TECHNISCHE UNIVERSITÄT MÜNCHEN
Human-centered Assistive Robotics
UNIV.-PROF. DR.-ING. DONGHEUI LEE

June 16, 2020

M A S T E R ' S T H E S I S
for
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Comparison between IMU-based and Pressure Insoles-based Thresholds for Biofeedback in Postural Transitions

Problem description:

Wearable devices provide a good opportunity for people with postural instability to improve postural control in everyday life [3]. Different feedback devices have been investigated in the research area of postural control[1, 2, 3, 4] and in the context of wearable sensors inertial measurement units (IMUs) located on various parts of the body or plantar force sensors [3, 4, 5] have been widely used to measure static and dynamic balance. However, when using a feedback based on one single sensor at the trunk in situations of postural transition, like bending forward, one might get an unreliable feedback, as being still in a stable position. Consequently the following research questions will be investigated:

1) Is a pressure insole (PPS) based feedback more reliable than an IMU suit based system?

2) Is a combined feedback (PPS + IMU suit based) more reliable than the PPS based system?

3) Optional: Is the reliability of the systems dependent on the definition of threshold?

Tasks:

- Literature research and develop the study design
- Write/adapt scripts for communication and synchronisation of the different hardwares (IMU suit, force plate, pressure insoles)
- Write/adapt scripts for capturing and saving data with IMU suit, force plate pressure insoles
- Define the thresholds for feedback by pilot testing
- Carry out user study with 20 participants
- Data post processing and statistical analysis

Bibliography:

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Supervisor:	M. Sc. Katrin Schulleri
Start:	16.06.2020
Intermediate Report:	13.10.2020
Delivery:	XX.XX.2020

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