Design for User Interaction with Intelligent Systems

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ABSTRACT

Intelligence is now a widely accepted part of systems that we interact with every day, but comes in many forms as far as the user is concerned. There is a need for interaction designers to have an understanding of the nature of intelligent systems and be able to categorise different types of intelligence as it appears to the user. This course will give attendees an appreciation of what 'intelligence' or 'smartness' within computer systems is, discuss how it is currently perceived, and describe the enablers and barriers to its effective use. The course will categorise different kinds of intelligence capability. It will offer interaction design guidelines or heuristics for the design of user interfaces with intelligent features to enable them to be more effective as partners with humans. It will use a mixture of teaching techniques combining presentation, discussion and class exercise.

KEYWORDS: intelligent systems; artificial intelligence; interaction design guidelines

1 BENEFITS

The intended benefits of the course are to:
- Give delegates a high level appreciation of the scope of intelligent systems and the technologies that underlie them.
- Provide a framework for categorising types of system intelligence as a way to consider human interaction issues.
- Provide design guidelines that can be used to help in improving the design of the user interface to an intelligent system.
- Help in visualising a future intelligent world and the Human Factors issues that may arise within it.
- Allow delegates who work in the area of intelligent systems to share their experiences.

2 INTENDED AUDIENCE

The tutorial will run for one 80-minute session. The session will not assume any technical knowledge and is intended for: interaction designers, UX designers and researchers as well as research students in HCI, who are interested in the implications of Artificial Intelligence (AI) systems for user interface design. It will only cover AI technologies and concepts at an introductory level so will be less suitable for specialists wanting to learn more about AI theory and methods.

3 PREREQUISITES

There are no prerequisites for attending this course.

4 CONTENT

The tutorial will start by posing the question of what is an intelligent system and will present a framework for considering it. It will briefly present some software concepts that underlie AI systems such as Bayes Theorem, decision trees, and neural networks to give a simple understanding of how they can be applied to applications. There will be a brief history of the development of AI described in terms of a few key milestones including the Turing Test, the Dartmouth summer conference, ELIZA and SHAKEY, Deep Blue versus Gary Kasparov, speech recognition coming of age, and the IBM Watson system. It will also try to summarise the current state of intelligence within systems that affects users today including ecommerce recommender systems, chatbot telephone assistants, and decision support for professional systems including its strengths and weaknesses.

Four different usage scenarios will be described (e.g. medical diagnosis, customer service chatbot, critical system environment advisor, smart home assistant). Each scenario will be elaborated to illustrate the nature of the user interactions that may take place.

A number of design issues for each will be listed which may form discussion points with the audience. These will include aspects such as knowing what capabilities and limitations the system has, explaining the rationale for its decisions or recommendations in an understandable way (which may be a legal requirement for an operator to act on them), determining the balance of control between human and system, and defining effective forms of interaction with the system.

A design framework will be introduced reflecting the range of characteristics of intelligence which a system kay exhibit. It is composed of key elements including, for instance, problem solving dealing with constraint satisfaction; certain and uncertain knowledge representation; feature learning; perception, communication and action involving parsing of texts; representation of images (2D or 3D); and perception, communication and action taken by robotic agents. A number of design guidelines for creating effective human interaction with intelligent systems will be described, drawing upon existing HCI design principles but adapted to the characteristics and capabilities of intelligent technology and human psychology, and people's emotional reactions when interacting with intelligent systems. The approach will allow the characteristics of a particular type of intelligent system to be applied to the framework and suitable design guidelines to be suggested.

5 PRACTICAL WORK

There will be an exercise within the session where a fictitious intelligent system will be described. The delegates will discuss in pairs or threes to identify the characteristics of the intelligent system and use the design framework to identify key interaction design guidelines that can be used to critique the design and suggest improvements. This will give delegates practice in using the framework in order to improve user interaction with an intelligent system.

6 INSTRUCTIOR BACKGROUND

Martin Maguire has a background in computer studies and ergonomics. His main interests are in the usability of interactive systems including the needs of inexperienced users, older people and people with disabilities. He has been involved in several EU projects to develop human factors tools, methods and guidelines to promote usability within European IT projects and programmes. He has conducted ergonomic appraisals of IT and web-based systems for public sector and private organisations in the UK. He is interested in the development of intelligent systems and how to design effective user interaction with them, and improve user experiences of them. He teaches HCI, usability and user-experience design within the Design School and Department of Computer Science at Loughborough University.

7 RESOURCES

Instructor links:
http://www.lboro.ac.uk/departments/design-school/
http://www.lboro.ac.uk/departments/design-school/staff/martin-maguire/

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