HIT3061 – Software Team Project - Semester 2, 2013

Leap Motion Development

Software Requirements Specification

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**Table 1. Document Change Control**

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| Version | Date | Author | Changes |
| 0.1 | 27/08/2013 | Joshua Stopper | Create Document  Create Content Areas  Names added |
| 0.9 | 02/09/2013 | Joshua Stopper | Continue to fill out remain sections |
| 0.91 | 02/09/2013 | Minh Duc Nguyen | Continue Section 4 |
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| 0.93 | 04/09/2013 | Tran Xuong Tran | Reformat some content |
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**Table 2. Document Sign Off**

|  |  |  |
| --- | --- | --- |
| Name | Signature | Date |
| Joshua Stopper |  |  |
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# 1 – Introduction

Over one year ago, Dr. Phillip Michael from the Royal Victorian Eye & Ear hospital discovered the capability of the Leap Motion Controller to track 1/100th of a millimeter changes in the location of fingers at up to 200 times a second. In an attempt to advance the state of the industry, Dr. Phillip Michael has brought the project to Swinburne University to make the advancement a reality.

In collaboration with Swinburne University, Dr. Phillip Michael and select students, the Leap Motion Controller will attempted to be used to detect tremors in surgeons hands whilst outputting to a display a variety of characteristics relating to their tremor.

In continued analysis by Dr. Phillip Michael of the Leap Motion Controller and what can be achieved, the use cases attributed with controller expanded from not only surgeons hand but also to patients with Parkinson’s disease. The controller and developed software in this case will provide Drs. as well as patients the ability to see the level of progression of the disease, as well as whether or not medications to treat the disease are working.

## – Purpose

The purpose of this document is to detail the requirements of the project so that a product can be developed that meets the requirements. As such, this document is for the client and the developers so that an agreement can be reached.

## – Scope

**Name**

* Tremor analysis with Leap Motion

**What the software will do**

* Display the characteristics of tremor in the hand, providing the amplitude, velocity and frequency of the tremor
* Software contains brief tutorials in use of the software
* Software contains instruction in the use of the software in real time.
* Software provides a means to export the data recorded by the leap motion device to a file
* Software provides a means to save results of a user’s test

**What the software will not do**

* Provide a specific rating of how severe or mild a tremor is
* Be liable in the event that a surgeon has a tremor during operation
* Give a concrete output whether the surgeon is ready for operation

**Application and use of the software**

* Surgeons test their hands pre-operative to determine if they are able to perform
* Drs. Clinics testing tremors in Parkinson’s patients
  + Comparing past results of patients

**Benefits of the software**

* Tremor can be tested in real time without expensive hardware
* Tremor can be detected in a non-intrusive way

**Objective of the software**

* To develop software that will interface with the leap motion controller and detect the level of tremor in the hand. This includes tracking the frequency, velocity and amplitude of tremors.

## – Definitions, Acronyms and Abbreviations

*Provide the definition of all terms, acronyms, and abbreviations used in the SRS.*

|  |  |
| --- | --- |
| **Word** | **Definition** |
| LM | Leap Motion |
| LMD | Leap Motion Device |
| JS | JavaScript |
| API | Application Programming Interface |
| Local | The software/hardware is being executed/stored on the machine the end user is accessing |
| Remote | The software/hardware is being executed/stored on a machine separate from the end user |
| Hertz | Unit of frequency that defines a rate of change. Hertz defines the rate of change |

# - Overall Description

Leap Motion is a tiny device with sensors that interacts with the computer via USB cable. It is able to track and identify a user’s hand movements and gestures to very precise figures, allowing us to use it as a means to track tremor in hands.

## 2.1 - Product Features

* Software possesses ability to measure the amplitude, frequency and velocity of a user’s tremor and display this information to the user
* Instructions on how to complete test are available in real time, giving the user feedback on how to use the program correctly
* Software allows the results of a test to be recorded and saved in a file

## 2.2 System Requirements

### 2.2.1 - Development Requirements

|  |  |
| --- | --- |
| **Requirement** | **Explanation** |
| Leap Motion Device | This device is what records the motion and sends the data to the computer |
| Leap Motion Driver | This software interfaces with the leap motion device and converts the binary into usable data |
| Leap Motion JSAPI | The Leap Motion JSAPI provides a javascript interface to the leap motion device. |
| Computer | The computer will perform the calculations required by the software |
| Local Web Server | This software will host the code for execution in a web browser |
| Web Browser (Chrome/Firefox/IE/Safari) | The web browser will run the software developed |
| IDE/Text Editor | The software will be developed in this software. |

### 2.2.2 – Production Requirements

|  |  |
| --- | --- |
| **Requirement** | **Explanation** |
| Leap Motion Device | This device is what records the motion and sends the data to the computer |
| Leap Motion Driver | This software interfaces with the leap motion device and converts the binary into usable data |
| Leap Motion JSAPI | The Leap Motion JSAPI provides a Javascript interface to the leap motion device. The JSAPI will be included when the web page is loaded, therefore not required locally |
| Computer | The computer will perform the calculations required by the software |
| Web Browser (Chrome/Firefox/IE/Safari) | The web browser will run the software developed |

### 2.2.3 – Hardware Requirements

|  |  |
| --- | --- |
| Component | Minimum Requirements |
| Processor | AMD Phenom ™ II or Intel® Core™ i3, i5, i7 |
| Memory | 2 GB RAM |
|  | USB 2.0 port |

### 2.2.4 – Software Requirements

|  |  |
| --- | --- |
| Software Requirements | |
| Operation System | Windows® 7 or 8 or Mac® OS X 10.7 |
| Browser | Chrome/Firefox/IE/Safari |

## 2.3 Documentation

* Real time tutorials in how to use the software
* Manuals in how to install, plug in, and use the hardware
* Manuals in how to install, configure, and use the software
* Testing documentation during the building of the software
  + Use Cases
  + Software outputs

# 3 System

Leap Motion Device

Leap Motion Airspace

Leap Motion JSAPI

Leap Motion JS Controller

HTML – JAVASCRIPT – CSS FILES

# 4 Interface Requirements

## 4.1 User Interfaces

The user will interact with the Leap motion controller via a HTML webpage developed in HTML5, CSS and JavaScript (Figure 1 shows an example of how the Leap Motion Device is used). The user will choose what type of test they would like to take and then the screen will present them with the required information to take the test.

|  |
| --- |
|  |
| Figure 1. Example of how Leap Motion Device is used. Hand movements above the sensor will be captured by the device and can be accessed at a later stage. |

On the testing page, there is a frame showing the movement of the user’s hand. The program will give the user feedback about where they need to move their hand to be in ideal testing range. Once in the correct position for a certain amount of time the program will inform the user that the test is about to begin. The user will then hold their hand in position for the duration of the test and will then display the results on the screen.

## 4.2 Hardware Interfaces

The Leap Motion Airspace application runs HTML5 socket server that the Leap Motion JSAPI communicates with. Therefore it requires a browser that supports HTML5 sockets such as Chrome, Firefox, and Safari to work correctly.

Wampserver is the application that can be used to manage the connection session. For the Mac user, Mampstack is the replacement.

## 4.3 Software Interfaces

The system we develop will not need to interface with a database as the results of the test will be saved in a file locally stored on the machine.

## 4.4 Communication Interfaces

The software will communicate over HTTP to request the pages local or remotely. HTTP Post and get will also be used to place data on the servers.

# 5 References:

Js.leapmotion.com. 2013. *leapjs*. [online] Available at: http://js.leapmotion.com/ [Accessed: 17 Sep 2013].

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