HIT3061 – Software Team Project - Semester 2, 2013

Leap Motion Development

Test Plan

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**Table 1. Document Change Control**

|  |  |  |  |
| --- | --- | --- | --- |
| Version | Date | Author | Changes |
| 1.1 | 09/09/2013 | Daniel Corsaletti | Create Document |
| 1.2 | 27/09/2013 | Daniel Corsaletti | Updated more sections of document |
| 1.3 | 30/9/2013 | Minh Duc Nguyen | 1.3/ Measurable  4.2/ Technical Environment  5/ Function to be tested (table)  6/ Deliverables ( 6.1 – functional test result, 6.2 – Usability Questionaires |

**Table 2. Document Sign Off**

|  |  |  |
| --- | --- | --- |
| Name | Signature | Date |
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Table of Contents

1 Test Plan 3

1.1 Introduction 3

1.2 Objectives 3

1.3 Measurable 3

2 Scope 4

3 Test Strategy 5

3.1 Function Testing 5

3.2 Usability Testing 5

3.3 User Group 5

3.4 Metrics 5

4 Environment Requirements 6

4.1 Physical environment 6

4.2 Technical Environment 6

5 Functions to be tested 7

6 Deliverables 9

6.1 6.1 Functional test results 9

6.2 User Acceptance Questionnaire 9

7 References 10

8 Bibliography 11

# Test Plan

*Discuss in general what you will be testing, then identify the test objectives (about 3 to 10) of the project that are at a high level breakdown of the goal. The test will be measured by whether these objectives are met. The objectives should be measurable statements if possible. List the objectives in order of importance.*

## Introduction

This test plan will be used so we are able to accurately identify and track which aspects of our program need to be tested to ensure that the data we are gathering and supplying to the client is correct and that the overall project is reliable and fulfils their requirements.

## Objectives

The main criteria to ensure that this project is a success, is to make sure that our software can accurately track a tremor in the user’s hands. In order for this goal to be achieved we must make sure that our methods of calculating a tremor are correct. Our main objectives from testing include:

* Ensuring tremors are accurately identified
* Track a user’s movement precisely
* Test for use with 1 hand
* Identify any situations where the Leap Motion device might struggle to capture data accurately
* Ensure ease of use of software
* Store and retrieve all relevant data
* Identify and report as many bugs and/or issues as possible

## Measurable

The specific objectives of the test plan are to measure:

* Hand Tremor variables for each finger include:
  + Hertz
  + Amplitude
  + Velocity
  + Acceleration
* The noise filter during the data capturing session, which means that the system should apply Math algorithm to detect whether a movement is a hand tremor or a noise.

# Scope

*Define what will be tested. Specify what the test will and will not accomplish. Examples are data entry, file transfer, security, report generation*

Testing of this project will be used to ensure whether the project meets all of its functional and business requirements. By assessing the validity of its results and testing its usability, we are able to assess whether what we are handing over to the client is what they required.

To test the accuracy of our tremor indication, we will hopefully be able to get some test data from our client to compare to. The client already has a method of recording tremors in a user’s hand; however the only way to do this is using expensive equipment, which is why our solution is needed. If we are able to get results from a test using this equipment and then compare to results that our software generates we should be able to judge whether our method is accurate.

Our software will also be tested for usability, to ensure that our client will be able to use it in his own environment. To test this we must have test subjects who are asked to use the software and determine whether all of the instructions given to them about using it are reliable guides. They must be able to understand where they must place their hands and they must be able to figure out how to access their test data.

Other tests that must be completed will rely more upon the reliability of the Leap Motion device. We must ensure it is still able to function correctly under different circumstances that our client might be in. To test for this we will be using the device with different situations of the client in mind, for example, with gloves on, or with freshly cleaned hands. We do not expect there to be any issues, however testing is still necessary.

For our testing purposes file generation will be necessary, however in the final product the client has not asked for any file saving so we will not need to test the effectiveness or the ability to store these files anywhere. As previously stated, the accuracy of the Leap Motion device has already been proven in journal articles so the device’s ability to accurately track movement will not be tested.

# Test Strategy

*Discuss what test strategies will be used in your project. Examples are automated testing, stress and load testing, security test, recovery test, user acceptance test.*

## Function Testing

## Usability Testing

## User Group

## Metrics

# Environment Requirements

*Identify work places, computers, user accounts, server accounts, DBMS, and stationary*

*required for testing.*

## Physical environment

To get an accurate assessment on how well our program correctly calculates tremors we may need to use software that already detects tremors and then compare the results. This means we will need to get the client to supply us with some test data from the machines that he already uses and maybe add in a Leap Motion device to track the hand movements as well. We will need something to compare our results to if we want to make sure our software works.

If this method of obtaining similar results is unfeasible then we must find a way for our results to be assessed and compared to what a user would expect. Aside from using things like accelerometers and high speed cameras, it may be easier to set up a test case where a user will have their hand movements recorded on camera and then both the recording and results of the test are shown to our client to see if he believes these results look accurate. It may not be an ideal testing situation but if the client is happy with this type of testing it could be useful. For these tests we will also require a camera and have our client (or another surgeon familiar with tremors) to come in and check recorded tests.

Another aspect of the program to test will be testing the program under different circumstances that the client will be in. As a surgeon we believe it is possible he could be wearing gloves or having freshly washed hands which could raise or lower the temperature of his skin. A user may also be wearing rings or jewellery that may interfere with the Leap Motion device so it’s important we test for these factors too. We aim to replicate these situations and test to make sure these do not interfere with the results.

## Technical Environment

Hardware:

* CPU: Core 2 Duo 2.0Mhz
* RAM: 2 GB
* Free space for software application requires at least 500 MB
* Monitor: 32bits or higher display adapter
* Keyboard
* Mouse
* LeapMotion device

Software:

* Internet browse.IE 8, Google Chrome,firefox.
* Windows XP, 7 macOSX lion
* Apache Server for hosting the web application such as WarmpServer, Mampstack, Uniserver, etc
* LeapMotion device driver

Network:

* Web application works in either online or offline network connection

# Functions to be tested

The main functionality of our software will be to track a tremor in a user’s hand. The different statistics of this tremor that we are trying to capture include the frequency, the amplitude, the acceleration and the velocity of the tremor. We will need to test that each of these is correctly being calculated. It will be difficult to confirm these calculations are correct, however using journal articles we can confirm that the Leap Motion device is accurate, so using simple calculations to gain maximum values and changes in direction is a simple task. As previously stated, a method of testing our calculations would be to show somebody who is familiar with tremors the visual recording of a test and hopefully producing what are expected results.

Another factor that is present in tremor calculations is the identification and removal of any noise in a user’s movements. Once this is calculated then we can get a proper reading of a tremor, and the software’s ability to identify and display information about the tremor can be assessed.

Some of the functionality of this test will be the ability to be guided and interact with the software without the use of a mouse. The user will be able to begin a test by holding their hand over the Leap Motion sensor and being told if they are using the software correctly or not. We need to make sure accessing a test and completing it is possible without even touching a mouse or keyboard once inside the software.

The software will be used on only 1 hand; however ideally it will not have a specific hand that needs to be used. We must test that a user is able to use either a right or a left hand without making any changes to the test. This is mainly for the preference of the user, however if restrictions need to be made and only allow a specific hand then that is a change we will have to investigate.

As part of our testing we are creating output files of all tests, however the client didn’t want any file storage as a functional requirement. He was happy for the software to only display the results on the screen at the end of the test. This means no file storage tests will need to be conducted.

A list of function to be tested is in below table

|  |  |  |
| --- | --- | --- |
|  | **Test Case Objective** | **Expected output (Pass requirements)** |
| 1 | Detecting Leap Motion device connection | Display appropriate message to indicate user whether the device has been connected/disconnected |
| 2 | Validate noise in movement | Should display appropriate message to indicate user whether current movement is a tremor or a noise during the assessment task |
| 3 | User instruction | A set of user interaction instruction of hand movement should be shown before and after the measuring task. For instance, a picture of moving a hand on top of Leap Motion device will show before initiating the data capturing, and a picture of moving a hand out of Leap Motion device when the data capturing session is done. |
| 4 | Output value of 4 variables for each finger: Hertz, Amplitude, Velocity and Acceleration | A summary page for 4 output values must be displayed after finishing capturing task. |
| 5 |  |  |
| 6 |  |  |
| 7 |  |  |

# Deliverables

*Identify and list the documents that will capture the results of your testing. Results must answer the test objectives that are listed in section 1.*

A document that includes the results of the client reviewing our test data footage will be delivered to show the results of our testing. This will include the results of different tests that were conducted by different users and whether our client was satisfied with the results that were produced for each test.

This document will also contain the results for the usability tests of our software. We will identify how easy our software was to use without having to interact with a mouse or keyboard to conduct a test. Here we will also, identify if the software is useable in a variety or possible situations like while wearing gloves or jewellery. We will also discuss the results of what hands can be used while testing.

A defect document will be used to identify any faults or bugs that we discover through testing. This will be used as a document to identify any faults that we discover throughout the design process.

## 6.1 Functional test results

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **#** | **Test Case Objective** | **Date** | **Pass** | **Failure** |
| 1 | Detecting Leap Motion device connection | 24/9/2013 | Yes |  |
| 2 | User instruction | 26/9/2013 | Yes |  |
| 3 | Output value of 4 variables for each finger: Hertz, Amplitude, Velocity and Acceleration | 26/9/2013 | Yes |  |
| 4 | Validate noise in movement |  |  |  |
|  |  |  |  |  |
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## User Acceptance Questionnaire

1. Do you feel it’s easy to use the system and why?
2. Do you feel that the presentation components are well designed and presentable? If not, please specify
3. Do you think that functionality of capturing tremor data has been meet in accordance to specifications in term of accuracy or needs improvement?
4. Could you specify the level of satisfaction you found while testing the product? (Rate from 1 to 10)
5. Other Comments (if any)

Do we need to show client about testing documentation and acceptance form in regarding user is also client?

# References

# Bibliography