CITS7212: Computational Intelligence

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Unit Overview

- Computational Intelligence (CI): nature-inspired heuristic-based technologies that demonstrate emergent, adaptive, or intelligent behaviour

- Usually applied to
  - complex optimisation problems
  - adaptive learning
  - knowledge acquisition

- CITS7212 will introduce six core CI technologies
  - evolutionary algorithms
  - neural networks
  - fuzzy logic
  - particle swarm optimisation
  - ant colony optimisation
  - learning classifier systems
Reading Units

- CITS7212 is a reading unit
  - the unit will not run as a series of formal lectures
- Reading units are less structured than other undergraduate units
  - the unit coordinator will assist you with learning the material, not teach you the material
- The emphasis is on self-learning and self-investigation, where students find information for themselves
  - you should still expect to average 10–12 hours/week, as normal for a 6-point unit
Unit Structure

- The class will be divided into teams of students
- Each team will be assigned a number of technologies to research and report on, one of which will be used to complete the common project
  - different teams will be assigned different technologies
  - the unit coordinator will advise which technologies should be used for the project
- All students are expected to gain a basic understanding of all of the technologies
Unit Structure

- All students will be given 2–3 introductory research papers on each technology
- The papers will introduce/summarise the topic, but they will be insufficient for a complete understanding
- Each team is expected to research their topics in more detail than provided by these papers
The unit assessment comprises three components
- three seminars (each worth 10%)
- a programming project (40%)
- a final exam (30%)

Each team will present three seminars
- Weeks 5, 7, and 10
- one seminar on each of three technologies

Each team will implement a solution to the project using one of their assigned technologies

There will be an exam in November
Seminars

- Each seminar should introduce how the technology works through a logical progression of relevant material, including discussion of its application to an interesting real-world problem.
- Seminars will be assessed on:
  - understanding of the technical material
  - breadth of coverage
  - quality of the presentation
- Each team member must contribute equally.
- All material originating from someone outside the team must be fully accredited.
Seminars should run for 30 minutes plus questions
  – aim for around 30 slides
Do not assume any prior knowledge
Maintain a balance between overview information and technical details: a good lecture offers both
  – ideas should build successively upon each other
Pictures, diagrams, videos, and demos help
Additional supporting handouts are not compulsory, but may help to convey your message
Slides must be emailed to the unit coordinator for inclusion on the unit web-site after the seminar
There will be a lecture in Week 8 to introduce the project – it will be due in Week 13

For each team, the project will involve

– applying one of your assigned technologies to implement a solution to a real-world problem
– writing a report on your solution, its structure, and its performance
– presenting your work to the class in Week 13
Questions?