

Development of a model predicting the use of automated decision aids

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Abstract

Common theories of operators' use of assistance systems often involve the concept of trust. It is assumed that trust guides operators' behaviour. They develop a certain level of trust towards the system based on the characteristics of the automation. This amount of trust should be appropriate in order to use the automation properly. However, some studies did not find empirical evidence for this mediator role of trust. A model which is taking these contradictory findings into account and which is able to predict the usage of an assistance system is missing so far. Based on a narrative analysis of five experimental studies investigating the effect of decision aids on human behavior, we have developed a model predicting the use of decision aids. The model does not only focus on the technical components and the level of trust, but also takes the perceived risk of the anticipated output and the perceived interpretability of the situation, i.e. uncertainty into account. The model assumes that risk and interpretability have a strong influence on using an assistance system. Furthermore it is assumed that they moderate the mediator role of trust. Practical implications are made, regarding the importance of multiple sources of information to reduce operators' uncertainty. Empirical studies will show the influence of interpretability and risk on operators' behaviour and operators' trust towards the system.

Introduction

The automation of functions prior performed by human operators is continuously increasing especially in safety related work domains such as aviation or process industry. The use of automation can enhance productivity as well as safety because of faster and more precise operation methods even under dangerous conditions. However, as the implementation of automation changes operators' work environment and practices, it also leads to new challenges in regard to operator-automation interaction. A broad range of research deals with the different problems arising from operators' new role as supervisors (Sheridan, 1997) of the human-machine system. One aspect that seems to play an important role for the efficient and safe interaction of humans with sophisticated technical systems is operators' trust in the automation they use.