

“LISTEN TO THE BALL!” – SONIFICATION-BASED SPORTS GAMES FOR PEOPLE WITH VISUAL IMPAIRMENT

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Visual information is the leading afferent information for players to regulate their actions in sports games. This makes the access to sports games particularly difficult for people with visual impairment. But since these people also desire to get access to sports games, it is our task in the field of adapted physical activity to push the boundary of ordinary sports games in search for new opportunities or enabling techniques to facilitate their participation.

In our contribution we present the development of new sports games focusing on the excellent auditory perception skills which are highly adapted for people with visual impairment due to their enhanced everyday use. We break new ground in using the method of interactive sonification (Hermann, 2002) in sports games to present auditory information as the leading information for action regulation. For this, we use insights from three areas: firstly, actual sports games are analysed in order to discover basic principles for non-visual games (e.g. goalball). Secondly, we regard successful applications of interactive sonification in auditory computer games, and finally we take virtual simulations of sports games into consideration.

Building on this analysis, we introduce the new technical system "*AcouMotion*", a hard- and software-based system that offers new ways for developing sonification-based sports games that can be played just by using auditory, non-visual information. *AcouMotion* presents for instance information on the position of a virtual ball by using sound. Based on this information the player is expected to play the ball with a virtual racket against a wall without dropping on the ground. *AcouMotion* provides a sensor equipped hand-held controller to assess the position and orientation of the racket. Interactions like the hit of the ball update the ball's motion state in the simulation environment and thus the sonification. The real-time control and auditory feedback creates a closed interaction loop that engages the player in sports activity.

AcouMotion goes beyond hitherto existing systems and offers various possibilities for the enhancement of sports games for people with visual impairment. In particular, we report on the development progress of a non-visual game "blindminton" in the style of the traditional game badminton. Furthermore, *AcouMotion* offers perspectives to test specific – and in games like goalball performance determining – skills like auditory-perception-based orientation in space.

References

Hermann, T. (2002). *Sonification for Exploratory Data Analysis*. Ph. D. thesis, Bielefeld University, Bielefeld 2002.