PAMAP

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Early Prototype

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EXECUTIVE SUMMARY

The PAMAP project aims at developing a system that enables the accurate monitoring of the physical activities of aging people. This deliverable provides the reader with a general description of an Early Prototype developed by the consortium partners. This first milestone serves as proof-of-concept for PAMAP.

DESCRIPTION OF THE EARLY PROTOTYPE

The elderly population in the industrialized world is steadily increasing. In order to keep a high quality of life and be active participants in the community, they need to stay healthy. For this it is important to maintain a balanced level of physical activity and to be properly rehabilitated in case of a severe disease.

The Early Prototype demonstrates first results of the PAMAP project in the second area mentioned above. It supports functional rehabilitation of, e.g., stroke patients, by monitoring and promoting repetitive arm exercises. The system is based on two miniature inertial sensors that are attached to the upper and lower arm of the monitored individual (see Figure 1 (left)). Using a biomechanical model of the arm, the joint angles and kinematics are estimated from the sensor measurements in an extended Kalman filter. Afterwards, relevant parameters, such as the frequency, the range or the amplitude of the performed motion are extracted. Based on this, the system generates feedback, e.g. praise, corrections or warnings. Moreover, the performed motion and the target motion are visualized with a virtual upper body model (see Figure 1 (right)) at the same time. This helps the user to learn to conduct the exercises in the correct way.

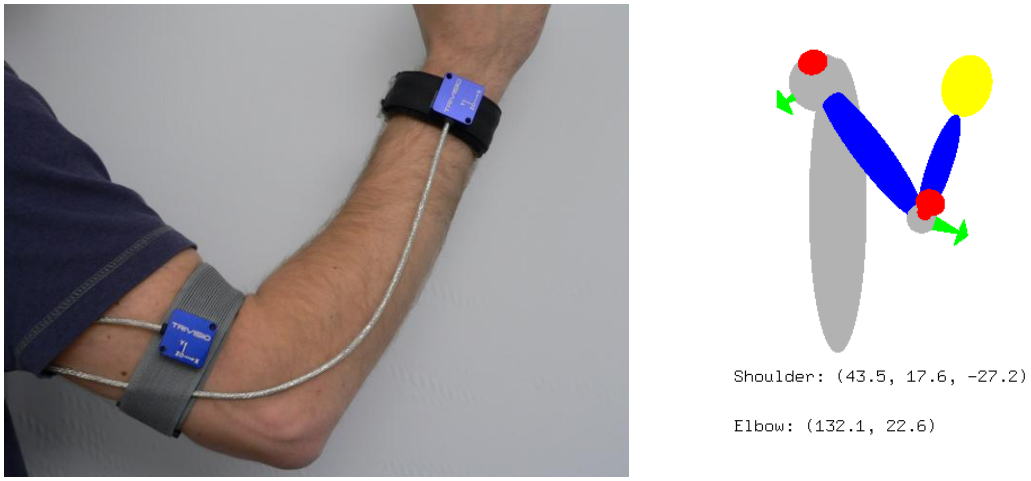

Figure 1 Inertial sensors attached to a human arm (left) and simple graphical and textual OpenGL visualisation of the estimated joint angles (right).