U. Cortés, A. Martínez-Velasco, C. Barrué, T. Benedico, F. Campana, J. Fernandez, R. Annichiarico. A SHARE-it service to elders' mobility using the i-walker. Gerontechnology 2008; 7(2):95. The goal of SHARE-it, a EU FP6 funded project, is to develop a scalable, adaptive system of add-ons to sensor and assistive technology so that they can be modularly integrated into an intelligent home environment to enhance the individual's autonomy. In this paper we focus on the development of an intelligent pedestrian mobility aid that we call i-Walker. SHARE-it will provide an Agent-based Intelligent Decision Support System to aid the elders. In the personal autonomy and disability context, two different scenarios of the shared autonomy can be elicited. People presenting mainly physical impairments are able to define their own goals, but due to their restrictions they usually are not able to execute them, suffering a limitation in their autonomy. In this scenario the contribution of AT focus on physical devices, mostly mobility hardware, that allows them to reach their objectives. These devices may be controlled by multiagent systems or through an agent supervised shared control if the user motor capabilities are not severely damaged. In this scenario, user interfaces are very important to detect the user intention, which is critical to define goals for the wheelchair to be able to assist him/her. People presenting mostly cognitive impairments may require a different kind of assistive aids, which may lead even a more relevant role in the sharing of personal autonomy. In this scenario the user probably does not have very clear goals or is not capable of achieving them because he/she cannot remember how to do them. In these cases, AT may empower and complement their autonomy using agents that offer them a set of services, like reminding what kind of activities they can or should perform at a certain moment of the day or pointing them out how to achieve these activities. The main idea is to offer the users a set of cognitive aids, either rational or memory based, that can ease their daily living. Roboticists have developed a number of mobility-enhancing assistive technologies. Most of these are active aids, meaning that they share control over motion with the user. Most are aimed at obstacle avoidance and path navigation. The functionalities of the i-Walker are divided in three areas: Analysis, support and navigation walker (aid to move in a well-known environment). The Analysis walker consists in gathering, real time information coming from different sensors: forces in the handlebars and normal forces from the floor, feet relative position towards the walker, tilt information, speed of rear wheels, mainly. The analysis of this information will allow the study about: the gait, how the patient lays onto the walker and how much force exerts on the handlebars while following a predefined trajectory. The support walker consists in applying two strategies to motor: (i) A helping strategy. In the normal operation of the i-Walker, the user must apply pushing or pulling forces in the handlers to move around. The strategy of helping the user consists on relieving him from doing a determined percentage of the necessary forces. (ii) A braking strategy. It can oblige the patient to apply a forward pushing force in the handlers in a downhill situation instead of pulling force, which can be less safe. A doctor can determine both the amount of helping percentage and braking force in each hand.

Keywords: disability, ageing, assistive device, autonomous system

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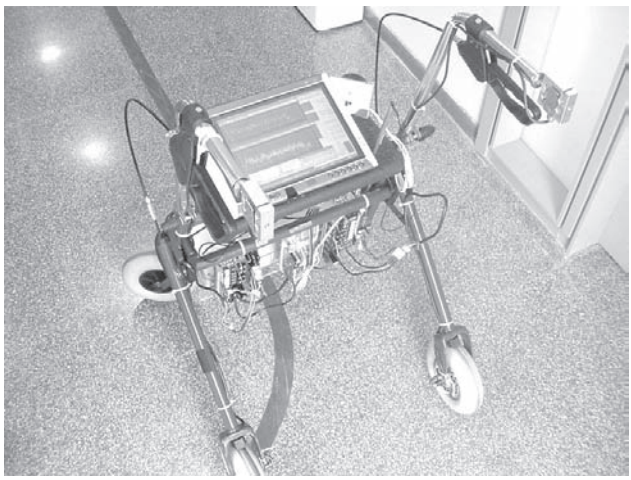

Figure 1 Overview of the system