**FIT3094
AI for gaming**

Unit guide

Semester 1, 2009

Table of Contents

FIT3094 AI for gaming - Semester 1, 2009

Unit leader :

Alan Dorin

Lecturer(s) :

Caulfield

- as above

Tutors(s) :

Caulfield

- Minh Ngoc Dinh

Introduction

Welcome to FIT3094, AI In Gaming, a unit about Artificial Intelligence applications in Computer Games. Please check the official Monash Handbook for details regarding degrees, unit points, pre-requisites etc.

Unit synopsis

ASCED Discipline Group classification: 020103 Programming.

This unit will introduce Artificial Intelligence (AI) techniques that can be used in games development. General capabilities of AI technology, behaviours/circumstances that need to be simulated/learned/reproduced by the smart non-player characters/environments in smart games, AI techniques (such as evolutionary and neural computations) used in the development of smart games will be discussed at length. This unit will build upon previous programming skills, and provide a strong grounding for further study in this area, especially related to games engine development. The unit will examine intelligent game creation using C++.

Learning outcomes

At the end of this unit, students should be able to select and use various Artificial Intelligence techniques to build intelligent games.

Workload

Every week you will need to attend:

- a two hour lecture
- a two hour laboratory session

You will also need to spend 2-3 hours of personal study per one hour of contact time in order to satisfy the reading and assignment expectations.

Unit relationships

Prerequisites

Before attempting this unit you must have satisfactorily completed FIT2049 Games Programming using C++ or equivalent. You should have knowledge of C++ programming skills as applied to games development. A basic knowledge of working with a Unix-based operating system is required. It is recommended that students who do not have this experience pick up a basic book on Unix prior to course commencement and learn the following skills:

- Working with files and directories (e.g. cd, mkdir, ls, basic understanding of vi)
- Compiling and executing C/C++ code (e.g. from the command line and with a basic Makefile)

Effective written and spoken English communication skills are required. If your communication skills in English are not of a high standard, you must seek assistance from language and learning officers (access via the Monash library). Students will be assessed on their ability to write in English.

All students must have paid their university fees as required. Students who have not done this on time will not be able to complete the assessment / hurdle requirements and will therefore not pass the course. This is *university* policy, the lecturer cannot make exceptions for students who fail to pay their fees.

Relationships

FIT3094 is a core unit in the Bachelor of ITS degree, Games Major.

The unit may also be taken as an elective for some other degrees within the faculty. Consult your course information guide to see if the unit is a valid elective in your degree.

Continuous improvement

Monash is committed to 'Excellence in education' (Monash Directions 2025 - http://www.monash.edu.au/about/monash-directions/directions.html) and strives for the highest possible quality in teaching and learning.

To monitor how successful we are in providing quality teaching and learning Monash regularly seeks feedback from students, employers and staff. One of the key formal ways students have to provide feedback is through Unit Evaluation Surveys. The University's Unit Evaluation policy (http://www.policy.monash.edu/policy-bank/academic/education/quality/unit-evaluation-policy.html) requires that every unit offered is evaluated each year. Students are strongly encouraged to complete the surveys as they are an important avenue for students to "have their say". The feedback is anonymous and provides the Faculty with evidence of aspects that students are satisfied and areas for improvement.

Faculties have the option of administering the Unit Evaluation survey online through the my.monash portal or in class. Lecturers will inform students of the method being used for this unit towards the end of the semester.

FIT3094 AI for gaming - Semester 1, 2009

Student Evaluations

If you wish to view how previous students rated this unit, please go to
http://www.adm.monash.edu.au/cheq/evaluations/unit-evaluations/

Improvements to this unit

This is a new unit. It has not been run before. There is nothing to improve upon.

Unit staff - contact details

Unit leader

Dr Alan Dorin
Senior Lecturer
Phone +61 3 990 53576
Fax +61 3 990 31077
Contact hours : appointment via email, also 4-5pm Fridays (after the lecture)

Lecturer(s) :

as above

Tutor(s) :

Minh Ngoc Dinh

Teaching and learning method

Students will need to:

- attend lectures, listen attentively and respond in class to questions from the lecturer and their peers.
- actively participate in laboratory classes, completing practical exercises and participating in discussions with the tutors.
- complete homework study tasks, readings set for each week and practical tasks.

Tutorial allocation

On-campus students should register for tutorials/laboratories using Allocate+.

Communication, participation and feedback

Monash aims to provide a learning environment in which students receive a range of ongoing feedback throughout their studies. You will receive feedback on your work and progress in this unit. This may take the form of group feedback, individual feedback, peer feedback, self-comparison, verbal and written feedback, discussions (on line and in class) as well as more formal feedback related to assignment marks and grades. You are encouraged to draw on a variety of feedback to enhance your learning.

It is essential that you take action immediately if you realise that you have a problem that is affecting your study. Semesters are short, so we can help you best if you let us know as soon as problems arise. Regardless of whether the problem is related directly to your progress in the unit, if it is likely to interfere with your progress you should discuss it with your lecturer or a Community Service counsellor as soon as possible.

Unit Schedule

Week	Topic	Key dates
1	Introduction to Artificial Intelligence (AI) and Artificial Life (AL)	
2	A brief history of AI and AL in Computer Games	
3	Finite State Automata	
4	Expert and Rule-based Systems	
5	Search Algorithms	
6	Mid-course revision	Assignment 1 due
	Mid semester break	
7	Artificial Evolution	
8	Steering Algorithms	
9	Coherent Group Behaviour	
10	Plant Models	
11	Intelligent Environment Generation	
12	Virtual Ecosystems	Assignment 2 due
13	Revision	

Unit Resources

Prescribed text(s) and readings

Textbook: no prescribed text is required. Recommended reading lists will appear each week with the lecture notes.

Some useful web resources:

www.ai-depot.com www.gameai.com www.generation5.org www.ai-junkie.com www.gamedev.net www.google.com

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Required software and/or hardware

On-campus students may use the software which is installed in the computing labs. Information about computer use for students is available from the ITS Student Resource Guide in the Monash University Handbook.

You will need access to:

- Current C++ compiler (e.g. GNU)
- Current OpenGL and GLUT libraries
- Unix-based operating system (e.g. Linux, BSD, MacOS X)

Equipment and consumables required or provided

Students studying off-campus are required to have the minimum system configuration specified by the Faculty as a condition of accepting admission, and regular Internet access.On-campus students, and those studying at supported study locations may use the facilities available in the computing labs.Information about computer use for students is available from the ITS Student Resource Guide in the Monash University Handbook.You will need to allocate up to **6** hours per week for use of a computer.

Study resources

Study resources we will provide for your study are:

Online lecture notes, reading lists, practical exercises, assignment specifications practice examination paper

Library access

The Monash University Library site contains details about borrowing rights and catalogue searching. To learn more about the library and the various resources available, please go to http://www.lib.monash.edu.au.

The Educational Library and Media Resources (LMR) is also a very resourceful place to visit at http://www.education.monash.edu.au/library/

Monash University Studies Online (MUSO)

All unit and lecture materials are available through MUSO (Monash University Studies Online). Blackboard is the primary application used to deliver your unit resources. Some units will be piloted in Moodle. If your unit is piloted in Moodle, you will see a link from your Blackboard unit to Moodle (http://moodle.monash.edu.au) and can bookmark this link to access directly. In Moodle, from the Faculty of Information Technology category, click on the link for your unit.

You can access MUSO and Blackboard via the portal: http://my.monash.edu.au

Click on the Study and enrolment tab, then Blackboard under the MUSO learning systems.

In order for your Blackboard unit(s) to function correctly, your computer needs to be correctly configured.

For example:

- Blackboard supported browser
- Supported Java runtime environment

For more information, please visit: http://www.monash.edu.au/muso/support/students/downloadables-student.html

You can contact the MUSO Support by phone : (+61 3) 9903 1268

For further contact information including operational hours, please visit: http://www.monash.edu.au/muso/support/students/contact.html

Further information can be obtained from the MUSO support site: http://www.monash.edu.au/muso/support/index.html

Assessment

Unit assessment policy

To pass a unit which includes an examination as part of the assessment a student must obtain:

- a pass or better in the unit's examination
  and
- a pass or better in the unit's total non-examination assessment
  and
- an overall unit mark of 50% or more

Ifa student does not achieve a pass or better in the unit examination or the unit non-examination total assessment, and the total mark for the unit is greater than 44% then a mark of 44-N will be recorded for the unit.

Assignment tasks

- ### Assignment Task

  Title : Game Controller

  Description :

  Write an intelligent game controller for a non-player character. A detailed document describing what is required will be distributed to students via the online materials.
  Weighting : 20%

  Criteria for assessment :

  Please consult the detailed sheet.
  Due date : End of week 6, 6pm Thursday 9th April
- ### Assignment Task

  Title :

  Description :

  Write software to generate emergent group behaviour of non-player characters. A detailed document describing what is required will be distributed to students via the online materials.
  Weighting : 20%

  Criteria for assessment :

  Please consult the detailed sheet.
  Due date : End of week 12, 6pm Friday 29 May

FIT3094 AI for gaming - Semester 1, 2009

Examinations

- **Examination 1**

  Weighting : 60%

  Length : 2 hours

  Type (open/closed book) : Closed book

Assignment submission

Assignments will be submitted electronically using an online system written especially for the purpose. This will be available from the unit online site. The due date is the date by which the submission must be received.

Assignment coversheets

Assignments are submitted electronically using an online system written especially for the purpose. Cover sheets are not required.

University and Faculty policy on assessment

Due dates and extensions

The due dates for the submission of assignments are given in the previous section. Please make every effort to submit work by the due dates. It is your responsibility to structure your study program around assignment deadlines, family, work and other commitments. Factors such as normal work pressures, vacations, etc. are seldom regarded as appropriate reasons for granting extensions. Students are advised to NOT assume that granting of an extension is a matter of course.

Requests for extensions must be made to the unit lecturer at least two days before the due date. You will be asked to forward original medical certificates in cases of illness, and may be asked to provide other forms of documentation where necessary.

Late assignment

Assignments received after the due date will be subject to a penalty of 10% of the total possible mark per 24 hours late including weekends and public holidays. Assignments received later than one week after the due date will not normally be accepted.

Return dates

Students can expect assignments to be returned within two weeks of the submission date or after receipt, whichever is later.

Assessment for the unit as a whole is in accordance with the provisions of the Monash University Education Policy at http://www.policy.monash.edu/policy-bank/academic/education/assessment/

We will aim to have assignment results made available to you within two weeks after assignment receipt.

Plagiarism, cheating and collusion

Plagiarism and cheating are regarded as very serious offences. In cases where cheating has been confirmed, students have been severely penalised, from losing all marks for an assignment, to facing disciplinary action at the Faculty level. While we would wish that all our students adhere to sound ethical conduct and honesty, I will ask you to acquaint yourself with the University Plagiarism policy and procedure (http://www.policy.monash.edu/policy-bank/academic/education/conduct/plagiarism-procedures.html) which applies to students detected plagiarising.

In this University, cheating means seeking to obtain an unfair advantage in any examination or any other written or practical work to be submitted or completed by a student for assessment. It includes the use, or attempted use, of any means to gain an unfair advantage for any assessable work in the unit, where the means is contrary to the instructions for such work.

When you submit an individual assessment item, such as a program, a report, an essay, assignment or other piece of work, under your name you are understood to be stating that this is your own work. If a submission is identical with, or similar to, someone else's work, an assumption of cheating may arise. If you are planning on working with another student, it is acceptable to undertake research together, and discuss problems, but it is not acceptable to jointly develop or share solutions unless this is specified by your lecturer.

Intentionally providing students with your solutions to assignments is classified as "assisting to cheat" and students who do this may be subject to disciplinary action. You should take reasonable care that your solution is not accidentally or deliberately obtained by other students. For example, do not leave copies of your work in progress on the hard drives of shared computers, and do not show your work to other students. If you believe this may have happened, please be sure to contact your lecturer as soon as possible.

Cheating also includes taking into an examination any material contrary to the regulations, including any bilingual dictionary, whether or not with the intention of using it to obtain an advantage.

Plagiarism involves the false representation of another person's ideas, or findings, as your own by either copying material or paraphrasing without citing sources. It is both professional and ethical to reference clearly the ideas and information that you have used from another writer. If the source is not identified, then you have plagiarised work of the other author. Plagiarism is a form of dishonesty that is insulting to the reader and grossly unfair to your student colleagues.

Register of counselling about plagiarism

The university requires faculties to keep a simple and confidential register to record counselling to students about plagiarism (e.g. warnings). The register is accessible to Associate Deans Teaching (or nominees) and, where requested, students concerned have access to their own details in the register. The register is to serve as a record of counselling about the nature of plagiarism, not as a record of allegations; and no provision of appeals in relation to the register is necessary or applicable.

Non-discriminatory language

The Faculty of Information Technology is committed to the use of non-discriminatory language in all forms of communication. Discriminatory language is that which refers in abusive terms to gender, race, age, sexual orientation, citizenship or nationality, ethnic or language background, physical or mental ability, or political or religious views, or which stereotypes groups in an adverse manner. This is not meant to preclude or inhibit legitimate academic debate on any issue; however, the language used in such debate should be non-discriminatory and sensitive to these matters. It is important to avoid the use of discriminatory language in your communications and written work. The most common form of discriminatory language in academic work tends to be in the area of gender inclusiveness. You are, therefore, requested to check for this and to ensure your work and communications

are non-discriminatory in all respects.

Students with disabilities

Students with disabilities that may disadvantage them in assessment should seek advice from one of the following before completing assessment tasks and examinations:

- Faculty of Information Technology Student Service staff, and / or
- your Unit Coordinator, or
- Disabilities Liaison Unit

Deferred assessment and special consideration

Deferred assessment (not to be confused with an extension for submission of an assignment) may be granted in cases of extenuating personal circumstances such as serious personal illness or bereavement. Information and forms for Special Consideration and deferred assessment applications are available at http://www.monash.edu.au/exams/special-consideration.html. Contact the Faculty's Student Services staff at your campus for further information and advice.