UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Ubiquitous, Pervasive & Context-aware Computing

2122-2-F9201P210

Aims

The main goal of the course is teaching students how to design --in multidisciplinary teams-- ubiquitous, pervasive & context-aware technology supporting groups and communities; in other words, the students will learn how to design technology which are pervasive, personalizable, & adaptive.

Moreover, the students will be able to adopt a user-centered approach to the design which is based on the interactions (i.e., Interaction Design).

Contents

The course introduces students to the main principles of the Ubiquitous Computing research area and, successively, focusses on those themes related to the definition, modeling, and use of contextual information in designing and developing ubiquitous/pervasive and context-aware technologies.

An overview of the various accepted meaning of Context and Context-Awareness will be presented; then the course focusses on the definition and use of those contextual information asking for complex representations (e.g., those information related to the user's activity and his/her preferences).

Detailed program

- Introduction of the course

- Introduction to the Ubiquitous Computing research area:
    - The three era of Computing
    - Invisible & calm technology
    - Dwelling with computers versus interacting with intelligent machines
- Related research areas & overview of Ubiquitous Computing systems, applications, & apps
- Context-aware computing: definition of context & context-aware technology by providing the different point of views of world–renowned researchers.
- Context modeling: main approaches and selected examples.
- Interaction Design: main principles
- In-depth analysis of systems and applications by domain or by services through:
    - Seminars of experts
    - Students' presentations (group work activity)
- Laboratory: Private and public meetings to review the students' home works and projects (group work activity).

Prerequisites

A good knowledge of the basis of ICT, web technology & apps

Teaching form

Social/participative learning.

Moreover, the teacher will adopt a British/American approach in running the lessons and in evaluating the students. Practically, the exam is partially made during the course.

The students must actively participate to the classroom discussions &/or post relevant messages in the forum of the course.

The teacher's lessons (via videoconferences) will be integrated with students' presentations (group work). The topic of the presentation is proposed by each group of students and decided with the supervision and collaboration of the teacher. Successively, the groups will design (and in some cases develop) an innovative technology adopting an user-centered approach named Interaction Design. The topic of the presentation and of the project are strictly related in order to both minimize the student's effort and maximize the outcomes.

Finally, to enrich the content of the course and stimulate the debate, seminars of experts will be organized.

Textbook and teaching resource

No textbook is adopted. All the teaching resources are made available through the e-learning area. The material is composed of: the professor's slide, a collection of research articles, videos, demos and links.

The main research articles are the following:

- The Computer for the Twenty-First Century, Mark Weiser, Scientific American, pp. 94-10, September 1991
- The Coming Age of Calm Technology, Mark Weiser and John Seely Brown, 1996
- Open House, Mark Weiser, 1996
- Yesterday’s tomorrows: notes on ubiquitous computing’s dominant vision, G. Bell, P. Dourish, 2006
- Understanding and Using Context, Anind K. Dey. In Personal and Ubiquitous Computing (POC), vol. 5, n. 1, 2001, pp. 4-7.
- A Context Modeling Survey, Strang T. and C. Linnhoff-Popien. In Workshop on Advanced Context Modelling, Reasoning and …, 2004.
- Loosely Coupling Ontological Reasoning with an Efficient Middleware for Context-Awareness, Agostini A., Bettini C., Riboni D. In MobiQuitous 2005
- Dan Saffer, Designing for Interaction, 2nd Edition, New Ridersor

Semester

First semester

Assessment method

During the course:

- active participation to the classroom discussions;
- various group colloquies with the teacher in order to discuss & revise the students' presentation;

- group presentations focused on a specific theme or on a technology (e.g. Augmented Reality, localization technology, etc.);
- various group colloquies to verify the progress of the group project.

Final examination:

- final evaluation of the group project trough a presentation which have to contain:
    - a demonstrator, or a mock-up, or a prototype, or a video, or the screen-dumps showing the Human Computer Interactions;
    - the personas of the designed technology;
    - 1 or 2 user scenarios of use of the designed technology.
- 2-3 questions on the topics explained by the teachers or presented during the seminars;
- 1 question on the colleagues' presentations. Since, generally, there are too many group's presentations made during the course, the student have to study in depth only 3 colleagues' presentations).

Office hours

Contact any time, via email, the teacher to fix an appointment