Interactivity in smart environments

Interaktivitet i smarta miljöer

7.5 credits

Course Code: 5DV174
Syllabus valid from: 2016, week 20
Responsible Department: Department of Computing Science
SCB Subject: Computer Science
Main Field of Study and progress level: Computing Science: second cycle, has only first-cycle course/s as entry requirements (A1N)
Grading System: 5 Pass with distinction, 4 Pass with merit, 3 Pass, VG Pass with distinction, G Pass , U Fail
Level of Education: Advanced level

Requirements

Univ: To be admitted you must have 60 ECTS in Computing Science or 2 years of completed studies (120 ECTS), in both cases including a course in Human Computer Interaction (at least 7.5 ECTS) and a course in data communication (at least 7.5 ECTS) or equivalent.

Proficiency in English equivalent to Swedish upper Secondary course English A/5. Where the language of instruction is Swedish, applicants must prove proficiency in Swedish to the level required for basic eligibility for higher studies.

Learning Outcomes

Knowledge and Understanding

After finished course the student should be able to:

- explain and characterize different information technology paradigms relevant for designing and constructing interactive intelligent environments (FSR1)
- account for the central issues/topics that need to be taken into consideration in the design of interactive intelligent environments from the perspective that the environment will be proactive, reactive, social and (semi-)autonomous (FSR2)
- account for which main types of interactive intelligent environments that are in use today and analyse the technical strengths and limitations for different types of applications/purposes (FSR3)
- explain the basics of architectures that are specific for interactive intelligent environments, and exemplify different techniques that can be used for realising interactive intelligent environments (FSR4)
- account for and apply concepts, methods and theories for proactive, reactive, autonomous and social agents (FSR5)

Skills and abilities

After finished course the student should be able to:

- demonstrate practical skills in communicating and integrating multiple perspectives (e.g. ethical, security, safety, personal, societal) in the design of interactive intelligent environments/systems in a multi-professional work process (FSR6)
- demonstrate practical skills in developing interactive intelligent environments/systems (FSR7)
- demonstrate practical skills in designing and evaluating proactive, reactive, autonomous and social agents/agent societies (FSR8)

Values and attitudes

After finished course the student should be able to:

- evaluate different interactive intelligent environments from different perspectives (ethical, security, safety, personal, societal) (FSR9)
- evaluate the quality in different design proposals based on the purpose and the need for interactive intelligent environments (FSR10)
- evaluate practical results critically and compare these with theoretical, technological and societal expectations (FSR11)

Contents

The course is divided into a theoretical part (4.5 ECT) and a practical part (3 ECT). The theoretical part covers theoretical frameworks and methods for developing and evaluating intelligent interactive systems and provides introduction into how using these in practice. Parts of the content in the theoretical part are applied in the practical part, which is conducted in parallel, and that consists of a group project.

The main theme of the course is theories, methods and technologies for the development of future intelligent interactive environments where humans and proactive, reactive, autonomous and social software agents communicate and cooperate to reach goals. Sometimes the software agents are embedded in robotic systems or in other artefacts/materials in the physical environment. The student will acquire knowledge about main research themes and experimental practices in the field of intelligent interactive environments as well as develop her/his skills in constructing and evaluating intelligent interactive environments. Different paradigms will be introduced and discussed, primarily from an interaction and design perspective such as ubiquitous computing, ambient intelligence, augmented and virtual reality, intelligent and adaptive user interfaces, tangible interfaces, persuasive technology, decision-support systems, Internet of Things and people, smart homes, semi-autonomous systems, social norms and agent societies.

Different societal challenges will be addressed through cross-disciplinary collaboration in student projects. In the laboratory part of the course, theories, methods and techniques discussed in the theoretical part are put into practice. From a societal perspective, the aim may be designing for empowerment, increasing autonomy, safety, competence, cohesion, social inclusion, relatedness, motivation and behaviour change in people; from a technology perspective the aim may be designing the interactivity by integrating self-learning, self-adaptation, sensor networks, semi-autonomous multi-agent systems, intelligent user interfaces, etc. that are instrumental for reaching the societal aims and meeting the individual's preferences and needs.

Instruction

The course consists of lectures, project work in computer labs and other environments, and exercises in small groups. In addition to scheduled activities the course also requires individual work with the material.

Examination

Examination of the theoretical part (FSR 1-5, 9-11) is done through a written examination in a room. The grade on this part is one of the grades Underkänd (U), Godkänd (3), Icke utan beröm godkänd (4) eller Med beröm godkänd (5). For all students who do not pass the regular examination there is another opportunity to do the examination.

The examination of the practical part (FSR 6-11) is done through completing a project in group according to instructions provided during the course. Parts of the project work may be done through field studies outside the university in collaboration with societal organisations, and meetings during the project can be located at such organisation. The grade on the practical part is one of the grades Fail (U) or Pass (G).

A student that has failed the practical part of the course but has regularly attended a majority of the project activities can be given an re-exam covering the parts that the student has missed. If a student has not participated in the project activities (or missed a majority of them), the student can enroll in the practical part next time the course is given. The student does not have the right to continue with the same project the next time (s)he attend the course, and may need to start over with the project work in collaboration with a new student group and with a new topic.

On the whole course one of the grades Fail (U), Pass (3), Icke utan beröm godkänd (4) eller Med beröm godkänd (5) is given. The grade is a summary evaluation of the results of the different examinations and is set when all obligatory parts have reached the grade Pass. At least the grade Pass must be achieved on each part in order to get a grade for the whole course.

A student who has passed an examination may not be re-examined. A student who has taken two tests for a course or segment of a course, without passing, has the right to have another examiner appointed, unless there exist special reasons (Higher Education Ordinance Chapter 6, section 22). Requests for new examiners are made to the head of the Department of Computing Science.
Examination based on this syllabus is guaranteed for two years after the first registration on the course. This applies even if the course is closed down and this syllabus ceased to be valid.

TRANSFER OF CREDITS
Students have the right to be tried on prior education or equivalent knowledge and skills acquired in the profession can be credited for the same education at Umeå University. Application for credit is submitted to the Student Services / Degree. For more information on credit transfer available at Umeå University's student web, www.student.umu.se, and the Higher Education Ordinance (Chapter 6). A refusal of crediting can be appealed (Higher Education chapter 12) to the University Appeals Board. This applies to the whole as part of the application for credit transfer is rejected.

Other Directives
In an exam This course may not be included, in whole or in part, simultaneously with another course of similar content. If in doubt, consult the student counselors at the Department of Computer Science and / or program director of the study program.

Course Literature

Reading list valid from: 2016, week 38

Material/articles provided by the department
Inst för datavetenskap,