

8 Human–Computer Interaction (AFB)

This question relates to the design of control software for home automation. There is a market opportunity arising from increasing deployment of software-controlled light bulbs and fittings. As householders acquire larger numbers of such products from different suppliers, they will wish to create lighting schemes, coordinating lights located in particular areas of the house or in individual rooms, where contrasting schemes might be designed for various times of day or activities.

You are asked to consider ways in which HCI research can be conducted to compare the relative advantages of two technical approaches to this opportunity. The first approach is to use machine learning algorithms to infer the schemes from user actions. The second approach is to provide a programming language with which users can define the schemes.

- (a) For *each* of the two technical approaches, describe a usability problem that you might expect to arise that is specific to the lighting scheme application, and a design strategy that could be taken to reduce the impact of this problem, noting any trade-offs that may result. [8 marks]
- (b) Propose a formative empirical research method that could be used to compare the relative desirability of the two technical approaches, from the perspective of the home lives of potential customers. Your proposal should include a description of the practical steps involved in carrying out the research, the data that will be collected, the way that it will be analysed, and the kind of recommendations that you expect to be able to make. [6 marks]
- (c) Your company has deployed alpha-release versions of both systems. Early feedback from users suggests that there is a problem when a new lighting scheme must be defined quickly, for example when guests arrive for a party. Propose a summative empirical research method that could be used to compare the speed of the two technical approaches, in order to find which is faster. Your proposal should include a description of the practical steps involved in carrying out the research, the data that will be collected, the way that it will be analysed, and the kind of recommendations that you expect to be able to make. [6 marks]