COS70008-Technology Innovation Project

Seminar 1 – Software Development/Cloud Computing/Information Systems

Semester 1 2025

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Acknowledgement of Country

We respectfully acknowledge the Wurundjeri People of the Kulin Nation, who are the Traditional Owners of the land on which Swinburne's Australian campuses are located in Melbourne's east and outer-east, and pay our respect to their Elders past, present and emerging.

We are honoured to recognise our connection to Wurundjeri Country, history, culture, and spirituality through these locations, and strive to ensure that we operate in a manner that respects and honours the Elders and Ancestors of these lands.

We also respectfully acknowledge Swinburne's Aboriginal and Torres Strait Islander staff, students, alumni, partners and visitors.

We also acknowledge and respect the Traditional Owners of lands across Australia, their Elders, Ancestors, cultures, and heritage, and recognise the continuing sovereignties of all Aboriginal and Torres Strait Islander Nations.

Overview

Unit information

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Problems of the domain

Innovation/application in the domain

How to contribute to innovation/application in the domain

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Unit Information

Unit convenor

Dr. Siva Chandrasekaran

Contact: schandrasekaran@swin.edu.au

Seminar/Workshop facilitator

Dr. Naveed Ali

Contact: nali1@swin.edu.au

Consultation: Monday 11.30-12.30 pm (online via MS-Teams)

Book time with Naveed Ali: COS70008 Consultation time

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Learning and Teaching Structure

Each student should attend the below to meet the standard of 25 CP unit

- Two one-hour seminars will be delivered online each week:
  - Seminar 1 is discipline-based, undertaken by the facilitator, who will cover the specialised knowledge and skills for different specialisation/disciplines.
  - Seminar 2, hosted by the professional learning facilitator, who will cover the general knowledge and professional skills that helps to undertake Team project.
- Two two-hour workshops will be delivered each week:
  - Workshop 1, hosted by the discipline-based facilitator, who will facilitate the technical project based on specialisation/discipline.
  - Workshop 2 hosted by the professional learning facilitator who will cover the fundamental practices for project delivery and management.

Non-scheduled learning events and activities, mainly the concrete development work for projects: approx. 240 hours for the whole semester

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Assessment Overview

Tasks and Details	Individual or Group	Weighting	Unit Learning Outcomes that this assessment task relates to	Assessment Due Date
Project brief	Individual	10%	1,2	21st Mar 23:59
Research paper review and Ethics practice	Individual	10%	1,2	28th Mar 23:59
Final project report	Individual	15%	3,4,5,6	30th May 23:59
Reflection report	Individual	15%	3,4,5,6	2nd June 23:59
Team Innovation Concept	Team	25%	3,4,5,6	11th Apr 23:59
Team Project Demonstration/Presentation	Team	25%	3,4,5,6	21st May 23:59

To pass this unit, you must achieve an overall mark for the unit of 50% or more and complete the project to an acceptable standard.

For further details, refer the course syllabus

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Important details about the use of Generative AI

Use of generative AI (genAI) in this unit	The valid use of genAI in this unit is as follows:
	• AI is used to complete certain elements of the task, with students providing **discussion or commentary** on the AI-generated content, images and tables.
	• Students should justify the use of AI content by providing enough explanation with proper references, citations.
	• Any assessments submitted with genAI content will not be assessed
	  ○ If there is no proper discussions or commentary provided on the AI-generated content
	  ○ If there is not enough explanation with proper references, citations within the generated content, images or tables.
	  ○ There will be percentage of penalty applied to the whole submission based on the percentage of genAI content.

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COS70008-Technology Innovation Project

- A project-based unit where you work in teams to innovate a solution to an industry-driven challenge.
- The project will have a substantial emphasis on innovation.
- Teams of students will have a staff member as a ‘facilitator’ whilst working on this project.
- This unit forms part of the student specialisation selection if their course undertaken has a choice of specialisation.

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- Submission Requirements

  All tasks are to be completed and managed within Canvas

- Extensions and Late Submission

  Unless an extension has been approved, late submissions will result in a penalty. You will be penalised 10% of your achieved mark for **each calendar day** the task is late, up to a maximum of **5 calendar days**. After 5 days, a zero result will be recorded.

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Project Description

Name of project

Developing a web-based system to analyse malicious attacks using a Hybrid Machine Learning model

Client details

IoT Training Academy, DFAT and Swinburne University

Dr Siva Chandrasekaran (Director of IoT Training Academy)

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Project introduction

- Despite advancements in network security, timely identification, detection and analysis of malicious activities is still a significant challenge for individuals and organisations.
- Plenty of useful data could be collated from diverse sources for various potential purposes such as identification, classification and visualisation to improve the efficiency and effectiveness of security protocols.
- This project is proposed to aim at developing a web-based system to analyse malicious attacks and predict the cyber physical systems behavioural analysis using a Hybrid Machine Learning model.

Problem statement/rationale

- Identify and explore various malicious attacks
- Explore publicly available datasets for malware detection
- Design and develop Hybrid machine learning models to identify and analyse malicious attacks.
- Explore and implement different Machine Learning techniques to predict the cyber physical systems behavioural analysis

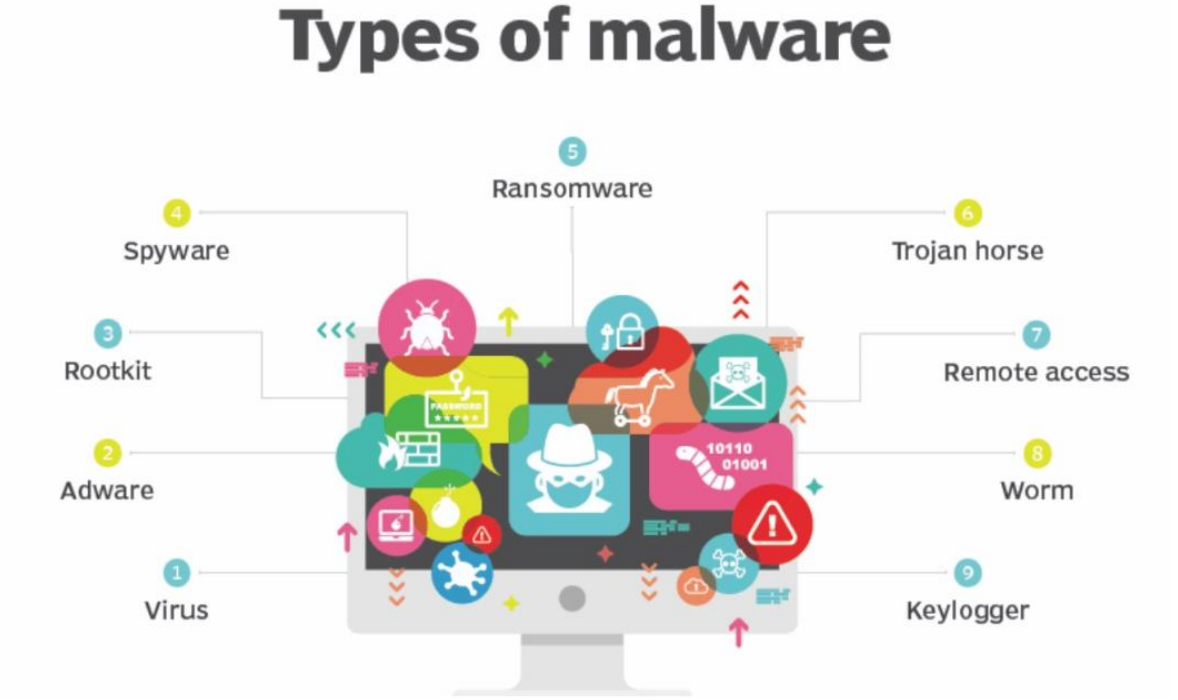
Project requirements

1. Identify and analyse relevant data sets.
2. Explore and develop a range of malware classification and analysis ML models.
3. Explore and implement different techniques to the cyber physical systems behavioural analysis
4. Build a web-based system to incorporate the above points (1-3).

For further details, refer Week 1 Software Development/Cloud Computing/Information Systems Project from Canvas.

Malware (definition and types)

- Cyber attackers create and use malwares to steal personal and professional details for different reasons.
- It's a malicious piece of code/software attached to emails, fake links and URLs.
- Once entered in the system, details available in the personal computers and networks could be misused to perform different deceitful activities.



https://imit.com/malware-attacks-types-and-how-to-combat-them/

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Problems of the domain

1. Current processes
   - How does the current processes work
   - Issues in processes
2. Legacy System
   - Are there similar solutions available, similarities and differences
3. Criteria for success
   - How success will be measured

https://stackoverflow.com/questions/2914822/questions-and-considerations-to-ask-client-for-designing-a-database

https://marutitech.com/5-challenges-in-web-application-development/

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Problems of the domain (Cont.)

4. Stakeholders and their involvement
   - Who are the key stakeholders involved and their expectations
   - Who will use the system

5. Adding data into system
   - How the data will be entered into the system

6. Data analysis
   - How data will be analysed
   - How predictions can be made
   - Which AI techniques can be used

Problems of the domain (Cont.)

7. Regulatory requirements
   - Any licenses / membership / subscription required

8. Data storage and accessibility
   - Which techniques and approaches would be used

9. Data provenance
   - Is it possible to locate and verify the source of data

10. Selecting the right tools and technology
    - Which programming languages, APIs, frameworks, and front-end and back-end tools could be used.

11. User experience

    How to make system more appealing and make navigation easy

12. Additional things to consider...
    - Who can access and manage the data
    - System downtime
    - Data privacy
    - How security will be implemented
    - How reliability can be guaranteed
    - Acceptable performance rate required
    - Extent of data scalability

13. Assumptions
    - Are there any assumptions made, if yes, then who made it
    - How does these assumptions affect the business

Innovation/Application in the Domain (Few ideas…)

AI-powered decision support systems

- Analysing data, gathered from multiple sources, to make informed decisions

AI chatbots

- Use of machine learning techniques
- Provide better customer service

Microservices and serverless architecture

- Microservices – design web application
- Serverless – to run web application

Web responsiveness

- How to achieve it?

https://blog.hubspot.com/website/web-development-trends

https://www.globalmediainsight.com/blog/web-development-trends/

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Push notifications

- Instant notifications to show messages and other relevant details

Cloud-based DBMS

- Database runs on a cloud computing platform
- Database access is provided by Database-as-a-service (DBaaS).
- Two deployment models: independently running databases, purchased access

Data Security and privacy

- Protecting data from malicious use or potential breach
- Software vs hardware-based security mechanisms

https://en.wikipedia.org/wiki/Cloud_database

How to Contribute to Innovation/Application in the Domain

Conduct research

Investigate different approaches, platforms and technologies

Generate multiple design ideas

Perform feasibility to select the most appropriate solution

Trust yourself

Maintain healthy communication

Don’t forget customer’s expectations

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Questions???

Thank you