University of Applied Sciences Dresden
Faculty Informatics/Mathematics

Course Description

Virtual Intelligent Environments

Contents:

Students get to know a practical technology for the development of virtual intelligent environments combining methods from the computer science fields computer graphics (CG), virtual reality (VR), artificial intelligence (AI), and web technology (WT) and applying them to several human environmental fields.
The main topics of the course are:
- modelling of spatial worlds,
- animation of temporal processes,
- reproduction of regularities and relationships,
- involvement of multimedia contents,
- controlling of user interactions,
- definition of intelligent behaviours,
- creation of knowledge bases,
- activation of inference processes,
- generation of local and distributed presentations,
- treatment of environmental applications.

The software basis for the course consists of the CG and VR specification languages VRML, X3D, and X3DOM as well as the AI programming languages LISP, CLIPS and PROLOG combined with the WT programming language JavaScript.
Theoretical lectures provide students with the basic conceptual knowledge of the technology. The practical trainings conduce to the development of related skills in the computer labs.
At the end of the course, students master the covered computer-based technology from a practical point of view. They are able to transfer real or artificial application scenarios into simple computer-based virtual intelligent environments and utilize them for visualisation and presentation, partly also for analysis and simulation purposes.

Target audience: Studium Integrale
Extent: Weekly lecture hours 2/0/2
Premise: Basics in informatics, English language
Certificate: Alternative Assessment APL (BGA)

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Course:

Week:	Lecture:	Practical:
1	Virtual Intelligent Environments	Virtual Intelligent Environments
2	VRML: Language and Environment	VRML: Language and Environment
3	VRML: Nodes and Geometry	VRML: Nodes and Geometry
4	VRML: Material and Light	VRML: Material and Light
5	VRML: Animation and Interaction	VRML: Animation and Interaction
6	VRML: Networking and Programming	VRML: Networking and Programming
7	VRML: Behaviour and Intelligence	VRML: Behaviour and Intelligence
8	LISP: Language and Environment	LISP: Language and Environment
9	LISP: Data and Program Structure	LISP: Data and Program Structure
10	LISP: Knowledge Representation	LISP: Knowledge Representation
11	LISP: Problem Solving	LISP: Problem Solving
12	CLIPS: Rule Modelling	CLIPS: Rule Modelling
13	PROLOG: Logics Modelling	PROLOG: Logics Modelling
14	Virtual Intelligent Integrations	Virtual Intelligent Integrations
15	Virtual Intelligent Applications	Virtual Intelligent Applications

Literature:

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- Kloss, J.; Rockwell, R.; Szabo, K.; Duchrow, M.: *VRML97: Der neue Standard für interaktive 3D-Welten im World Wide Web*. Addison-Wesley, Bonn, 1998
- Daly, L.; Brutzman, D.: *X3D - Extensible 3D Graphics for Web Authors*. Elsevier, London, 2007
- VRML97: *The Virtual Reality Modelling Language*, VRML97. International Standard ISO/IEC 14772-1:1997 and ISO/IEC 14772-2:2004
- *Extensible 3D (X3D) encodings* ISO/IEC FDIS 19776-2. Web3D Consortium, Inc., 2004
- Quigley, E.: *JavaScript*. Pearson Education, Upper Saddle River, 2004
- Harper, J.: *Mastering Autodesk 3ds Max 2013*. Autodesk Official Press, 2012
- Russell, S.; Norvig, P.: *Artificial Intelligence*. Pearson Education, München, 2004
- Beierle, Kern-Isberner: *Methoden wissensbasierter Systeme*, Vieweg, Wiesbaden, 2006
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- Steel, G. L.: *Common Lisp the Language*. Digital Press, 1990
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- gprolog.org; staff.fnwi.uva.nl/u.endriss/teaching/prolog/prolog.pdf
- Web3D-Consortium: www.web3d.org