User-Centered Semiautomatic Assistive Devices

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ABSTRACT

The coming decades will likely see tremendous growth in diversity and use of embedded devices and systems targeted for elderly individuals for many reasons, including that global population ages and technology advances make the devices affordable. Such a device can improve the quality of life of its user and assist the user to live independently. It can also serve as a point-of-care tool for care providers when assistance and care become necessary. As examples, medication dispenser may first find its place in a home as a birthday gift to provide information and reminders as assistance to the user in compliance, but when the need arises, it becomes an essential automation tool for the user to be cared at home. A smart walker may be used initially for the enhancement of the user's dexterity but can adapt to provide the user with stability and mobility as the user ages.

This family of devices and systems should be user (human) centered, meaning that the purpose of automation is to compensate the user's skills and weaknesses and that the degree of automation should be adaptable over the life time of the device according to the user's condition and needs. A key problem in building such devices is how to model, architecture and build the human-device system as a whole so as to ensure safe migration of the partition of functionalities between the device and the user. The problem is made more challenging by the fact the users are untrained, many may be undisciplined and their skills vary widely not only among the user population but also for an individual user over time. This talk first presents a brief overview of available solutions from embedded systems, human-centered computing and interaction, and other related areas. It then discusses missing gaps in technology and tools.

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