

Liverpool John Moores University

Title: ADVANCED ARTIFICIAL INTELLIGENCE FOR GAMES
Status: Definitive
Code: **7047COMP** (103306)
Version Start Date: 01-08-2011

Owning School/Faculty: Computing and Mathematical Sciences
Teaching School/Faculty: Computing and Mathematical Sciences

Team	Leader
Yuanyuan Shen	Y

Academic Level: FHEQ7
Credit Value: 15.00
Total Delivered Hours: 36.00
Total Learning Hours: 150
Private Study: 114

Delivery Options

Course typically offered: Semester 2

Component	Contact Hours
Lecture	12.000
Practical	24.000

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Practice	AS1	A practical design/implementation by groupwork.	60.0	
Report	AS2	An Individual analytical essay requiring a literature survey.	40.0	

Aims

*To provide an advanced presentation to Artificial Intelligence and practical experience of AI techniques.
To develop understanding of AI and relations to Artificial Intelligence for Game.*

Learning Outcomes

After completing the module the student should be able to:

- 1 Critically evaluate the relationship between Artificial Intelligence and Artificial Intelligence for Games.
- 2 Design and implement a Game Artificial Intelligence technique using an appropriate middleware or programming language.
- 3 Explain a range of applications of Artificial Intelligence in games.
- 4 Review and evaluate alternative solutions for Artificial Intelligence in games.
- 5 Discuss the problems involved in using Artificial Intelligence technology in games for: e.g. path planning, knowledge management, team communication, and learning.

Learning Outcomes of Assessments

The assessment item list is assessed via the learning outcomes listed:

Design/implementation	1	2	3	5
Analytical essay	4			

Outline Syllabus

History of AI and Turing Test

Search Techniques

Minimax and Alpha-Beta algorithms

Expert Systems: Model and Theory

Multi-Agent Systems: Model and Theory

Evaluation of Game AI in commercial Games: Case Studies, for e.g. Rome Total War, Neverwinter nights, Baldur Gates, World of Warcraft, Creatures, Black and White, Fable, etc...

Game Genres and Artificial Intelligence Techniques. Selected topics from the following:

-FSM: Evaluation and Application to FPS, for e.g. Quake

-Logic Models: Boolean, Predicate, Fuzzy Logic

-Rules Based Systems and Application in Games

-Path Finding and Application in Games

-Multi-agent systems and Application in Games

-Classifiers and Application in Games

-Neural Network and Application in Games

-Genetic Algorithms and Application in Games

-Believable Characters in Games

-Game AI Middleware, and Hardware

Learning Activities

Lectures, tutorials, labs and reading.

References

Course Material	Book
Author	Ahlquist, J.
Publishing Year	2007
Title	Game Development Essentials: Game Artificial Intelligence
Subtitle	
Edition	1 Pap/Cdr
Publisher	
ISBN	1418038571

Course Material	Book
Author	Furnkranz, J., Miroslav, K.
Publishing Year	2002
Title	Machines That Learn to Play Games (Advances in Computation: Theory & Practice)
Subtitle	
Edition	
Publisher	Nova Biomedical
ISBN	1590330218

Course Material	Book
Author	Schwab, B.
Publishing Year	2004
Title	Game Engine Programming
Subtitle	
Edition	
Publisher	Charles River Media
ISBN	1-58450-344-2

Course Material	Book
Author	Buckland, M.
Publishing Year	2004
Title	Programming Game AI by Example
Subtitle	
Edition	
Publisher	Wordware Publishing, Inc
ISBN	1-55622-078-2

Course Material	Book
Author	Deloura, M. & Rabin, S.
Publishing Year	2002
Title	AI Game Programming Wisdom
Subtitle	
Edition	
Publisher	Charles River Media
ISBN	1-58450-077-8

Course Material	Book
Author	Dorfman, L. & Ghosh, N.
Publishing Year	1996
Title	Developing Games that Learn
Subtitle	
Edition	
Publisher	Manning Publications
ISBN	0-13-569617-8

Course Material	Book
Author	Funge, J.
Publishing Year	1999
Title	AI for Computer Games and Animation: A Cognitive Modelling Approach
Subtitle	
Edition	
Publisher	AK Peters, Ltd.
ISBN	1-568-81103-9

Course Material	Book
Author	Russel & Norvig
Publishing Year	2003
Title	'Artificial Intelligence :A Modern Approach
Subtitle	
Edition	2nd
Publisher	Prentice Hall
ISBN	

Course Material	Book
Author	Muller, Woodridge & Jennings
Publishing Year	1997
Title	Intelligent Agents III: Agent Theories Architecture & Languages
Subtitle	
Edition	
Publisher	Springer Verlag
ISBN	

Notes

The module aims at providing an advanced presentation to Artificial Intelligence and a practical experience of AI techniques for games. Part of the assessment is achieved within group-works, and the students will be assessed individually via peer-assessment and individual conclusion in the report.