USER-CENTRIC COMPUTING FOR HUMAN-COMPUTER INTERACTION

PROF. SAMIT BHATTACHARYA

Department of Computer Science and Engineering

IIT Guwahati

PRE-REQUISITES : None. However, knowledge in basic subjects of Computer Science and Engineering/IT (Data structures, Algorithms, FLAT, Software Engg, Operating Systems, Databases, Computer Architecture) preferable.

INTENDED AUDIENCE : UG/PG/PhD students (also people from industry may benefit)

INDUSTRIES APPLICABLE TO : Industry/companies that deal with consumer electronics and user-interface design and development.

COURSE OUTLINE :

Human-computer interaction is an emerging field of study at present, due to the proliferation of large number of consumer electronic products. The key issue in this field is to make the products usable to lay-persons. In order to do that, we need to take care of the (creative) design aspects (the look-and-feel of the interface) and also the system design aspect (both software and hardware). The field is interdisciplinary with inputs required from various other fields. However, the computer science and engineering plays the central role in the design of such systems (as per SIGCHI of ACM). In this course, we will introduce the engineering and computational issues in the design of human-computer interfaces for laypersons. The topics covered in the course includes the engineering life cycles for design of interactive systems, computational design framework (as part of the life cycle), components of the framework including the computational models of users and systems, and evaluation of such systems (with or without users).

ABOUT INSTRUCTOR :

Prof. Samit Bhattacharya is an associate professor in the Dept of Computer Science and Engineering, IIT Guwahati, with more than 15 years of teaching and research experience. He has taught numerous courses, including those related to the proposed course, to both the PG and UG level students of Computer Science and Engineering. He also has more than 85 publications as books, book chapters, patents, peer-reviewed journals and conference proceedings under his credit. Most of his publications are related to the topics covered in this course. He has already graduated 6 PhD students and guided 20 + MTech projects and more than 40 BTech projects in this and related areas. He is also involved in various sponsored projects (funded by the Govt and private agencies) as principal investigator/co principal investigator having close relations to the topics covered.

COURSE PLAN :

Week 1**:** Introduction to user-centric design – case studies, historical evolution, issues and challenges and current trend

Week 2**:** Engineering user-centric systems – relation with software engineering, iterative life-cycle, prototyping, guidelines, case studies

Week 3**:** User-centric computing – framework, introduction to models, model taxonomy

Week 4**:** Computational user models (classical) – GOMS, KLM, Fitts' law, Hick-Hymans law

Week 5**:** Computational user models (contemporary) 2D and 3D pointing, constrained navigation, mobile typing, touch interaction

Week 6**:** Formal models – case study with matrix algebra, specification and verification of properties, formal dialog modeling

Week 7**:** Empirical research – research question formulation, experiment design, data analysis, statistical significance test

Week 8**:** User-centric design evaluation – overview of evaluation techniques, expert evaluation, user evaluation, model-based evaluation with case studies