Shim Dance Application

Arkadiusz Gabryś
Seminar Android Apps für Sensornetzwerke
Friedrich-Alexander Universität
Erlangen-Nürnberq
Technische Fakultät

***Abstract*—**

I. Motivation

There exist various dance games for Android platform. But in most cases the player interactions are limited to the screen [6]. Despising the fact that this conflict with the dance nature itself (which is the movement of whole body), it shows the great limitation of today mobile devices in user interaction.

There is one game which recognizes player movements [5]. In this case phone is used as a game controller and movements are read from one hand. We wanted to focus on player feet.

Outside of the mobile world there exist dance game controllers for feet [1], [2]. But those solutions are not suitable for mobile applications.

Our goal was to create dance game application for Android where game controllers are player feet. We also wanted to replace external physical controllers with shimmer sensors to read player movements directly from they feet [3].

II. Methods

A. Hardware & Software

Two shimmer sensors are used as a motion capture devices. The second edition of the device is used with *BTStream v1.0* firmware, as well as the calibration software provided by the vendor [4]. Sensors are placed on the front of the feet with orientation shown on Fig. 1. Only accelerometer sensors are used with range set to $6\,G$ and with any of sampling rates: $102,4\,Hz, 128\,Hz, 170,7\,Hz, 204,8\,Hz, 256\,Hz$.

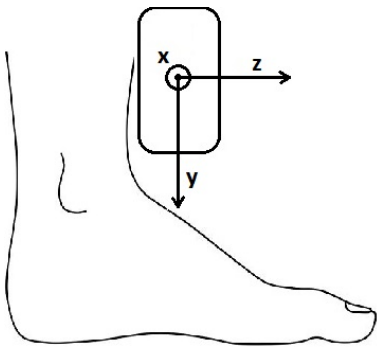

Fig. 1. Placement of the Shimmer sensor on the left foot. Y axis is pointing down, Z axis is pointing forward (with respect to the person wearing the sensor) and the X axis is pointing to the right. The same sensor orientation should be used in the right foot.

B. Data acquisition

C. Preprocessing

D. Game & Graphic control

E. Synchronization of application modules

III. Results

IV. Discussion

V. Summary and outlook

In the future we can expect to see technology such as Project Soli which will allow to recognize user motions far from device [7].

Acknowledgment

References

[1] Suzuki, T. and Okita, K. and Takahashi, K. and Takeda, T.: Dance game apparatus and step-on base for dance game, US Patent 6,227,968 (2001)
[2] Openiano, R.M.: Foot-actuated computer game controller serving as a joystick. US Patent 5,139,261 (1992)
[3] Shimmer http://www.shimmersensing.com/. Last visited: 28.07.2015 (2015)
[4] Shimmer 9DOF Calibration v2.0 http://www.shimmersensing.com/images/uploads/docs/Shimmer_9DoF_Calibration_v2.7.zip Last visited: 28.07.2015 (2015)
[5] Google play, Just Dance Now https://play.google.com/store/apps/details?id=com.ubisoft.dance.JustDance 26.07.2015 (2015)
[6] Google play, Dance games https://play.google.com/store/search?q=dance%20game&c=apps. last visited: 26.07.2015 (2015)
[7] Youtube, Welcome to Project Soli https://youtu.be/0QNiZfSsPc0. last visited: 28.07.2015 (2015)