

804245 - IAVJ - Artificial Intelligency

Coordinating unit:	804 - CITM - Image Processing and Multimedia Technology Centre		
Teaching unit:	804 - CITM - Image Processing and Multimedia Technology Centre		
Academic year:	2019		
Degree:	BACHELOR'S DEGREE IN VIDEO GAME DESIGN AND DEVELOPMENT (Syllabus 2014). (Teaching unit Compulsory) BACHELOR'S DEGREE IN VIDEO GAME DESIGN AND DEVELOPMENT (Syllabus 2014). (Teaching unit Compulsory)		
ECTS credits:	6	Teaching languages:	Catalan, Spanish, English

Teaching staff

Coordinator:	Garrigó Invers, Marc
Others:	Kanaan Izquierdo, Samir Escudero Bakx, Gerard

Prior skills

Knowledge about graf theory and coding in C++

Teaching methodology

During each class, the lecturer will first show the students the theory behind the problem that needs solving. Together with the students, the lecturer will explore the different solutions that exist in the present that solve and simplify the complexities of real time applications like videogames.

Learning objectives of the subject

- Understand the basis of classic Artificial Intelligence areas like genetic algorithms and neural networks.
- Good knowledge of the most common AI techniques used in video games like hierarchical state machines and rule systems.
- Get familiar with advanced navigation tools like sectorization.
- Explore the newest methods in video game AI like Behavior Trees and Planners.

Study load

Total learning time: 150h	Hours large group:	18h	12.00%
	Hours medium group:	30h	20.00%
	Hours small group:	0h	0.00%
	Guided activities:	12h	8.00%
	Self study:	90h	60.00%

804245 - IAVJ - Artificial Intelligency

Content

<p>AI Agent navigation</p>	<p>Learning time: 20h Theory classes: 8h Self study : 12h</p>
<p>Description: Kinetic movement Map Markup Steering behaviors Coordinating movement for groups</p>	
<p>Pathfinding systems</p>	<p>Learning time: 20h Theory classes: 8h Self study : 12h</p>
<p>Description: The base of Dijkstra, A* Navigation Mesh and sectorization Path beautification Common improvements on A*</p>	
<p>Perception Systems</p>	<p>Learning time: 10h Theory classes: 4h Self study : 6h</p>
<p>Description: Simulating senses Level Markup techniques</p>	
<p>Decision making for videogames</p>	<p>Learning time: 15h Theory classes: 6h Self study : 9h</p>
<p>Description: Hierarchical state machines Rule systems Fuzzy logic Scripting</p>	

804245 - IAVJ - Artificial Intelligency

Advanced systems for decision making	Learning time: 15h Theory classes: 6h Self study : 9h
Description: Sharing information with Blackboards SmartObjects Behavior Trees Planners	
Tactic and strategic systems	Learning time: 15h Theory classes: 6h Self study : 9h
Description: Code Structure Waypoints Markup Tactical Pathfinding	
Learning systems	Learning time: 15h Theory classes: 9h Self study : 6h
Description: Reinforced Learning Neural Networks Genetic Algorithms	
AI game design	Learning time: 20h Theory classes: 8h Self study : 12h
Description: Shooters and 3rd person Driving RTS RPGs & Turn Based	

804245 - IAVJ - Artificial Intelligency

Qualification system

Final Exam 40% about all the knowledge of the entire subject.

First assignment about steering behaviors and pathfinding with a weight of 15%.

Second assignment about decision taking using behavior trees with a weight of 15%.

Third assignment about a playable demo that uses all the IA technologies explained with a weight of 20%.

A revaluation exam with the same weight as the final exam (40%).

Attitude and class participation will weight 10% of the final grade.

Bibliography

Basic:

Millington, I.; Funge, J.D. Artificial intelligence for games [on line]. 2nd ed. Burlington, MA: Morgan Kaufmann/Elsevier, 2009 [Consultation: 19/12/2016]. Available on: <<http://www.sciencedirect.com/science/book/9780123747310>>. ISBN 9780123747310.

Buckland, M. Programming game AI by example. Plano, Texas: Wordware, cop. 2005. ISBN 9781556220784.