

Homework 9 (*due: Apr 14*)

MACHINE LEARNING - COSC 4360

Department of Computer Science and Electrical Engineering

Spring 2025

Exercises

Create a **New Project** for every exercise. Take a screenshot of the source code along with its output and place the **source code** and the **screenshot** in a **zipped folder** named **LastNameFirstName_HW9**

Exercise 1

Given the following dataset: *balloons_extended.csv*, use a **Decision Tree Classifier** to predict whether a balloon is *inflated* or not. Compute the **accuracy score** of the model and print the **classification report** as well as the **Confusion Matrix** both in *text* and as a *visualization* (use: `test_size=0.20`, `random_state=0`). In addition, print the most **important features**. Finally, create a *visualization* of the decision tree.

Note: You may also wish to create a **text** representation of a decision tree using:

```
text_representation = tree.export_text(dtree)
print(text_representation)
```

Exercise 2

Similarly to Ex. 1, use a **Random Forest Classifier** with `n_estimators=100`.

Note: No need for tree visualizations. Optionally, you can visualize e.g., the first 10 trees.

Exercise 3

Given the following dataset: *lenses.csv*, use a **Decision Tree Classifier** to predict whether a patient should be prescribed *hard contact lenses*, *soft contact lenses*, *no contact lenses*. Compute the **accuracy score** of the model and print the **classification report** as well as the **Confusion Matrix** both in *text* and as a *visualization* (use: `test_size=0.30`, `random_state=0`). In addition, print the most **important features**. Finally, create a **visualization** of the decision tree.

Exercise 4

Similarly to Ex. 3, use a **Random Forest Classifier** with `n_estimators=500`.

Note: No need for tree visualizations. Optionally, you can visualize e.g., the first 10 trees.

Note: Submit through **Canvas**