

Structured Abstract Example

(250 words maximum)

Objective: We develop a method for enabling human-like, flexible supervisory control via delegation to automation.

Background: Real time supervisory relationships with automation are rarely as flexible as human task delegation to other humans. Flexibility in human-adaptable automation can provide important benefits including: improved situation awareness, more accurate automation usage, more balanced mental workload, increased user acceptance, and improved overall performance.

Method: We review problems with static and adaptive (as opposed to “adaptable”) automation. We contrast these approaches with human-human task delegation, which can mitigate many of the problems. We revise the concept of a “level of automation” as a pattern of task-based roles and authorizations and argue that delegation requires a shared hierarchical task model between supervisor and subordinates, used to delegate tasks at various levels and offer instruction on performing them. A prototype implementation, called Playbook™, is described.

Results: On the basis of these analyses, we propose methods for supporting human-machine delegation interactions that parallel human-human delegation in important respects. We develop an architecture for machine-based delegation systems based on the metaphor of a sports team’s “playbook”. Finally, we describe a prototype implementation of this architecture, with an accompanying user interface and usage scenario, for mission planning for uninhabited air vehicles.

Conclusion: Delegation offers a viable method for flexible, multi-level human-automation interaction to enhance system performance while maintaining user workload at a manageable level.

Application: Most applications of adaptive automation (aviation, ATC, robot control, process control, etc.) are potential avenues for the adaptable, delegation approach we advocate. We present an extended example for UAV mission planning.