ECE457B Design Project

Winter 2015

Project Description and Abstract

For the course Design project, groups of three to four students maximum should email by February 3, 2015 to TA Arief at arief.koesdwiady@uwaterloo.ca their group membership, the tentative title of their design project and an abstract articulating the overall theme of the project, motivation for choosing the theme and tentative solutions to handle the challenging aspects (use the exact abstract template posted on Learn). Theme for potential projects could be chosen from the list of topics below or from similar or related ones. Please do some research prior to the drafting of the abstract. The list of all topics will be later posted on Learn. Students could start working on their project as soon as they receive an approval statement from the course instructor.

Topics:

Design projects pertain mostly to applications or potential applications of tools of fuzzy logic and neural network for designing intelligent systems, for which conventional approaches may not be very suitable. The Design Project could be either Computer Software based projects (mostly software implementation) or Real World Implementation based projects (may include one or more hardware components). Examples of such design projects include but not restricted to the following:

Some Examples of Software Based Projects:

- Classification and Clustering of very large data sets using neural networks or/and fuzzy classifiers (such as in Data mining or knowledge discovery)
- Biometrics (fingerprint recognition, face recognition, speaker identification),
- Natural speech recognition such as understanding of semantics of voice utterances
- Natural Language Processing topics such as: text classification, information retrieval, indexing, information extraction
- Pattern recognition and Perception
- Other ideas could be proposed as well

Some Examples of Real World Implementation Based Projects:

- Autonomous control of machines or robots (could be implemented on a graph simulator)
- Design of an Intelligent Mechatronics sensor arrays for dual night/daylight vision
- Design of a fatigue detector system in a car environment
- Design of an intelligent overhead system
- Robotics, obstacle avoidance, intelligent vehicles routing (software or hardware base)
- Design of an intelligent car platoon system (graphic simulation could do) under breaking and

accelerating modes
- Other ideas could be proposed as well

Requirements and Deliverables:

The common requirement for all project is that the students in each group need to make use in their design project any method or combination of methods of material taught in the course (or closely related to it) to solve the proposed problem or improve on an existing solution. These are the required deliverables

- A report of 20 to 25 pages needs to be provided with these sections:
    - Abstract
    - Introduction to the problem and motivation to use the computational approach (fuzzy or neural network based) to solve it;
    - Theoretical background material with references
    - Present your solution using tool(s) learned in class (or something related);
    - Results: Analysis and comparison if any
    - Conclusion,
    - References.
- The full report will be posted on Learn (under project assessment part) as a zipped file including all pertinent items (document file, ppt file, code, executable file if any for demos, poster file).
- Each group will prepare a poster presentation at later part of the term .

Marking Scheme:

Marking for the project report will be as follows : The challenging nature of the problem (20%); the sophistication and depth of solution(s) proposed (40%), presentation of the report and the results (20%). The remaining 20% will be assigned for the poster presentation due at the end of the term .