A GAIT METRONOME IMPLEMENTATION BASED ON AUGMENTED REALITY

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INTRODUCTION

This abstract presents the design and implementation of a gait metronome based on Augmented Reality (AR). Metronomes have been used in biomechanics as assistive devices to help older adults and clinical populations regain the healthy properties of their gait based on the optimal movement variability hypothesis [1]. Such metronomes incorporate properties of the optimal movement variability hypothesis in their operation. For example, an auditory metronome may feature a beat that follows a "pink-noise" distribution, so that research participants can synchronize their gait to the beat of the metronome [2]. However, existing gait metronomes remain naïve from a technological point of view. To this end, the use of immersive technologies, such AR, in the context of gait metronomes could significantly improve the quality of experience of research participants and offer opportunities for novel gait rehabilitation methods

DESIGN

In Figure 1, we present the design of our AR-based gait metronome. Our metronome runs on Microsoft Hololens 2 headsets and visualizes stimuli in the form of a bar that moves vertically. When the bar reaches its highest point, research participants are instructed to touch the ground with their feet as they are taking a step.

The movement of the vertical bar is based on different frequency distributions. The first available distribution is "pink noise" (representing healthy gait), the second is "brown noise" (representing an over-regular gait behavior), and the third one is a random distribution. We present the developed user interface in Figure 2.

Figure 1: The design of our AR-based gait metronome running on Microsoft Hololens 2 headsets.

CONCLUSIONS

In this abstract, we presented the design of a gait metronome based on AR. The developed metronome runs on Microsoft Hololens 2 headsets and features various frequency distributions to help research participants train their gait based on different properties. We expect the integration of AR with assistive devices to offer opportunities for the development of

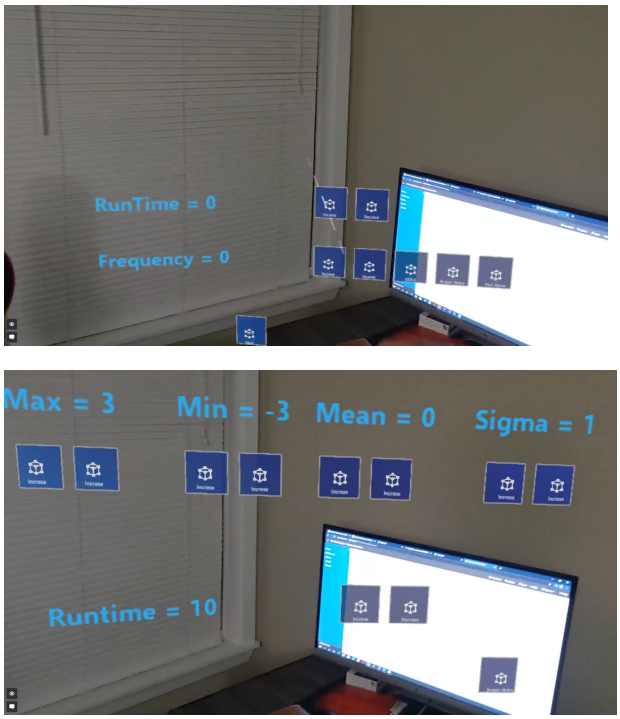

Figure 2: The user interface of our metronome. Users can select the desired frequency distribution for the movement of the bar as well as distribution-specific parameters.

novel gait rehabilitation methods to the biomechanics and human movement research community.

REFERENCES

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