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 |
| 0.92 | 02/09/2013 | Tran Xuong Tran | Continue Section 2 |

**Table 2. Document Sign Off**

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| Name | Signature | Date |
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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 details about select points of the hand and fingers.

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

*Start by providing a name for the software and then list what the software will and will not do. Describe the applications/uses of the software, including its benefit and objectives. Do not list the software requirements, as this should be a high-level summary*

**Name**

* Tremor analysis with Leap Motion

**What the software will do**

* Display the level of tremor in the hand in Hertz (metric) to a display
* 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 import the data saved to a file for analysis, replay
* Software provides a means to replay two sets of data for comparison

**What the software will not do**

* Provide analysis of the data recorded outside tremor in hertz
* 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.

## – 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 |

# 2 - Overall Description

*Discuss the context of the software being developed. For example, is it an upgrade or a replacement of an existing product? Is it a new and complete system? Is it a prototype? Is it a component of a larger system or a library? A simple diagram showing how the software relates to other components will be helpful.*

Leap Motion is a tiny device with a sensor and interact with the computer by an USB cable. People can be tracked the movement of the hands in the natural way such as point, wave, reach and grab.

## 2.1 - Product Features

*Summarize the significant features of the software in high-level. Section 1 prepares the reader, while Section 2 presents the software.*

* Display the level of tremor in the hand in Hertz (metric) to a display
* 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 import the data saved to a file for analysis, replay
* Software provides a means to replay two sets of data for comparison

## 2.2 System Requirements

*Discuss the minimum software and hardware requirements needed to deploy the software. Be careful not to state specifications beyond what is required. Also note that development and production requirements may be different.*

### 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

*List all the documents that will be delivered along with the software. This may include user manuals, tutorials and technical manuals.*

* 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

*Describe using appropriate models the high architecture of software that will be developed. This section can be organized by function, module, object class, or in a logical way to break down your software.*

Leap Motion Device -> Leap Motion Airspace -> Leap Motion JSAPI -> Leap Motion JS controller -> HTML-Javascript-css files

# 4 Interface Requirements

*Describe how the software communicates with other entities when it is executing. These may include (If any sub-sections below do not apply, the sub-section should state “The software has no <sub-section heading> interface requirements.*

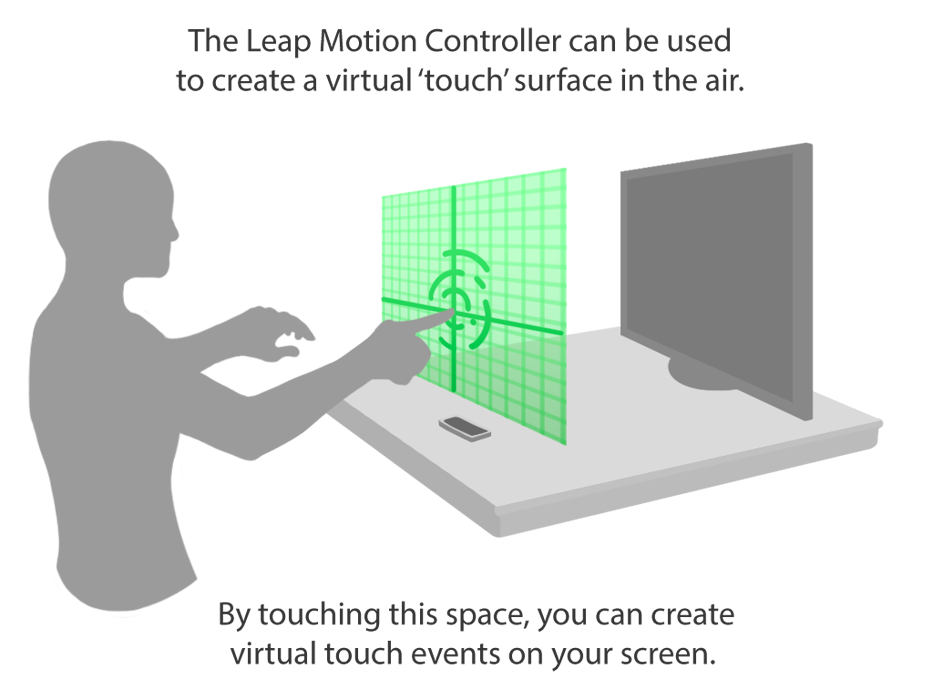
## 4.1 User Interfaces

*Describe how the user will interact with the software. This may be sample GUI or a console user screen.*

The user will interact with the Leap motion controller via a html webpage developed in HTML5, CSS and javascript. 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.

On the testing page, there is a frame showing the movement of user hand. Also, a sample instruction displays to instruct user in moving the hand to the right spot before conducting the test.

The instruction image can be as the below picture



## 4.2 Hardware Interfaces

*Discuss the hardware that the software will interface to. Describe how the software communicates, and/or controls the hardware. This may include the communication protocol used and interface requirement such as communication port.*

Leap Motion Device -> Leap Motion Airspace -> Leap Motion JSAPI -> Leap Motion JS controller -> HTML-Javascript-css files

The leap motion airspace application runs a html5 socket server that the leap motion JSAPI communicates with. Therefore requiring a browser that supports html5 sockets such as Chrome, Firefox, Safari, etc

In order to run socket server, Node.js library has to be installed. Node.js library can be found on <http://nodejs.com>

Warmserver is the application that includes both of Apache and Mysql that are used to store user information and manage connection session. For the Mac user, Mampstack is the replacement.

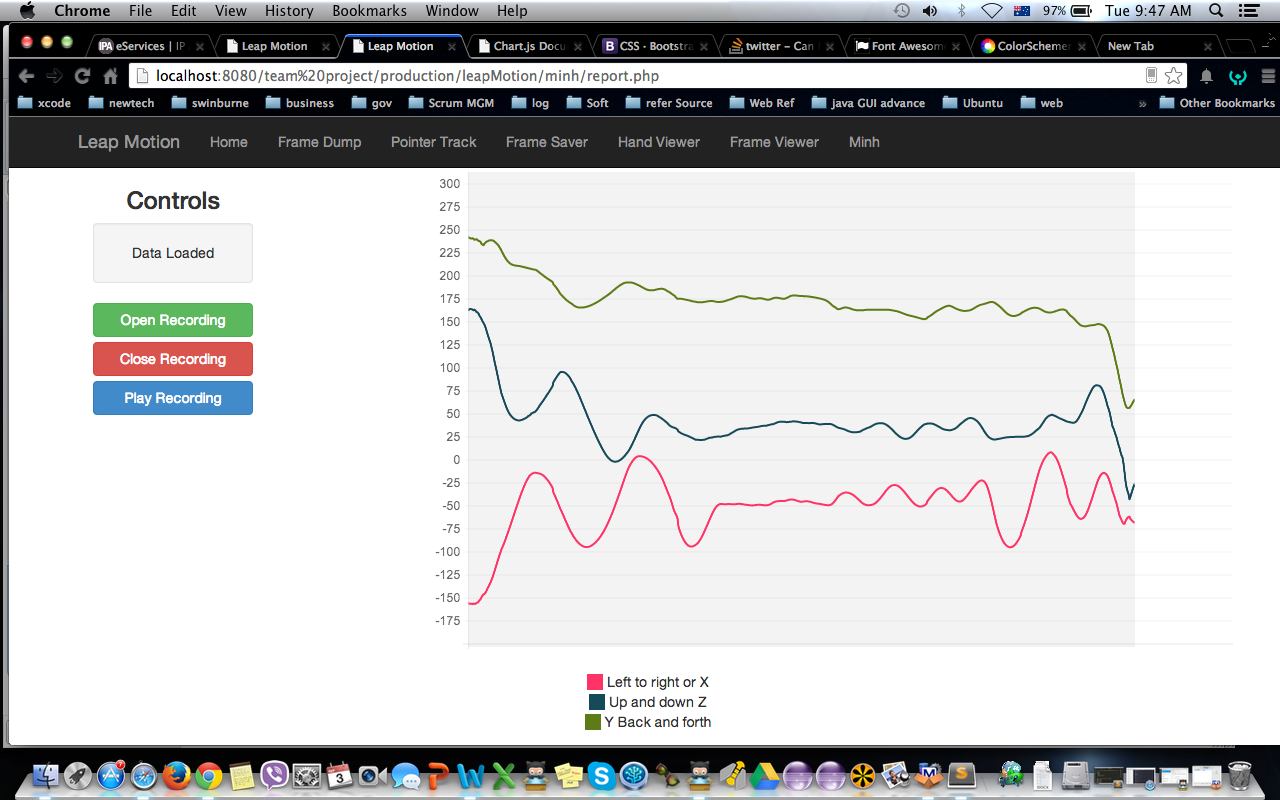
## 4.3 Software Interfaces

*Discuss the other software applications that the software will interface to. Other software applications may be database systems, and web servers. Complete information of the other software applications must be provided, such as name, version and source. Describe how the software interacts and/or communications with these other software.*

Leap Motion Device -> Leap Motion Airspace -> Leap Motion JSAPI -> Leap Motion JS controller -> HTML-Javascript-css files

The frontend we develop will communicate with a remote or local server for file storage, these files will contain recrdings of users in a centralized location.

The output of the test will be a set of graphs that collects user moving data. According to the performance and the threshold on the graph, system will generate appropriate report to assess user tremor status.



## 4.4 Communication Interfaces

*Discuss the communication interfaces that the software uses. These may be local area network communication, internet communication via HTTP/HTTPS or FTP/SFTP. If the communication is through another software application do not include it here.*

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:

*If you have got information from published sources, show where it came from. Put a superscripted number after the place in the report where the information is used, and list the details of the reference here.*

*1. Hamlyn-Harris, J H , “DEVELOPMENT OF A COMPARATIVE WEAR TEST FOR PVD COATED HELICAL ENDMILLS", Proc. "Materials Conservation, Materials Research Forum 1997, Centre for Advanced Materials Technology (CAMT), Monash University, Melbourne, 1997, pp. 49-52.*

*Don’t forget the page numbers. No-one want’s to read an entire book just to check one little fact.*