COMP606 – Foundations of Information Science

Assignment Part 2 – Fuzzy Logic Application

Due Date: Friday, 26th May 2017 at 5 pm.
Late submissions will incur a 1 mark penalty per day.

Weighting: 15% of the final course mark

Submission: You will need to submit the written part (report from tasks 2 and 4) and the practical part (model from Task 3 as .fis file) of this assignment through AUTonline in the Assessments section of this course.

Task 1

Choose one real-world problem that you are familiar with and that you want to model using a fuzzy system. This can be anything you are interested in, as long as it involves some form of prediction or classification. Talk to Anne about your chosen problem to make sure it is suitable for the assignment. Everyone has to choose a different problem. You do not need to have data for your problem.

Task 2 [4 marks]

Describe your chosen problem (400-500 words).

- What is the topic of your problem? [1 mark]
- Describe all input features and output classes and what these express. [1 mark]
- Choose three to six input features and one or two output classes that you want to focus on, and explain why you chose these ones. [1 mark]
- Use appropriate literature references to substantiate your claims. Alternatively, if you have data for your problem, you can also analyse the attributes to find out which ones would work best. [1 mark]

Task 3 **[4 marks]**

Using Matlab's Fuzzy Logic Toolbox, build a Fuzzy Inference System (FIS) for your problem.

- Based on your knowledge about the problem, design membership functions for your input and output variables, and specify four to six rules for your fuzzy model. [3 marks]
- Use the Rule Viewer and Surface Viewer to analyse your model, and make sure it matches the actual conditions of the problem as closely as possible. Save your final system as .fis file and submit it through AUTonline. [1 mark]

Task 4 **[6 marks]**

Describe and evaluate your fuzzy model (600-700 words).

- Explain how well your model matches the problem. Include a figure of the Rule Viewer and the Surface Plot to illustrate your claims. If you have data for your problem, include a confusion matrix of the classification results. [3 marks]
- Why did you choose these membership functions? [1 mark]
- On what observations did you base your rules? [1 mark]
- Which membership functions and rules did you have to adjust after creating your model? [1 mark]

There will be **1 mark** for the presentation of the assignment including spelling and grammar, layout and formatting, readability of figures, word count, and referencing.

Good luck!