Resources / Course Outline

Course Outline

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Course Details

Course Code	COMP9491
Course Title	Applied AI
Lecturers	Dr Yang Song (/users/z3526538) (LiC), Prof Maurice Pagnucco (/users/z9600614)
Contacts	Please email to **cs9491@cse.unsw.edu.au** for course related matters.
Classes	**Classes are scheduled as follows:** **11am-1pm Wednesday Online** **2-4pm Thursday Online**
Consultations	Please request a time by email.
Units of Credit	6
Course Website	http://www.cse.unsw.edu.au/~cs9491 (http://www.cse.unsw.edu.au/~cs9491)
Handbook Entry	https://www.handbook.unsw.edu.au/undergraduate/courses/2021/COMP9491 (https://www.handbook.unsw.edu.au/undergraduate/courses/2021/COMP9491) https://www.handbook.unsw.edu.au/postgraduate/courses/2021/COMP9491 (https://www.handbook.unsw.edu.au/postgraduate/courses/2021/COMP9491)

Course Summary

This course presents some advanced topics in various aspects of artificial intelligence such as computer vision, speech and language processing, deep learning, and knowledge representation and reasoning. The course aims to integrate these various aspects of AI and present case studies where such integration of different methodologies delivers interesting applications. Project development is the major component of this

course, to develop a solution to a practical or industry-based problem that requires an integration of more than one type of AI techniques ranging from symbolic AI (e.g. knowledge representation and reasoning) to deep learning, with example applications in computer vision, speech and language processing, etc. Assessment is based on group project development.

Required Knowledge

Students are expected to have taken COMP3411 or COMP9414: Artificial Intelligence or COMP9814: Extended Artificial Intelligence; and have taken at least two of other courses in the AI stream: COMP4418: Knowledge Representation and Reasoning, COMP9417: Machine Learning and Data Mining, COMP9444: Neural Networks and Deep Learning, and COMP9517: Computer Vision. A WAM >= 70 is also required. The handbook entry (undergraduate) (https://www.handbook.unsw.edu.au/undergraduate/courses/2021/COMP9491) and handbook entry (postgraduate) (https://www.handbook.unsw.edu.au/postgraduate/courses/2021/COMP9491) require these as pre-requisites for this course.

Student Learning Outcomes

This course aims to introduce students to the advanced concepts in various application domains of artificial intelligence, and focus on selected topics such as computer vision, language processing, and knowledge representation and reasoning. This course also gives the students an opportunity to develop a solution to a practical or industry-based problem that requires method developments by integrating these various aspects of AI.

As a result of this course, students will:

- analyse a complex practical problem and develop a solution that exploits and integrates the advantages of several advanced AI techniques;
- develop an implementation of the solution;
- analyse and evaluate the solution quantitatively and qualitatively providing a clear understanding of how the solution progresses the current state-of-the-art; and,
- explain the problem, solution and implementation.

Teaching Rationale and Strategies

The principal mode of teaching includes lecturing and project consultation. Lectures provide a means to present high-level overviews as well as in-depth presentations of selected topics. Project consultation sessions provide detailed guidance to help group project development. In summary, the course consists of:

- Lectures: To learn about concepts and example applications.
- Project consultations: To seek guidance from lecturers and tutors on the project development.
- Group Project: To learn working in a team and building a practical application with a significant research component.

Assessment

All assignments are group-based (including individual components for assessments). Project groups are to be formed by Week 2.

There will be a recommended list of projects to choose from. Students can also define their own projects. In both cases, a project proposal will need to be submitted and approved by the lecturers.

Item	Topics	Due	Marks
Assignment 1	Project proposal (report)	Week 4	10%

Assignment 2	Presentation of literature review	Week 5	20%
Assignment 3	Project demo	Week 10	30%
Assignment 4	Project report	Week 11	40%

Course Schedule

Week	Lectures, Project consultations & Presentations	Instructors
1	• (Wed - lecture) Introduction • (Thu - lecture) Project topics	• Yang Song, Maurice Pagnucco • Yang Song
2	• (Wed - lecture) Advanced deep learning topics • (Thu - lecture) Knowledge and reasoning	• Yang Song • Maurice Pagnucco
3	• (Wed - lecture) Advanced deep learning topics • (Thu - lecture) Knowledge and reasoning	• Yang Song • Maurice Pagnucco
4	• (Wed - lecture) Hybrid models • (Thu) Project consultations	• Yang Song • Yang Song, Maurice Pagnucco
5	• (Wed) Presentations & Feedback on proposal • (Thu) Presentations & Feedback on proposal	• Yang Song, Maurice Pagnucco • Yang Song, Maurice Pagnucco
6	• Flexibility week	
7	• (Wed) Project consultations • (Thu) Project consultations	• Yang Song, Maurice Pagnucco • Tutors
8	• (Wed) Project consultations • (Thu) Project consultations	• Yang Song, Maurice Pagnucco • Tutors
9	• (Wed) Project consultations • (Thu) Project consultations	• Tutors • Tutors
10	• (Wed) Project demo • (Thu) Project demo	• Yang Song, Maurice Pagnucco • Yang Song, Maurice Pagnucco

Resources for Students

This course does not have a prescribed textbook. Notes and/or slides on each topic will be made available on the class web page. References to the literature may be provided in lectures as relevant to the topic at hand. The following resources may be useful in gaining a more general understanding of various aspects of AI for and beyond this course.

1. Artificial Intelligence: A Modern Approach
    - Stuart Russell and Peter Norvig, Artificial Intelligence: A Modern Approach, Prentice Hall, 2020.
    - http://aima.cs.berkeley.edu/ (http://aima.cs.berkeley.edu/) .

2. General Knowledge Representation and Reasoning
    - Ronald J. Brachman and Hector J. Levesque. Knowledge Representation and Reasoning, Morgan Kaufmann, 2004.
3. Semantic Web
    - Grigoris Antoniou and Frank van Harmelen, A Semantic Web Primer, MIT Press, 2008.
4. Answer Set Programming
    - Bruce Porter, Vladimir Lifschitz, Frank Van Harmelen, Handbook of Knowledge Representation, Elsevier, 2007.
    - Potassco User Guide (http://sourceforge.net/projects/potassco/files/potassco_guide/2010-10-04/guide.pdf/download)
5. Deep Learning
    - Ian Goodfellow, Yoshua Bengio and Aaron Courville, Deep Learning, MIT Press, 2016.
    - http://www.deeplearningbook.org (http://www.deeplearningbook.org) .
6. Computer Vision Foundation Open Access
    - https://openaccess.thecvf.com/menu (https://openaccess.thecvf.com/menu)
7. Speech and Language Processing
    - Dan Jurafsky and James H. Martin, Speech and Language Processing, Prentice Hall, 2019.
    - https://web.stanford.edu/~jurafsky/slp3/ (https://web.stanford.edu/~jurafsky/slp3/) .

Student Conduct

The **Student Code of Conduct** (Information (https://student.unsw.edu.au/conduct) , Policy (https://www.gs.unsw.edu.au/policy/documents/studentcodepolicy.pdf)) sets out what the University expects from students as members of the UNSW community. As well as the learning, teaching and research environment; the University aims to provide an environment that enables students to achieve their full potential and to provide an experience consistent with the University's values and guiding principles. A condition of enrolment is that students *inform themselves* of the University's rules and policies affecting them, and conduct themselves accordingly.

In particular, students have the responsibility to observe standards of equity and respect in dealing with every member of the University community. This applies to all activities on UNSW premises and all external activities related to study and research. This includes behaviour in person as well as behaviour on social media, for example Facebook groups set up for the purpose of discussing UNSW courses or course work. Behaviour that is considered in breach of the Student Code Policy as discriminatory, sexually inappropriate, bullying, harassing, invading another's privacy or causing any person to fear for their personal safety is serious misconduct and can lead to severe penalties, including suspension or exclusion from UNSW.

If you have any concerns, you may raise them with your lecturer, or approach the School Ethics Officer (mailto:ethics-officer@cse.unsw.edu.au) , Grievance Officer (mailto:grievance-officer@cse.unsw.edu.au) , or one of the student representatives (mailto:stureps@cse.unsw.edu.au) .

Plagiarism is defined as (https://student.unsw.edu.au/plagiarism) using the words or ideas of others and presenting them as your own. UNSW and CSE treat plagiarism as academic misconduct, which means that it carries penalties as severe as being excluded from further study at UNSW. There are several on-line sources to help you understand what plagiarism is and how it is dealt with at UNSW:

- Plagiarism and Academic Integrity (https://student.unsw.edu.au/plagiarism)
- UNSW Plagiarism Procedure (https://www.gs.unsw.edu.au/policy/documents/plagiarismprocedure.pdf)

Make sure that you read and understand these. Ignorance is not accepted as an excuse for plagiarism. In particular, you are also responsible that your assignment files are not accessible by anyone but you by setting the correct permissions in your CSE directory and code repository, if using. Note also that plagiarism includes paying or asking another person to do a piece of work for you and then submitting it as your own work.

UNSW has an ongoing commitment to fostering a culture of learning informed by academic integrity. All UNSW staff and students have a responsibility to adhere to this principle of academic integrity. Plagiarism undermines academic integrity and is not tolerated at UNSW. Plagiarism at UNSW is defined as using the words or ideas of others and passing them off as your own.

If you haven't done so yet, please take the time to read the full text of

- UNSW's policy regarding academic honesty and plagiarism (https://student.unsw.edu.au/plagiarism)

The pages below describe the policies and procedures in more detail:

- Student Code Policy (https://www.gs.unsw.edu.au/policy/documents/studentcodepolicy.pdf)
- Student Misconduct Procedure (https://www.gs.unsw.edu.au/policy/documents/studentmisconductprocedures.pdf)
- Plagiarism Policy Statement (https://www.gs.unsw.edu.au/policy/documents/plagiarismpolicy.pdf)
- Plagiarism Procedure (https://www.gs.unsw.edu.au/policy/documents/plagiarismprocedure.pdf)

You should also read the following page which describes your rights and responsibilities in the CSE context:

- Essential Advice for CSE Students (https://www.engineering.unsw.edu.au/computer-science-engineering/about-us/organisational-structure/student-services/policies/essential-advice-for-cse-students)

Course Evaluation and Development

21T2 is the first offering of this course and student feedback is highly valued. Students are encouraged to provide informal feedback during the session, and to let the Lecturer-in-Charge know of any problems as soon as they arise. Student feedback will also be obtained by electronic survey at the end of the course through myExperience (https://myexperience.unsw.edu.au/) .

Resource created 7 months ago (Wednesday 28 April 2021, 06:26:06 PM), last modified 4 months ago (Monday 19 July 2021, 11:51:21 AM).

Comments

(/COMP9491/21T2/forums/search?forum_choice=resource/59976)

(/COMP9491/21T2/forums/resource/59976)



Yuan Tao (/users/z5001734) 5 months ago (Mon May 31 2021 08:45:57 GMT+1000 (Australian Eastern Standard Time))

How much this course requires offline interactions like group discussion, consultation, presentation etc.? As a working guy not sure if I have time for this course.



Yang Song (/users/z3526538) 5 months ago (Mon May 31 2021 10:26:59 GMT+1000 (Australian Eastern Standard Time))

Consultation and presentation are all scheduled during timetabled lecture hours. Group discussion will depend on how your group would like to work.