

A. Frizera, R. Ceres, J. Pons, A. Abellanas, R. Raya. *Smart walkers as geriatric assistive device. The symbiosis purpose. Gerontechnology 2008; 7(2):108.* One of the problems that affect the most of the elderly population is the reduction of mobility<sup>1</sup>. Mobility is one of the greatest and most important human faculties, since it affects not only a person's locomotion capacity and the ability to realize personal tasks, but also is related to physiologic and personal questions, conditioning the interaction of a person with his surroundings. **Mobility assistive devices** There are basically two groups of assistive devices to help people with mobility problems: the alternative devices and the empowering (or augmentative) devices. In the case of total incapacity of mobility (including both bipedestation and locomotion), alternative solutions are used. In the case of a reduced mobility capacity, the person has to use augmentative elements. These elements can be portable (or wearable) devices or external, such as crutches, canes and walkers. Considering the external augmentative devices, the walkers assume an important place, due to the fact that they work as a supporting device during bipedestation and, in addition, use the person's remaining locomotion capability in order to move<sup>2</sup>, avoiding the loss of bone mass and the formation of skin sores, improving blood circulation, digestive, respiratory, kidney and urinary functions. Also, it is important to note the psychological benefits related to self-esteem and relationship issues that are increased. **Smart walkers** The standard walking aids present problems related to: (i) the pushing energy required to move; (ii) the lack of stability; (iii) the possibility of collision with obstacles; and (iv) orientation. Considering the case of a walker with legs (Standard Walking Frames), another additional problem is the unnatural and discontinuous gait pattern. In this context, the assistance during the gait process is a clear application on the assistance robotic field, where advanced or robotic walkers and guiding devices, using a great variety of sensors and actuators, are presented as a solution to the problems previously presented. Also, navigation strategies, control, (auto-) localization, mapping and other concepts mostly used in the field of mobile robotics can be applied to solve some of the problems previously presented. We present a critical review of the most relevant robotic walkers in the literature<sup>3-5</sup> considering the navigation strategies and the sensors used to that purpose; and the human-machine interface used to communicate the device. Finally, based on the previous experience of the Bioengineering Group at IAI - CSIC on the development of robotic walkers<sup>6</sup>, a new concept of human-machine interface to guide a smart walker is presented – the SIMBIOSIS project.

## References

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