Slackliner – Using Whole-body Gestures for Interactive Slackline Training

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ABSTRACT

In this demo, we present *Slackliner*, an interactive slackline training assistant which features life-size projection, skeleton tracking, and real-time feedback. Like in other sports, proper training leads to a faster increase of skill and lessens the risk of injuries. We chose a set of exercises from slackline literature and implemented an interactive trainer which guides the user through the exercises giving feedback if the exercises were executed correctly. Additionally, a post-analysis provides the trainee with more detailed feedback about her performance. The results from a study comparing the interactive slackline training system to a classic approach using a personal trainer indicate the interactive slackline training system can be used as an enjoyable and effective alternative to classic training methods (see [1] for more details). The contribution of the present demo is to showcase how whole body gestures can be used in interactive sports training systems. The design and implementation of the system informs many potential applications ranging from rehabilitation to fitness gyms and home use.

CCS CONCEPTS

• **Human-centered computing** → **Gestural input**; • **Applied computing** → *Interactive learning environments*;

KEYWORDS

Slackline; Sports Technologies; Gestures; Real-time Feedback.

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1 SYSTEM OVERVIEW

Our system consists of several components: a mobile slackline (*alpidex POWER-WAVE 2.0*) stands in front of a projected screen and a Kinect v2 faces the trainee (see Figure 1). The actual recognition of the movements during the training employs a *rule-based* and a *gesture-based* approach. Unity 3D is used to handle the program logic and visualize a graphical user interface on the projected screen. The user interface of *Slackliner* consists of several screens that allow the trainee to navigate between different levels and exercise views. In the exercise view, the trainee is first instructed via text after which a video clip shows the correct execution of the exercise. On the main screen of the exercise view, a small silhouette of the trainee is always shown in the center of the screen to provide feedback on the status of the tracking system. Textual and visual feedback indicators provide necessary information related to the current execution of the exercise in real time.

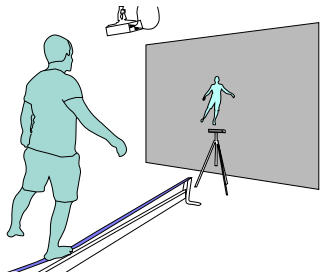

Figure 1: Setup of Slackliner. A Kinect facing the user tracks her movements. Real-time feedback on the display instructs the trainee during her exercises.

2 INTERACTION WITH THE SUI AUDIENCE

Each SUI attendee – no matter slackline novice or expert – can try out *Slackliner* to get an idea how spatial gestures can be used to learn slacklining in a novel interactive and entertaining way. With this demo, we aim to foster the discussion on how interactive spatial user interfaces can be used to learn complex motor movements in sports and beyond.

3 UBIQUITOUS MEDIA TECHNOLOGY LAB

In the Ubiquitous Media Technology Lab at the German Research Center for Artificial Intelligence (DFKI), we investigate intelligent multi-modal user interfaces using ubiquitous computing technologies. In this respect, we also investigate ubiquitous sports technologies that aim to support skill acquisition in sports.

REFERENCES

[1] Felix Kosmalla, Christian Murlowski, Florian Daiber, and Antonio Krüger. 2018. Slackliner – An Interactive Slackline Training Assistant. In *Proceedings of the 2018 ACM Multimedia Conference (MM '18).* ACM, New York, NY, USA. https://doi.org/10.1145/3240508.3240537

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