

## Realization of Wearable Inertial Measurement Units-Sensor-Fusion Harness to Control Therapeutic Smartphone Applications

**Authors :** Svilen Dimitrov, Manthan Pancholi, Norbert Schmitz, Didier Stricker

**Abstract :** This paper presents the end-to-end development of a wearable motion sensing harness consisting of computational unit and four inertial measurement units to control three smartphone therapeutic games for children. The inertial data is processed in real time to obtain lower body motion information like knee raises, foot taps and squats. By providing a Wi-Fi connection interface the sensor harness acts wireless remote control for smartphone applications. By performing various lower body movements the users provoke corresponding game state changes. In contrary to the current similar offers, like Nintendo Wii Remote, Xbox Kinect and Playstation Move, this product, consisting of the sensor harness and the applications on top of it, are fully wearable, which means they do not rely on the user to be bound to concrete soft- or hardware-equipped space.

**Keywords :** wearable harness, inertial measurement units, smartphone therapeutic games, motion tracking, lower-body activity monitoring

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