Continuous Assessment 1 25% - Fuzzy Logic Controller

Assessment Brief Part A)

As part of this continuous assessment you will be required to build a fuzzy logic controller for an inverted pendulum using the qtFuzzyLite system. As part of this you will need to develop a set of Linguistic variables and set of rules to control the system. You will also be required to integrate your fuzzy logic into the cart and pole simulation provided on MOODLE in order to test the performance of your controller.

Assessment Brief Part B)

In part B of this assessment you are required to build a Fuzzy Logic system using qtFuzzyLite in order to estimate a persons ***disposition*** *(Miserable, Sad, Average, Happy, Ecstatic)* based on their **Age**, **Income**, and **Health**. You will need to do some research to figure out the appropriate value ranges for each of the inputs to the system. You can assume the system will only deal with people who are of an employable age. NOTE: You do **NOT** have to implement any Java code for this part of the assessment.

Documentation

Along with your fuzzy controller code for part **A** and **B**, you will also need to submit documentation which should include the following sections:

(Part A - Inverted Pendulum - 2 Pages Approx)

Description of your system detailing how it is able to balance the inverted pendulum. Your description should make reference to the following terminology Feedback system, Linguistic variables, Terms, Decision matrix, Inference rules, Conjunction function, Accumulation function and Defuzzifier function.

(Part B - Disposition Estimator- 2 Pages Approx)

For part B you should document all of the design decisions you made including your Linguistic Variables, Terms (and chosen ranges), rule matrix and rules. You should include screen shots of the system in order to prove that it outputs appropriate values.

Grade Breakdown

Grades for this continuous assessment will be broken down as follows:

- Documentation Part A (system description): **5%**
- Documentation Part B (second example): 10**%**
- System code: **5%**
- System demo (in lab) **5%**

Deliverables

The deliverables for this continuous assessment are as follows:

1. Exported .java file from qtFuzzyLite
2. Ammended pole.java file containing your fuzzy controller code
3. Documentation
4. System demo (in lab)

Submission deadline/details

You must submit a ZIPPED (ONLY ZIP, **NOT RAR** or other compressed file) file containing the deliverables outlined above to MOODLE by **Friday 4th of March at 18.00hrs**. NOTE: you will also have to demo your control system in one of our practical labs before the submission deadline.