The University of Texas at TYLER

TYL 4: SOAR

Dept. of & Mechanical Engineering

Virtual Reality-Robotic Walking Training Device

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Background

Stroke victims and SCI patients are usually prescribed with gait rehabilitation programs to avoid further health conditions, recover their gait cycle, and increase walking speed. The purpose of the project is to improve the inherited RWTD in order to improve its knee and ankle gait cycle accuracy as well as to increase patients speed, balance, and mobility with the implementation of a VR system.

Objective

1. Incorporate a synchronous knee and ankle gait that is within.90% accuracy of the motion capture data given
2. Design and implement a VR system for the robotic assistant.

Specifications

1. Coding motors for knee gait and ankle gait so that they produce a gait within 90% accuracy with respect to the motion capture data given.
2. Designing and implementing VR program to the device

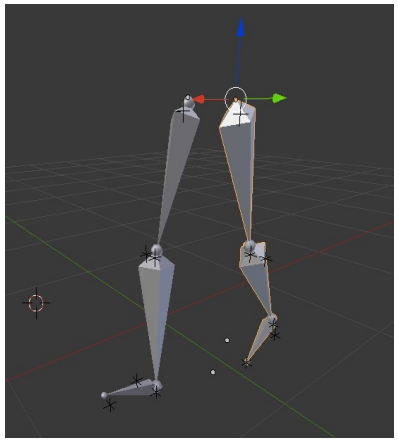

Figure 1. VR Animation Skeleton

Abstract

More than 50% of stroke victims have walking disabilities, and more than 90% of SCI patients lose sensory and motor control of their lower limbs. The goal of the VR-RWTD is to optimize the previous generation training device in order to get an accurate knee and ankle gait cycle. Additionally, the device will have the new incorporation of a VR system which will improve the patient's rehabilitation process.

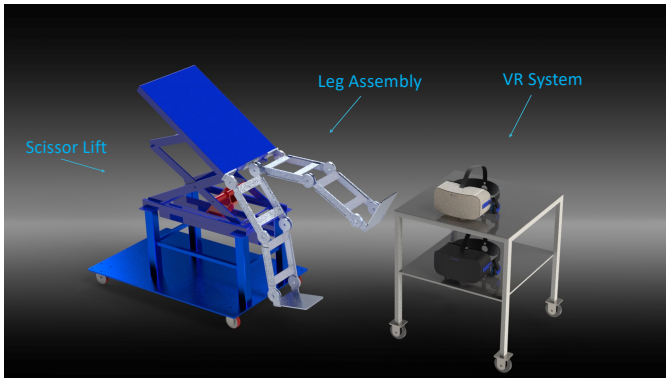

Figure 2. Full Assembly

Results and Discussion

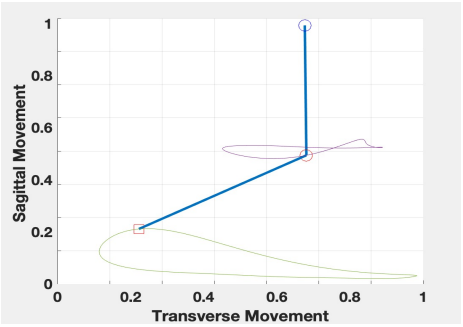

Figure 3. Knee and Ankle Simulation

Results and Discussion-Continue

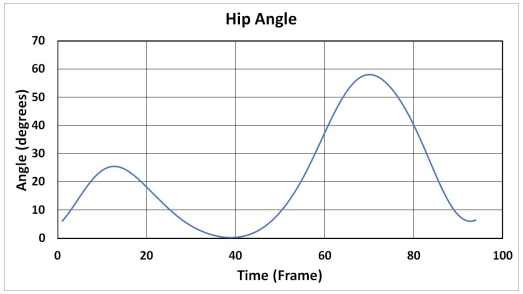

Figure 4. Hip Motor Output Angle

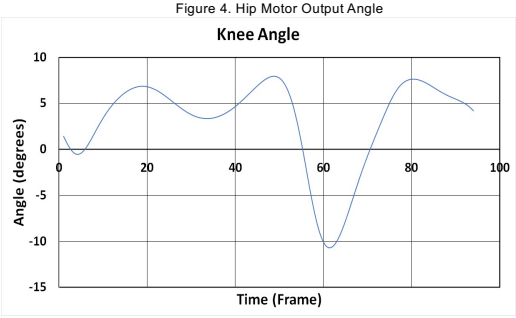

Figure 5. Knee Motor Output Angle

Figures 4 and 5 represent the hip and knee motor output angle calculated from the data collected from the UT Tyler biomechanics lab. These motor outputs will fulfill the gait 90% accuracy at each joint. Figure 3 represents a MATLAB simulation that shows the knee and ankle gait moving simultaneously, following the correct motion path to achieve 90% accuracy.

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