Titolo: EasyWalk: An Intelligent Social Walker for active living

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Budget UNIPD: 80.572,00 €

Abstract del progetto: In the Western European region, fall has the highest incidence and mortality rates in elderly population: around one-third of aged people experience a fall at least once per year. Critically, fall does not only cause physical injuries but also has direct mental and psychological effects. Indeed, the fear of falling prevents elderly people from independently initiating physical activities with a tremendous impact on their general health, on their social identity and, as a consequence, on their level of anxiety and depression.

They do not trust themselves and they completely rely on relatives or on external assistance: they have lost their independence in daily life. In this context, walkers are often proposed to people with walking difficulties as fall-prevention assistive devices to help maintain stability, increase mobility, and enhance users' independence and confidence in daily activities. Furthermore, in the last years, technological advances allowed the introduction of smart walkers that aim at actively assisting the locomotion by exploiting artificial intelligence algorithms to control the brakes, to avoid obstacles and to navigate in crowded environments. However, despite the impressive results achieved by researchers in the field, the translational impact of smart walkers and the spread usage in daily life operations are still limited. Only few products exist in the market and they are usually expensive, with large size, with non-transparent control interface and definitely not tailored for the individual user's needs. We identify three main reasons for that:

i) current approaches lack reliability and robustness; ii) the coupling between human and machine is underestimated; iii) the cost of the platform is often prohibitive. As a direct consequence, users do not trust the walker, and thus, they do not use it.

In the EasyWalk project we hypothesize that such a trust can be achieved by providing a walker that is low-cost, easy-to-use, reliable and able to infer, to integrate and to contextualize the user's intentions according to the environment information.

The EasyWalk project will propose a new generation of smart walkers specifically designed to exploit human-robot interaction approaches, and thus, to enhance the coupling between user and walker and to promote the mutual trust between the two actors.

From a scientific perspective, the EasyWalk project will ensure advances in the robotics and artificial intelligence fields by providing an innovative proof-of-concept based on shared-intelligence approaches specifically designed for walker applications. Furthermore, EasyWalk will have profound social and economic impacts by alleviating and potentially eliminating the necessity of a stand-by human assistant, and as a consequence, by reducing the economic burden not only for the user's family but also for the national healthcare system.

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