COMP 6001 NEUROMORPHIC ALGORITHMS AND COMPUTATION

Credit Points 10

Legacy Code 800232

Coordinator Saeed Afshar (https://directory.westernsydney.edu.au/search/name/Saeed Afshar/)

Description Designing and implementing processing pipelines for event-based sensory data is a crucial skill for neuromorphic engineers to test novel hardware platforms or to develop new algorithms and learning mechanisms. This project-based subject focuses on principles of neuromorphic algorithm design and hardware-friendly neural architecture design for neuromorphic information processors. This subject consists of two streams of research: applied event-based algorithms and bio-inspired spiking networks. Through solving increasingly challenging tasks using distributed, event-based competitive processing elements, students will learn the differences between conventional and neuromorphic algorithm design, critically assessing real-world problems in a structured manner.

School Graduate Research School

Discipline Algorithms

Student Contribution Band HECS Band 2 10cp

Check your HECS Band contribution amount via the Fees (https://www.westernsydney.edu.au/currentstudents/current_students/fees/) page.

Level Postgraduate Coursework Level 6 subject

Restrictions

Must be enrolled in 8124 Master of Applied Neuromorphic Engineering

Learning Outcomes

On successful completion of this subject, students should be able to:

1. Critically evaluate the advantages and disadvantages of event-based data processing in comparison to Conventional Frame-based data
2. Assess the fundamental building blocks of neural computation in biology and Neuromorphic Systems
3. Design and evaluate event-based algorithms on standard von Neumann architectures
4. Propose novel neuromorphic processing methods relevant to distributed neuromorphic processors
5. Develop a solution-oriented way of critically assessing real-world problems using Neuromorphic algorithms
6. Effectively communicate the significance and impact of a specific Neuromorphic system to an audience consisting of both specialist and non-specialists

Subject Content

- Encoding and Processing Conventional and Event-based data
- Architectures of Neural Computation
- Spiking Neural Networks in Biology, Software Simulation and Neuromorphic Hardware
- Event-based Classification
- Event-based Tracking
- Event-based Feature Extraction
- Designing a Novel Event-based Algorithm

Assessment

The following table summarises the standard assessment tasks for this subject. Please note this is a guide only. Assessment tasks are regularly updated, where there is a difference your Learning Guide takes precedence.

Type	Length	Percent	Threshold	Individual/ Group Task
Practical	Maximum 1000 lines of code	30	N	Individual
Practical	Maximum 1000 lines of code	30	N	Individual
Applied Project	1000 words	20	N	Group
Viva Voce	15 minutes	20	N	Individual

Teaching Periods

Spring (2022)

Parramatta City - Macquarie St

Day

Subject Contact Saeed Afshar (https://directory.westernsydney.edu.au/search/name/Saeed Afshar/)

View timetable (https://classregistration.westernsydney.edu.au/even/timetable/?subject_code=COMP6001_22-SPR_PC_D#subjects)

Spring (2023)

Parramatta City - Macquarie St

On-site

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View timetable (https://classregistration.westernsydney.edu.au/odd/timetable/?subject_code=COMP6001_23-SPR_PC_1#subjects)