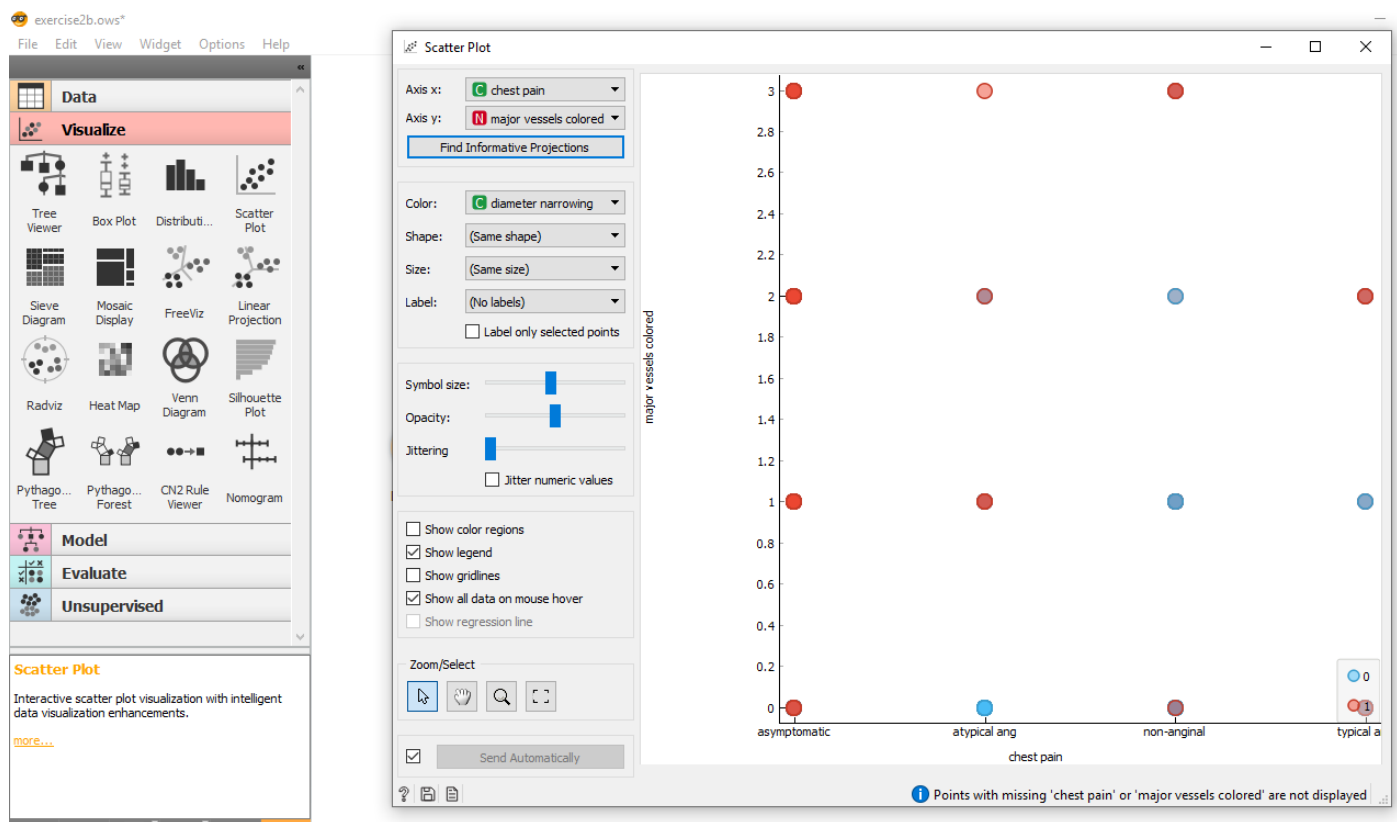


## Lab 2a: Heart Disease / Orange

Use "Orange" in Anaconda to follow these steps. Insert the five screenshots at the marked positions. Upload the Word file with your screenshots to eCampus (preferably saved as PDF).

**Your name: Almesberger Marcel (dh181812)**

1. Load "Heart Disease" dataset. This dataset comes with Orange; you can use the "Datasets" widget to easily access it.
2. Check its data using a "Data Table" widget.
3. Draw a Scatter Plot. Configure the plot to find & show the most informative projection. Insert a screenshot of the scatter plot window showing the most informative projection:



4. Use the "Test & Score" widget. Drag the "Datasets" output to the "Test & Score" input.
5. Create the "Tree", "Random Forest", "kNN", "SVM" and "Neural Network" classifiers and connect all their outputs to the input of "Test & Score"
6. Check the "Test & Score" results. Configure it to use 20 folds for stratified cross validation. Order the classifiers by their precision. Which classifier has the highest precision? Paste a screenshot.

The screenshot shows the Orange3 interface with the 'Test & Score' widget selected. The widget is configured with 'Cross validation' and 'Number of folds: 20'. The 'Evaluation Results' table is displayed, showing the performance of various classifiers.

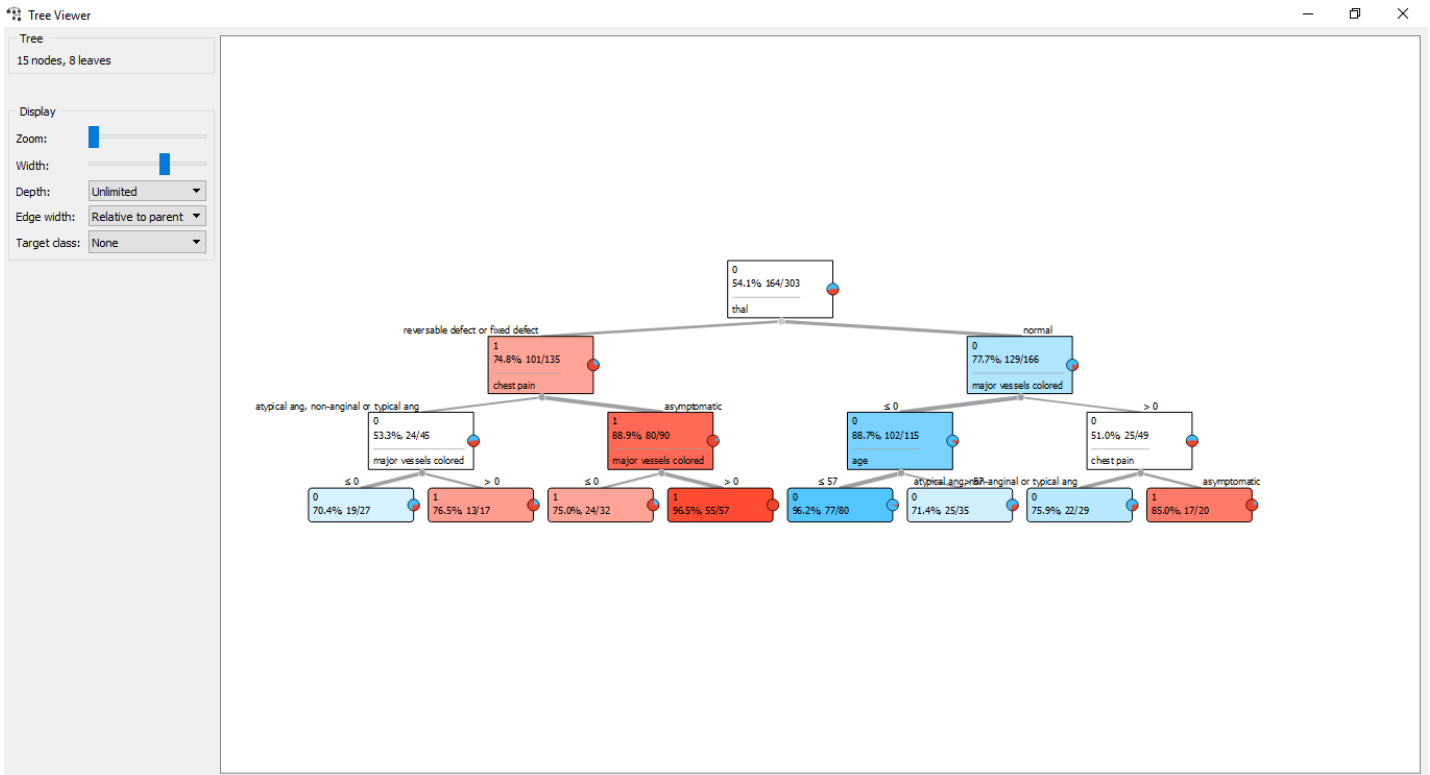
| Method         | AUC   | CA    | F1    | Precision | Recall |
|----------------|-------|-------|-------|-----------|--------|
| SVM            | 0.901 | 0.828 | 0.828 | 0.828     | 0.828  |
| Random Forest  | 0.887 | 0.818 | 0.818 | 0.818     | 0.818  |
| Neural Network | 0.900 | 0.795 | 0.795 | 0.795     | 0.795  |
| Tree           | 0.731 | 0.739 | 0.739 | 0.739     | 0.739  |
| kNN            | 0.696 | 0.630 | 0.627 | 0.629     | 0.630  |

7. Connect the "Test & Score" output to a "Confusion Matrix". Take a screenshot of the confusion matrix of the classifier with the best precision.

The screenshot shows the Orange3 interface with the 'Confusion Matrix' widget selected. The widget is configured to show the 'Number of instances'. The confusion matrix is displayed for the SVM classifier.

|          |   | Predicted |     | $\Sigma$ |
|----------|---|-----------|-----|----------|
|          |   | 0         | 1   |          |
| Actual   | 0 | 139       | 25  | 164      |
|          | 1 | 27        | 112 | 139      |
| $\Sigma$ |   | 166       | 137 | 303      |

8. Use “Datasets” as input for a second “Tree (1)” classifier. Connect the new classifier to a “Tree Viewer” widget to visualize the decision tree. Configure the decision tree to use the following configuration, and then insert a screenshot of the resulting tree:
  - a. Binary tree
  - b. Min number of instances in leaves: 2
  - c. Do not split subsets smaller than: 5
  - d. Limit the maximum tree depth to: 3



- Take a screenshot of your completed canvas in orange that shows how you connected the widgets.

