Informatics Institute of Technology

In collaboration with

University of Westminster, UK

Cybersickness Susceptibility Index for Virtual, Augmented & Mixed Reality Applications

A dissertation by

Brion M. Silva

Supervised by

Pumudu Fernando

This report is submitted in partial fulfilment of the requirements for the

BEng(Hons) Software Engineering degree at the

University of Westminster

May 2019

Abstract

Virtual, Augmented & Mixed Reality (VAMR) applications has already taken up the consumer market by storm and are demanding among users owing to their practicality and aesthetics. Despite the massive popularity and hype, VAMR carry a loathsome side-effect called "Cybersickness", which is often times severe enough to cause significant discomfort to the users causing the discontinuation of use. Studies have been going on for years with the intentions of finding the theories and factors which contribute to this unpleasant experience but still the underlying contrivances of cybersickness have not been defined. The existing solutions to counteract cybersickness do a decent job in quantifying the cybersickness levels in applications but lacks in predicting susceptibility.

To address the above mentioned issues, the CSSI algorithm was designed utilising the commonly identified contributing factors of cybersickness and this algorithm was later used in a system which could potentially be used as quality assurance platform for cybersickness susceptibility testing in virtual reality applications. The system could be used by quality assurance engineers, researchers and developers to test their applications and the architecture of the system provides ability to extend the system with pluggable contributors.

An experiment was specially designed with intentions of testing and quantifying the accuracy of the system and the CSSI algorithm exhibited an accuracy rate of 77.68% during the testing process. The outcome of this project could be further developed towards an intelligent self-learnable system which could potentially eradicate the existence of cybersickness once in for all.

Subject Descriptors:

- Human Computer Interaction
- Computer Vision
- Image Processing

Keywords:

Cybersickness, Simulator Sickness, Virtual Reality, Augmented Reality, Mixed Reality