SRTP - Project Description Form #233

PART I:

Name of Schulich faculty member who will supervise the project	Douglas Ross
Supervisor's Schulich, Western, Hospital or Lawson Email	rleung96@uwo.ca
Schulich Department	Surgery
Name of Division Chair	Arjang Yazdani
Division Chair Email	Arjang.Yazdani@lhsc.on.ca

PART II - Project Description

Title of Project	Mixed Reality Automated Joint ROM Measurement Application

Background
Hand joint ROM measurements using a manual goniometer is a common and important tool used in hand surgery for both diagnostic and therapeutic purposes. However, manual measurements and subsequent documentation are both time consuming and error-prone. As a result, often times, hand measurements are not properly taken or documented.

Hypothesis
Mixed reality headset technology such as the Microsoft HoloLens has made significant advances in hand tracking capabilities. We propose an automated method of using mixed reality headsets to track/measure hand joint ROM with angles labeled directly on a captured image of the hands for immediate documentation as well. We hypothesize that it is feasible to use mixed reality headsets to track/measure joint ROM with auto-documentation on images that would significantly improve workflow efficiency and accuracy.

Proposed Methodology
We will develop a hand ROM measurement/documentation application for the Microsoft HoloLens using game engine development software Unity and software package MRTK for hand tracking/hololens specific user interface development.

Expected Outcomes
Development of a fully functional Microsoft HoloLens mixed reality application that is able to track, measure, and document all hand joint ROMs that is ready for use in early stage clinical testing

Research Environment – Description of the number of research personnel, primary location of research, size of lab, etc
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Hand joint ROM research will be done in conjunction with researchers at both St. Joseph and Victoria Hospital in direct collaboration with clinicians and engineers. Development equipment has already been purchased and proof-of-concept has been developed. Lead developer available to guide student through development process.

Names and titles of other individuals who will be involved with the research project?
Dr. Regina Leung - PGY 3 Plastic & Reconstructive surgery resident

Can this project be done remotely?	Yes
Duration of Project	One Summer

Expected Objectives/Accomplishments for Student?

Completion of mixed reality application expanding on proof-of-concept.

PART III - Certifications

Note: certification approval should be obtained prior to the start of the summer. Projects without this approval will not be a priority for funding.