

Centre of Assistive Technologies: New Opportunity for Interdisciplinary Education

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Abstract — At present the need for interdisciplinary education supporting development and practical application of assistive technologies (AT) is continuously growing. It is given by development of demographic and age structure of the population and the need to ensure support and safety of elderly and handicapped people with increased health and other risks. Currently there is lack of graduates having interdisciplinary theoretical education in the fields of electronics and information and communication technologies and simultaneously focusing on the whole complex of practical needs of applications related to assistive technologies. The same situation arises at producers of these technologies. There are very few graduates able to understand and realize complex applications as a whole. Most of the graduates are able to manage separate narrow applications without ability to interconnect them. Therefore we have decided to develop a series of courses that will fill the gap in the education. And at the same time we have established a specialized facility – Centre of Assistive Technologies composed of several laboratories and working places. This facility will serve for practical project-based education of students in AT. The situation in the given field may be characterized in following way: there are no graduates specialized in AT; there is no complex educational program in AT; there exist a number of information barriers between disciplines that may be solved exclusively by consistent interdisciplinary integration; there exists social and objective demand for employees in AT; in the Czech Republic there are relatively many SMEs and institutions focused on AT that need graduates and support for life long learning of current employees. The courses will become a core of an interdisciplinary study branch in Master study and at the same time they will be offered in life long learning. The core courses cover the following topics: data sensing and transmission; sensors, security and control in assistive environment; circuitry and system principles of electronic devices for AT; advanced methods of data mining and knowledge discovery and their applications in AT; telecommunication equipment and systems for AT; multimedia technology. The topics are systematically and logically interconnected. The content is designed in such a way that theory, applications and system integration are represented in suitable proportion. The paper will describe in more detail the content of the courses and approach to integration of individual disciplines.

Acknowledgement — This work has been supported by the research program No. MSM 6840770012 of the Czech Technical University in Prague (sponsored by the Ministry of Education, Youth and Sports of the Czech Republic).

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Need for Interdisciplinary Education

- strong need for interdisciplinary education supporting development and practical applications of assistive technologies
- there is lack of graduates having interdisciplinary theoretical education in the fields of electronics and information and communication technologies and simultaneously focusing on the whole complex of practical needs of applications related to assistive technologies
- therefore we have decided to develop the Centre of Assistive Technologies (CAT) – basic platform for education and research in the field of assistive technologies

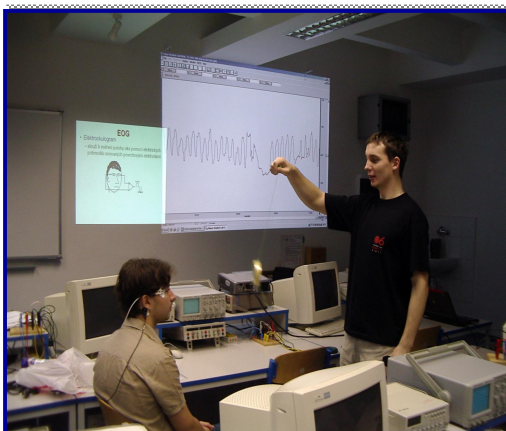


Background Knowledge and Experience

- master study in biomedical engineering – interdisciplinary study in the wide area of interests
- life long learning for current employees – medical technicians and engineers and other professions
- research and development in the field of biomedical engineering
- successfully participation in EU projects (4Care, Oldes, NetCarity, DfA@eInclusion)
- member of EDeAN network

Interdisciplinary Team of CAT

- electrical engineers focused on electronics, medical devices, microelectronics, radioelectronics and telecommunications
- information technology and cybernetics – advanced processing of biological signals, modeling, simulation and computer graphics
- medical doctors, psychologist – design of experiments and interpretation of results
- industrial designers and other professions



Main Topics

- measurement, recording, processing and evaluation of biological and other natural signals
- psychoacoustic and psychovisual processes
- perception of audiovisual information
- conditioning and processing of sensors signals
- data fusion from sensors in smart homes
- data transmission using various technologies (LAN, WiFi, Bluetooth, ZigBee and other wireless technologies)
- data storing and encoding
- patients data security and system security

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