GangKlang: interactive sonification of gait data

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Sound is an inherent dimension of our everyday activities, guiding, refining and mediating our interactions with the environment. In my PhD research I explore how sonic interactions may facilitate the experience of flow in the activity of walking. My research question is integrated within the BMBF[1] research project "Flow-Machines: Body Movement and Sound" (10/2012 – 10/2013). The concept of flow as introduced by Csikszentmihalyi [1] conceptualizes playful experiences in games and in everyday life. The term flow is used to describe "[. . .] a subjective state that people report when they are completely involved in something to the point of forgetting time, fatigue, and everything else but the activity it- self" [1:600]. Flow-Machines are mobile audio biofeedback systems that detect and analyze gait and heart rate characteristics, interpret the state of walking, and apply audio feedback to support the experience of flow. To implement Flow-Machines, we outlined a first model to study, measure and design flow while walking. We ask firstly whether and how flow measurably effects heart rate and gait characteristics and secondly how to address these levels in our design concept [2]. A main objective of the Flow-Machines project, framing my PhD research, is to understand how sonic interaction can contribute to the experience of flow. I use the term "GangKlang" (a German portmanteau of gait and sound) to refer to a specific type of sonic interaction, mediating the activity of walking by sound.

My PhD study is allocated within in the interdisciplinary research area of Sonic Interaction Design. I examine the possibilities of sonic interaction design to support flow in the activity of walking. In an initial step towards this goal, I address the question how the concept of flow can be utilized in the different levels of the walking activity. Based on the Activity Theory, I model the activity of walking on the three levels of activity, actions and operations. A principal part of my research investigates how objectively gathered data on different levels of the walking activity can be interpreted in a meaningful manner and transformed into sound (sonification) to support the experience of flow. To understand the influence of sonification on the walking activity and to devise the concept of GangKlang, I design, develop and evaluate prototypes of gait sonification. Thus, to devise sonic interaction for flow while walking, I apply scientific and design approaches of research. - Current work: The first GangKlang prototype concentrates on the operational level of walking, namely the gait cycle defined by two consecutive steps. Analyzing flow on a biomechanical level, I take into account the characteristic of smoothness, a measurement addressing "the degree of continuity in the course of a movement." [3:466]. A gait cycle can be divided into smaller phases (such as stance and swing phase) and events (heel strike, toe-off). Depending on the gait cycle feature chosen for sonification, different walking units will be emphasized and attract users attention. How does the selection of gait phases and events to be sonified, influence the manner of walking with regard to smoothness?

References

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