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Using Augmented Reality and Internet of Things to Improve Accessibility of People with Motor Disabilities in the Context of Smart Cities

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Abstract

Smart Cities need to be designed to allow the inclusion of all kinds of citizens. For instance, motor disabled people like wheelchair users may have problems to interact with the city. Internet of Things (IoT) technologies provide the tools to include all citizens in the Smart City context. For example, wheelchair users may not be able to reach items placed beyond their arm's length, limiting their independence in everyday activities like shopping, or visiting libraries. We have developed a system that enables wheelchair users to interact with items placed beyond their arm's length, with the help of Augmented Reality (AR) and Radio Frequency Identification (RFID) technologies. Our proposed system is an interactive AR application that runs on different interfaces, allowing the user to digitally interact with the physical items on the shelf, thanks to an updated inventory provided by an RFID system. The resulting experience is close to being able to browse a shelf, clicking on it and obtaining information about the items it contains, allowing wheelchair users to shop independently, and providing autonomy in their everyday activities. Fourteen wheelchair users with different degrees of impairment have participated in the study and development of the system.

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