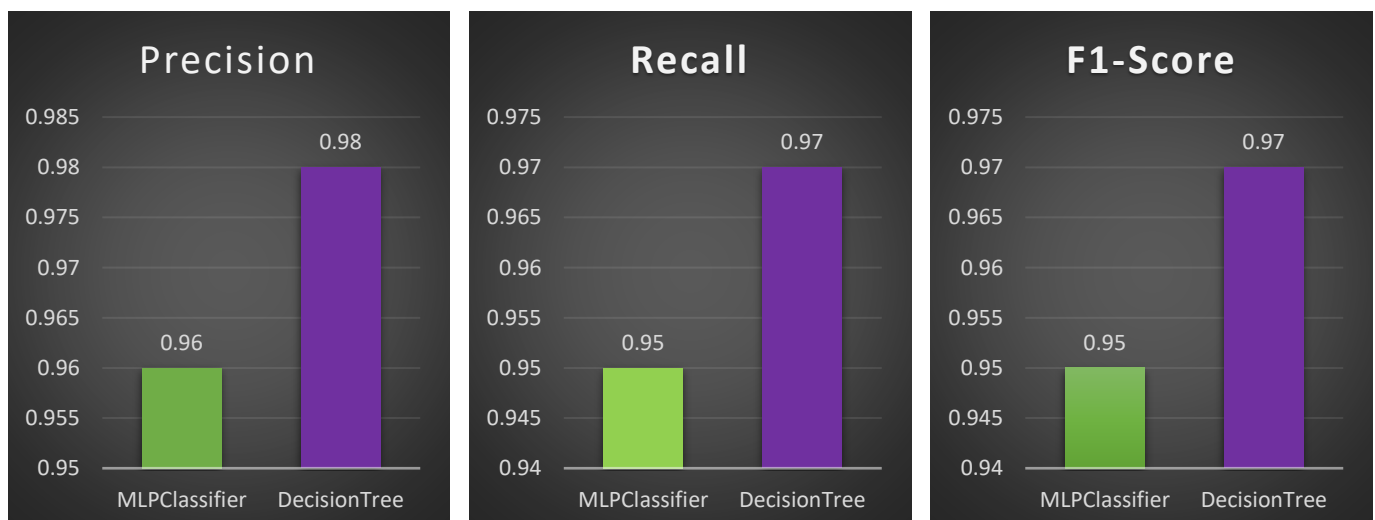
Decision Tree performs better than MLP Classifier because the F1-Score of Decision Tree is greater than MLP's.

4. SPAM Test
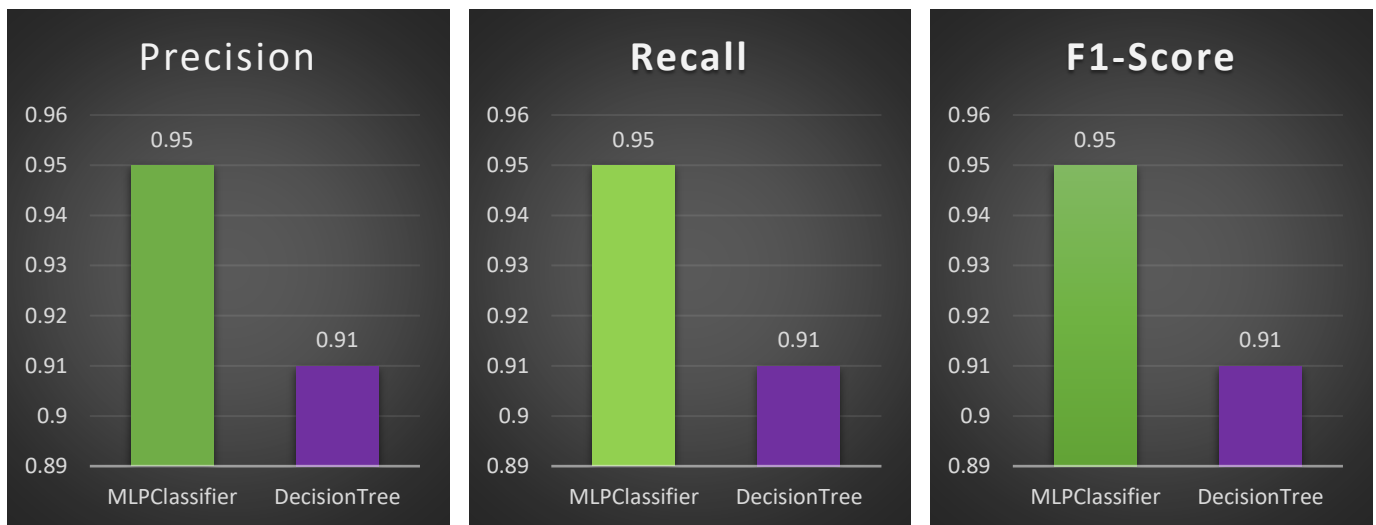
MLP Classifier performs better than Decision Tree because the F1-Score of MLP is greater than Decision's Tree.

5. IONOSPHER Test

MLP Classifier performs better than Decision Tree because the F1-Score of MLP is greater than Decision's Tree.