HIT3061 – Software Team Project - Semester 2, 2013

Leap Motion Development

Project Plan

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**Table 1. Document Change Control**

|  |  |  |  |
| --- | --- | --- | --- |
| Version | Date | Author | Changes |
| 0.1 | 02/09/2013 | Joshua Stopper | Create Document  Create Content Areas  Names added |
| 1.1 | 02/09/2013 | Daniel Corsaletti | Filled in sections in 2 and 3 |
| 1.2 | 02/09/2013 | Minh Duc Nguyen | Filled in section 8 budget |
| 1.3 | 24/9/2013 | Tran Xuong Tran | Filled in section 6  Modify and adding content |
| 1.4 | 26/9/2013 | SHENGWEI LI | Filled in Section 3,4 |
| 1.5 | 29/9/2013 | SHENGWEI LI | Filled in the section 2, 5 |
| 1.6 | 1/10/2013 | Tran Xuong Tran | Filled in section 7 |
| 1.7 | 4/10/2013 | SHENGWEI LI | Continue the section 4 and 6 |
| 1.8 | 8/10/2013 | SHENGWEI LI | Complete section 4 |

**Table 2. Document Sign Off**

|  |  |  |
| --- | --- | --- |
| Name | Signature | Date |
| Joshua Stopper |  |  |
| Minh Duc Nguyen |  |  |
| Tran Xuong Tran |  |  |
| Daniel Corsaletti |  |  |
| Shengwei Li |  |  |

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# 1 - Introduction

## - Purpose of Document

The purpose of this document is to specify the details of the project. This includes who the development team is, whom the key stakeholders are, the objectives and boundaries of the project, the deliverables and schedule as well as the resources and risks associated with the processes due the project. This project plan is for the client and the development team as it will only provide a clear overview of the whole project as well as give detailed steps to completing the project.

## 1.2– Background

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.

Fueling the drive for the project is the belief that the outcome can change an existing complicated and expensive process of detecting attributes of tremor into an easy to use, non-invasive and cheap process.

## 1.3 - Key Project Personnel

### 1.3.1 - Client

Dr. Phillip Michael of the Royal Victorian Eye & Ear Hospital is the client who brought the project to Swinburne University of Technology.

### 1.3.2 - Stake holders

**Unit Convener:** Ryszard Kowalczyk

Professor Ryszard is the unit convenor for Software Team Project. As convenor, Professor Ryszard ultimately decides whether or not the work completed is satisfactory. Professor Ryszard also provides a secondary (elevated) point of contact for the team in the event that there is an issue that can’t be resolved internally.

**Project Supervisor:** Caslon Chua

Caslon Chua is the project supervisor for this project. Caslon decides whether or not the work completed is satisfactory. Caslon also provides a first point of contact for the team in the event that there is an issue that can’t be resolved internally.

**Swinburne Project Contact:** Mark Schier

As a client contact, Mark has an interest in the outcome of the project, as he would like to see the project succeed. Mark has domain knowledge that will be useful to the project.

**Development Team:** Daniel Corsaletti

As a student enrolled in Software Team Project, the success or failure of this project will directly affect the received mark for this unit.

Role: Documentation

**Development Team:** Joshua Stopper

As a student enrolled in Software Team Project, the success or failure of this project will directly affect the received mark for this unit.

Role: Developer and Team Leader

**Development Team:** Shengwei Li

As a student enrolled in Software Team Project, the success or failure of this project will directly affect the received mark for this unit.

Role: Documentation

**Development Team:** Minh Duc Nguyen

As a student enrolled in Software Team Project, the success or failure of this project will directly affect the received mark for this unit.

Role: Developer

**Development Team:** Tran Xuong Tran

As a student enrolled in Software Team Project, the success or failure of this project will directly affect the received mark for this unit.

Role: Documentation

### 1.3.3 - Project Supervisor, Team Leader and key Project Members

**Project Supervisor:** Caslon Chua

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**Project Client:** Michael Phillips

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# 2 - Terms of Reference

## 2.1– Goals

To develop software that will interface with the Leap Motion controller and detect attributes of tremor in the hand.

The target audience is varied. Firstly, the software developed will be for surgeons who want to test the level of tremor in their hand pre-operation. Additional goals that would hopefully be achieved are being able to use the software to visualize improvement in steadiness and movement in an individual’s hands and to hopefully be useful for patients with conditions like Parkinson’s.

## 2.2– Objectives

* Software can capture and analyze movement of a hand, including measuring the frequency, velocity, acceleration and amplitude as outputs of data capturing.
* Software can validate valid hand position in order to start recording.
* Software allows user to adjust following options: recording time, number of fingers, and valid range multiplier which is the distance from the middle of the above device to the range counting as 10 centimeters in 3 different dimensions (x – horizontal, y – vertical, and z – backward and forward).

## 2.3 - Scope

The project will be used as a reliable and easy way to identify and track tremors in a user’s hands. The aim of this project is to identify the characteristics of a tremor in a user, however this will not be used to give a rating on how steady a user’s hands are.

Initially we believed this project will be used to help identify whether a surgeon should be operating or not, however we have discovered that it will be used by someone to track the tremors in their hands. It seems that this project will be used to give a visual representation to the idea of a user having varying tremors under different circumstances.

The final outcome of this project will allow a user to check the characteristics of the tremor in their hands in different situations. A completed test will return statistics about the velocity, frequency and amplitude of the tremor in each of the user’s fingers. The results of the tests are saved so that they can be compared against at a later stage.

We have planned to initially only gather this information from a user holding a steady hand over the leap motion sensor, however as per Phillip’s request, if we find we have the necessary time and capabilities we may try to test for steadiness by other methods, like drawing a horizontal line with a pen and analyzing how straight its path remains.

Primary development on this project will mainly consist of using the Leap Motion API to develop a JavaScript application that allow us to track movements of a user’s hands. Once we have got the software in place we must put a lot of effort into correctly analyzing a tremor in hand movement. With the API already available this project may be finished relatively early, however if this is the case we must try as hard as possible to incorporate Phillip’s request for the program and allow it to run multiple types of tests.

## 2.4 - Critical Success Factors

* The accuracy of measuring a tremor in a hand is incredibly important. We need to gather an accurate reading to be able to correctly calculate the frequency, velocity and amplitude of it
* The Leap Motion device should be easily used by surgeons, and our software must make it easy to interface with. The aim of this project was to gather this data in a cheap and easy method, so it must get accurate data easily
* We need to maintain a great degree of communication with the client while we develop this project. Constant input and feedback from the client will ensure that this project is really suited to their needs

## 2.5 - Acceptance Criteria

For the client to accept this project they will have to determine whether the project we have created for them is an effective and accurate way of capturing tremors in a user’s hands. If the program is not able to effectively measure these tremors, whether by error of calculation or an issue with the Leap Motion device, then the project will not be a success and the client will not accept it.

If the project does effectively capture all of this data, it will still have to be easily useable by the client. The client already has methods of capturing this data, however these methods are expensive and difficult, meaning if our project can gather data easily it will be a success and can be accepted by the client.

# 3 - Establishment

## 3.1 - Processes, Procedures and Standards

In the project, we will use ISO as our standard. Based on ISO 13407 outlines four essential activities in a USER-Centereddesign project:

* Requirements gathering - Understanding and specifying the context of use
* Requirements specification - Specifying the user and organisational requirements
* Design - Producing designs and prototypes
* Evaluation - Carrying out user-based assessment of the site

Because this project is specially designed for Dr Philip Michael, so we decide to choose usability testing and interview as user-centered design methods. For usability testing, we will collect data from people. A person is invited to attend a session in which they'll be asked to perform a series of tasks while a moderator takes note of any difficulties they encounter. We also time users to see how long it takes them to complete tasks, which is a good measure of efficiency.

Interview involves interviewer speaking to one participant at a time. During the interview, participant's point of view can be explored in detail. It is also the case that any misunderstandings between the interviewer and the participant are likely to be quickly identified and addressed.

## 3.2 - Project Environment

Each team member is equipped to develop and contribute to the project. Each member has a computer and is able to access the freely available JavaScript API for Leap Motion development and the Leap Motion devices are being rotated between each team member, allowing everyone to have an input. The software will be available to run in an Internet browser so long as the Leap Motion device has been installed, the developed software will run.

## 3.3 - Project team skill development requirements

Team members need to familiarize themselves with JavaScript development as it is the preferred development language for the team. Everyone will then be required to learn how to develop applications for Leap Motion using the Leap Motion API. We must also research a great deal about hand tremors to ensure we are able to identify and track them precisely. Everyone has to learn how to track the amplitude and frequency of a hand.

# 4 - Activities, Deliverables and Capital Resources

## 4.1– Deliverables

|  |  |  |
| --- | --- | --- |
| **Deliverables** | **Completion Date** | **Cost if applicable $** |
| Group set up | 20/08/2013 |  |
| Project analysis | 21/08/2013 |  |
| Project tasks assigned | 22/08/2013 |  |
| Gain client requirement | 26/08/2013 |  |
| Analysis and Define the requirement | 26/08/2013 |  |
| Leap motion API research | 27/08/2013 |  |
| Software Environment set up | 28/08/2013 |  |
| Software plan design | 28/08/2013 |  |
| Software Requirements Specification  Start | 29/08/2013 |  |
| Software coding version 1.0 | 03/09/2013 |  |
| Leap motion version 2.0 | 13/9/2013 |  |
| Interface version1 | 20/9/2013 |  |
| Leap motion version 3.0 | 27/9/2013 |  |
| Testing version 1 | 10/10/2013 |  |

## 4.2 - Activities and Tasks

Using the phases, stages and activities defined in the selected process or lifecycle, identify the activities to be executed to produce each deliverable. Define the tasks for each type of activity.

|  |  |  |
| --- | --- | --- |
| Development phase | Life Cycle Process | Activity |
| Software life cycle model planning | 1. Define the software life cycle model | 1. Identify the candidate in software life cycle 2. Select project model |
| Project management | 1. Project initiation 2. Project monitoring and control 3. Software quality management 4. Documentation | 1. Project plan 2. Define the activities 3. Allocate the project resources 4. Set up environment 5. Risk analysis 6. Records 7. Set up check points 8. Quality plan 9. Define metrics 10. Potential improvement |
| Development | 1. Research 2. Requirement analysis 3. Design 4. System set up 5. Implementation | 1. Identify needs 2. Analysis functions 3. Development architecture 4. Customer requirement analysis 5. Define Development requirement 6. Interface design 7. Coding 8. Final project |
| Testing | 1. Test plan 2. Test case 3. Test result | 1. Draft plan 2. Use case 3. Match requirement 4. Function testing 5. Usability testing |
| Review Documentation | 1. Conduct documents | 1. Collect all the requirement for the final deliverable |

# 5 - Resources

## 5.1 -Organization and Structure

A goal is achieved by doing any activities. Each activity is divides up into many tasks.

Describe the organizational structure that will be used during the project. Be sure to include every role (especially business users who will be interviewed during the requirements modeling and those involved in acceptance testing).

This is not just your team. It is anyone else who has direct interaction with the software – e.g. clients who test it or are interviewed about it, and other members of their organization.

In our project, we will use functional grouping model for organization design. It’s a great idea for Single-program organizations and most frequently used by our clients. We didn’t need to manage across a large geographic area.

The purpose of the organization is develops depth of skills in aparticular function,promotes functional innovation, scale and lower costs.Each member is going to understand their core responsibilities, and to hold them accountable.

# 

# 6 - Risks

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Rank | Description | Likelihood | Severity | Contingency |
| 1 | Lack of communication and misunderstand between team members and client | High | High | Create communication plans to improve the communication and understanding |
| 2 | Shortage of time resources due to the nature of the project | Low | Medium | Create project plan to monitor each stage |
| 3 | Lack of technological experiences | High | Medium | Assigned each member learning tasks to get familiar with the coding and structure |
| 4 | Final product does not meet requirement | Medium | High | Nil |
| 5 | Changes to requirements specification during coding | High | High | Pre-define the potential change parts and keep in touch with the client all the time |
| 6 | Specification takes longer than expected | Medium | Medium | Update the specification each week and keep everything on track |
| 7 | Module coding takes longer than expected | High | High | Assign the work to each member and prepare a back plan for the hardest part |
| 8 | Testing demonstrates in design | Low | Low | We had already prepare several version for testing and make sure the final delivery |
| 9 | User training is postponed | Low | Low | We had a manual instruction for all the potential users |
| 10 | Financial problems | Low | Low | All the member are easy to communicate and negotiate |
| 11 | Time for underestimated | High | High | The final delivery will be ahead of schedule |
| 12 | Software components reused | Medium | Medium | Note for the reused parts |
| 13 | File component cannot be processed | Medium | Medium | Keep the text file in right format |
|  |  |  |  |  |
|  |  |  |  |  |

**Mitigation strategies**

* Make sure our team has a meeting regularly. If one of members are not attend to the meeting, that member need to contact to another member to keep on track and understand the progress
* Have a good and efficient plan to allocate tasks and monitor the tasks at every time the tasks change.
* Have a plan that every members can learn to get understand the coding and structure of the project
* Ensure the final product will meet the client’s requirement, present the progress of our requirement to the client and obtain some feedback directly to verify that our project is going on the right way.

# 7 - Schedule

## 7.1 -Delivery Phases

### 7.1.1– Overview

Project was completed within a timeframe of 11 weeks starting from 12th August 2013 to 3rd November 2013. There was 6 phase in total at each stage of deliverable

### 7.1.2 - Delivery Phase 1: Unit project

* Group meeting to introduce about each member skills and background
* Allocate roles and tasks
* Analyze project requirement
* Setup development environment
* Research about device API (LeapJS)
* Schedule meetings
* Collect user requirements (meeting with Michael and Philip)

### 7.1.3 - Delivery Phase 2:Planning and evaluation

* Analyze user requirements
* Design system interface
* Integrate LeapJS API into interface
* Identify tremor standard for assessment

### 7.1.4 - Delivery Phase 3: Development

* Record user tremor
* Represent captured data in figure
* Evaluate tremor with threshold (standard)
* Generate report as output

### 7.1.5 - Delivery Phase 4: Testing

* Test plan documentation
* Black box – unit testing
* Black box – integration testing
* White box – unit testing
* White box – integration testing
* System testing
* Usability testing

### 7.1.6 - Delivery Phase 5: Fixing bug and documentation

* Fixing bugs
* Regression testing
* User manual documentation

### 7.1.7 - Delivery Phase 6: Release

* User acceptance documentation
* Delivery project
* User sign off

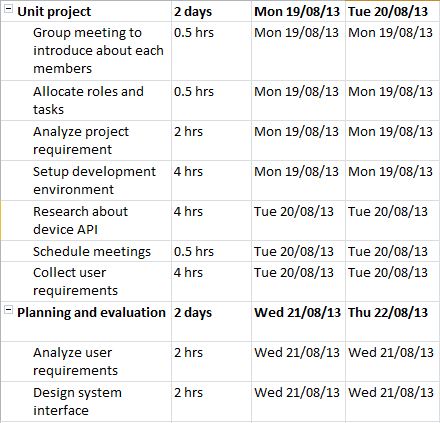
## 7.2 - External Dependencies

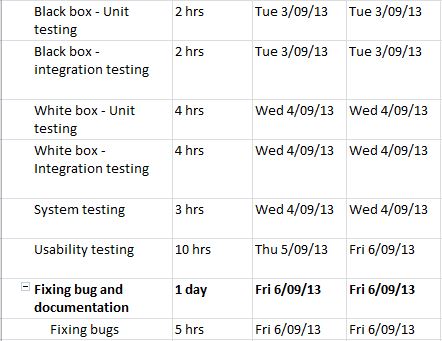
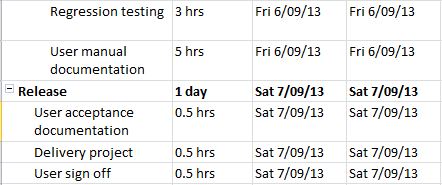
* Discuss and get the feedback from client at each deliverable stage
* Meeting and discuss with supervisor to get feedback for the project at each stage

## 7.3– Assumptions

* Getting the information that provided from client
* Project will be run on schedule
* Resources are available where needed
* Learning new technologies quickly
* Learn and understand the coding for project
* Understand how to use Leap Motion controller

## 7.4 - Project Time Line





# 8– Budget

Estimate and record the following:

* Approved Budget for the project (time)
* List all chargeable activities and the time allowed
* List all time expended so far

Estimate hour of each phrase

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Phrase | Phrase name | Task | Estimate Finishing Hour | Actual Finishing Hour |
| 1 | Unit project |  |  |  |
|  |  | Group meeting to introduce about each member skills and background | 0.5 |  |
|  |  | Allocate roles and tasks | 0.5 |  |
|  |  | Analyze project requirement | 2 |  |
|  |  | Setup development environment | 4 |  |
|  |  | Research about device API (leapjs) | 4 |  |
|  |  | Schedule meetings | 0.5 |  |
|  |  | Collect user requirements (meeting with Michael and Philip) | 4 |  |
| 2 | Planning and Evaluation |  |  |  |
|  |  | Analyze user requirements | 2 |  |
|  |  | Design system interface | 2 |  |
|  |  | Integrate Leapjs API into the interface | 2 |  |
|  |  | Identify tremor standard for assessment | 2 |  |
| 3 | Development |  |  |  |
|  |  | Record user tremor | 10 |  |
|  |  | Represent captured data in graph | 5 |  |
|  |  | Evaluate tremor with threshold (standard) | 20 |  |
|  |  | Generate report as output | 10 |  |
| 4 | Testing |  |  |  |
|  |  | Test plan documention | 6 |  |
|  |  | Black box – unit testing | 2 |  |
|  |  | Black box – integration testing | 2 |  |
|  |  | White box – unit testing | 4 |  |
|  |  | White box – integration testing | 4 |  |
|  |  | System testing | 3 |  |
|  |  | Usability testing | 10 |  |
| 5 | Fixing bug and documentation |  |  |  |
|  |  | Fixing bugs | 5 |  |
|  |  | Regression testing | 3 |  |
|  |  | User manual documentation | 5 |  |
| 6 | Release |  |  | Release |
|  |  | User acceptance documentation | 0.5 |  |
|  |  | Delivery project | 0.5 |  |
|  |  | User sign off | 0.5 |  |
|  |  |  |  |  |
|  |  | **Total** | 114 |  |

# 9 - References:

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.

# 10 -Bibliography:

Interaction Design: Beyond Human Computer Interaction, J. Preece, Y. Rogers and H. Sharp, John Wiley, New York, 2002.

Software Engineeing, Theory and Practice, Shari Lawrence Pfleeger, Prentice Hall, NJ, USA, 1998.

Software Engineering 6th. Edition, Ian Sommerville, Addison-Wesley, Harlow England, UK, 2001.

Cost-Justifying Usability, J Mayhew, R Bias, Academic Press, Boston, USA, 1994.