

A Case Study Based On Developing Human Artificial Intelligence Interaction

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Abstract

The increase machine intelligence has led to a shift from a plain interactive to a much more multifaceted cooperative human-machine relation. It requires a multidisciplinary development approach. In this paper, a common multidisciplinary Cognitive Engineering method CE+ is presented. The method is specially designed for the integration of human aspects and artificial intelligence, so that it leads to the development of human-machine cooperation. Two case studies are presented in this paper in which a description of the developed human-machine cooperation and the adjusted CE+ method are given. For each case study, the method supported research and development activities in such a way that sound knowledge bases, methodologies, and user interfaces for human-machine cooperation could be established. However, the method always needed to be tailored to the specific goals and circumstances, such as the available time, novelty and required integration.

Keywords: Artificial Intelligence, Human Computer Interaction (HCI), human-machine relation, Cognitive engineering (CE).

I. INTRODUCTION

Artificial Intelligence is helping to find solutions to difficult problems like a human being John McCarthy is the father of Artificial Intelligence AI He defines it as "the science and engineering of making intelligent machines and intelligent computer programs To mimic the human thinking and behavior of humans the computers computer controlled devices robots or software is developed Every researcher interpret Artificial Intelligence differently according to scope and views

Nowadays the technology dominates the living world. The life of human being is controlled by technology such as agriculture health care and security services. The interaction between man and computer obtain world information. In current Human Computer Interaction (HCI) research personalization adaptive interfaces and electronic assistants are proposed to enable easy access to the increasing functions and services [1] [3]

As the machine intelligence increases there is a need to shift from HCI to Human Machine Cooperation HMC [4]. Machines will be designed to cooperate with humans so that they will be able to assess and adapt to human goals [5]. There is a growing need for humans and machines to grasp each other's reasoning and behavior [6]. The aim of HMC is to customize support by accommodating individual user characteristics tasks and contexts in order to establish HMC in such a way that it provide the right information and functionality at the right time and in the right way [7].

The possibilities for HMC are wide however there is a lack of knowledge on both human factors HF and the artificial intelligence AI concept It should be successfully integrated with both HF and AI during development This paper focuses on the latter the integration of HF and AI during research and development R&D of HMC [8][9].

Various methods and tools are available for the design of tasks and user interfaces for instance from the view of task analysis of HCI [10..17]. Moreover there is a variety of guidelines and standards are available for HCI in general [18] and for specific application domains [19]. Developing HMC with real design practices in the near future is a challenging process. A suitable candidate for this activity is cognitive engineering with its roots in both principal contributors HF and AI Other available development methods are too heavily focused on human or technology and have a blind spot for the other domain [20].

In this paper, an enhanced Cognitive Engineering method CE+ is presented with two case studies. The case studies prove the use of CE+ method and the required adjustments based on specific requirements and environments.

II. THE COGNITIVE ENGINEERING METHOD CE+

Cognitive Engineering CE approaches improve the performance of computer supported task [21] [22] and developed from the fields of cognitive science and AI. The major objective of CE is generating enhanced HCI by increasing insight into the human performance [23]. Moreover CE guides to develop the iterative process of development with more detail and specifications. The existing CE methodology was modified with an explicit technology because of two reasons (i) the technological design space (ii) the integrated effects of technology and HF.

III. CASE STUDIES

3.1 Human-Computer Face Interaction

For human to human communication faces are important part. It is necessary to find faces at the center of human computer interaction. For this purpose Artificial Intelligence AI developed Intelligent Agents. They are applying machine learning techniques to help people interact with computers. The computer vision researchers interested in developing ever more refined algorithms to recognize and interpret facial information. The researchers in Human Computer Interaction may have brought the possibility of using facial information in computer interfaces closer than ever.

The purpose of this paper is to try to bring people results and questions together. From these three different disciplines HCI AI and Cognitive Science can explore the information from the computer interfaces and response conveyed by the human face. In recent days information from the computer to the user has been conveyed by the visual channel. The inputs from the user to the computer have been made through the keyboard and pointing devices via the user's motor channel.

While designing computer interfaces we reintroduce the use of all of our senses into the modern computer tools using multimodal devices. Given the increasing use of computers which support the human user in various types of tasks and activities issues in affective computing. Indeed there is a plenty of evidence in neuroscience and psychology overall human performance in tasks such as rational decision making communicating negotiating and adapting to unpredictable environments. As a result the new computer environments aimed at adapting to the user's friendly needs. We might also find an opportunity to better understand ourselves by building multimodal tools and assist psychologists in developing and testing new theories of the human cognition emotion complex system.

In this present article we discuss one of our projects which developed an automatic facial expression interpreter mainly in terms of signaled emotions. We presented some of the information relevant to facial expressions from Cognitive Science and Psychology

3.2 Personal Assistant for On-Line Services

The Personal Assistant for the on Line Services PALS project is improving the user experience of mobile internet services [24]. It focused on a generic solution a personal assistant which attunes the interaction to the momentary user needs and use context such as adjusting the information presentation and navigation support to the current context device and interests of the user. The first thing focused on the actual realization of a PALS demonstrator is guided by the cognitive engineering process. In various stages knowledge and/or technology was needed and was developed within the two discipline focused research lines of PALS such as enabling the realization of an effective PALS and extending the HF and AI knowledge base

The influence of attention on mobile user interaction, and the AI techniques to attune the interaction to the user's attentional state. These issues were examined by developing a rule-based in-car system that predicted the momentary mental load caused by the driving task and attuned the dialogue accordingly to prevent overload. In addition to the CE+ generated questions that “fed” the basic research, autonomous processes within the basic research line “fed” the CE+ process by providing new interaction concepts. The specific circumstances of this project such as the combination of fundamental research with prototype development, the relatively long running time, and the physical distance between the participating partners gave rise to the specific method that was used. The integration of HF and AI technology in PALS resulted for example in a Point of Return indicator, an Interactive Suspension Point and a Tailored Information View, based on mining and (graph) modeling of user behavior data and the identification of HF bottlenecks in mobile environments.

IV CONCLUSION

Many researchers have proposed guidelines and recommendations for designing effective interaction with Human AI systems The challenge is access to the kinds of data that would be necessary for a human AI to start functioning The vision of a human AI is to improve human systems and the human experience with humans on balance the world These risks are real They need to be known and addressed to limit the worst typical side effects of technological change Another issue is how humans and machines may cooperate and what the corresponding processes and 'building blocks' between them In this case study we suggest building a 'Human AI' that reflects and serves the objectives and drivers of human development in the data era.

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