B. Fosty, F. Bremond. **Visual recognition of gait parameters.** *Gerontechnology 2016; 15(suppl):109s;* doi:10.4017/gt.2016.15.s.837.00 **Purpose** There is major interest nowadays in moderate-high intensity aerobic activities for non- pharmacological interventions in elderly suffering from neurodegenerative diseases like Alzheimer's Disease and Related Disorders[1]. Within the context of the development of serious games for this population, we have developed algorithms to interact with the virtual environment through simple gesture recognition and walking speed computation (*Figure 1*). **Method** Based on an RGB-D (Red-Green-Blue+Depth) camera such as Kinect, the walking speed computation is performed as follow. First, people on the scene are detected using a background substraction algorithm[2] and tracked using a multi-feature algorithm[3]. Then, the feet positions are estimated based on the 25% of the lowest 3D points of the person. Finally, the walking speed of the person is computed from the successive positions of the feet. **Results & Discussion** With the help of a specialist in the domain of physical activities, a protocol has been set up to assess the precision of the computed walking speeds (covering the walking speed spectrum, from 1.5 to 5.5 km/h) and to prove the reproducibility of these results. Based on 36 participants (17 males, 19 females, age: 32.1±7.6) who performed this protocol, the system has shown an absolute mean error of 0.17 km/h with a higher accuracy for median speeds (around 4.5 km/h)[4]. Following that, we decided to study whether this system would be useful in rehabilitation. Some experts of this domain in a rehabilitation center (Centre Hélio Marin in Vallauris, France) have been interviewed and they were enthusiastic about using this type of system to get objective gait parameters. In collaboration with them, we have started to develop a proper application for rehabilitation, adding new functionalities around gait parameters computation such as side-by-side video comparison, automatic sequencing of video or 3D display (*Figure 2*).

References

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Figure 1: Gesture recognition and walking speed computation for serious game interactions; The gestures are: turning right (upper), turning left (middle) and action (lower); dots show the positions of arm and feet

Figure 2: Screenshot of the interface for a rehabilitation application; Top: patient general information; Left: camera image; Right: 3D side view of the cloud of points of the person; Bottom (thumbnails): sequences detected in the video