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HUMAN RECOGNITION AND CLASSIFICATION BASED ON GAIT ANALYSIS USING DEPTH SENSORS

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Summary: Human motion analysis is socially and economically relevant due to its wide spectrum of potential applications, ranging from clinical assessment, sport performance enhancement, smart surveillance systems, to pure entertainment, just to name a few. These examples demonstrate the growing usefulness of the human motion in people's lives. In particular, the human gait, which can be an information source of great relevance in order to identify a person or even to infer some attributes of a person like gender, age, mental state, etc. This retrieved information can benefit numerous applications in many domains, such as oriented video games and human-computer interactions (HCI), and targeted advertising, etc. Many different approaches have been proposed for human gait analysis using depth sensors. In this paper we present a detailed, broad and up to date study focused in gait analysis using a low-cost motion sensing device, with applicability mainly in person identification and classification. We give an overview of recent works in this field, describing feature-extraction processes, conducted experiments and used classification methods. In addition we also describe an ongoing work that aims to design a portable, relatively inexpensive and easy to configure architecture, influenced by the knowledge in biomechanics and computer vision, capable to recognize persons by their gait and also to infer the person's gender based on depth sensors. We describe experiments and present results that show that the proposed system, supported by the depth information, is able to be successfully used in gait recognition and classification problems.