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**Artificial Intelligence**

Scenario 2

14032908  
Joshua Michael Ephraim Bridge  
joshua.m.bridge@stu.mmu.ac.uk

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# 1 Introduction

In this report an AI classifier will be put forward which maps mamographical data to desired outputs (diagnoses). In order to do this two types of AI classifiers will be evaluated on their performance in this task, along with relevant pre-processing of the attributes to enhance classifier performance. The two classifier types will be a Decision Tree (J.48) and an Artificial Neural Network (Multilayer Perceptron, Minsky et al. (2017)). In order to evaluate their performance, considerations of both learning time & classification accuracy will be taken into account.

## 2 AI classifiers

In this section a brief study will be conducted into the two classifier types mentioned previously.

### 2.1 Decision Trees

A Decision Tree is a hierarchical variant of a multistage classifier (Safavian & Landgrebe 1991). The tree structure itself could be described as a single root node with 0 to many connected children, each themselves with 0 to many connected children. Any node in a decision tree with no children is known as a leaf node and will have a direct relationship with two or more class labels.

### 2.2 Artificial Neural Networks

Multilayer Perceptron (Minsky et al. 2017).

- 3 Data set analysis
- 4 Classifier Prediction
- 5 Initial Experiments
- 6 Main Experiments
- 7 Advanced Pre-processing
- 8 Conclusions

## References

- Minsky, M., Papert, S. A. & Bottou, L. (2017), *Perceptrons: An introduction to computational geometry*, MIT press.
- Safavian, S. R. & Landgrebe, D. (1991), ‘A survey of decision tree classifier methodology’, *IEEE transactions on systems, man, and cybernetics* **21**(3), 660–674.