School of Computing 

COMP3840 Scoping and Planning Document

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| **Student Name: Daniel Trusler** | |
| **Programme of Study: Comptuer Science With Mathematics** | |
| **Provisional Title of Project:** Integrating motion control to everyday software | |
| **Supervisor Name: Mark Walkely** | |
| **Type of Project: Software Product** | |
| ***NOTE to student****: ensure you have discussed the content with the supervisor well in advance of the deadline for submission. Submit a* ***hard copy*** *to SSO. An* ***electronic version*** *of this report in pdf must also be submitted via the appropriate module folder in the VLE; with filename of the format <surname><year>-SP ( e.g. SMITH15-SP.pdf).* | |
| **Signature of Student:** | **Date: 11/11/16** |
| **Assessor** *(leave blank)***:**  ***NOTE to assessor:*** *feedback form is available to download from VLE resources ‘Quick links’. On completion, please attached the feedback form to this document and return to SSO.* | |

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## 1. Background Research for the project

### 1.1 Context

Motion control is an emerging technology and currently doesn’t have many uses outside of entertainment. A functioning PDF reader with seamlessly integrated motion control acts as a proof of concept, and demonstrates the potential commercial uses for motion control.

In the commercial world a lot of presentations are done using PDFs and slideshows. Many of these presentations use remote clickers to scroll through or go to the next slide in the presentation. By using motion control we can eliminate the need to carry around a clicker and introduce more natural control for presentations.

Leap Motion is a precise, yet cheap, piece of motion control hardware. Released in 2013, it tracks the motion of fingers and hands. This is an advantage over other motion controllers such as the Microsoft Kinect, which track the whole body but are less precise when it comes to hands/fingers. Current development includes Leap Motion-equipped tablets that can interpret sign language.[[1]](https://www.engadget.com/2014/05/17/motionsavvy-uses-gesture-recognition-to-give-sign-language-a-vo/)Leap Motion does have some issues when it comes to room lighting and cluttered background.

### 1.2 Problem statement

The goal of the project is to produce a PDF reader with integrated motion controls. The project also will explore interface metaphors for motion control and natural gestures.

### 1.3 Possible solution

Our solution will contain our software and use manual as well as a report on how people interacted with our software. Human computer interaction and graphical user interfaces are key to our solution as well as proper software development.

The software is likely to be written in Java and use the Leap Motion SDK and have a Swing based GUI.

### 1.4 How to demonstrate the quality of the solution

The quality of the solution will be determined by the consistency of its motion controls as well as how intuitive and memorable the controls are. It will also need to run efficiently and be optimized. Testing the controls would require testing it and acquiring feedback. The efficiency is demonstrable by how much resources the software is using.

## 2. Scope for this project

### 2.1 Aim

The aim of the project is to capture data from the Leap Motion in our PDF reader application. This data is then used to control the application through hand gestures.

### 2.2 Objectiv**e**s

* Deliver a working piece of software that meets the need of our product owner
* Acquire feedback on the use of motion control and its integration into our product
* Show that motion control can be integrated into commercially used software

### 2.3 Deliverables

* Java based PDF reader with Leap Motion controls integrated
* Report on motion control and HCI. This includes feedback on using the software and also which gestures felt natural to the users.
* User manual and installation guide for software
* Source code for our software

## 3. Project schedule

### 3.1 Methodology

The product is to be developed in Java using the Leap Motion SDK and various .jar files. The version control software being used is going to be GIT. A prototype is going to be produced and tested on users. This will provide information as to which gestures are natural and how people feel about our layout. This will be followed by further development of the software and fully integrating our Leap Motion control.

### 3.2 Tasks, milestones and timeline

By the end of week 11, Semester 1:

* Have Leap Motion working at a basic level, including listeners.
* Have a PDF reader with desired features. This will not have motion control integrated at this point in time
* Have prototype including a UI mock-up and potential controls
* Test this prototype and Acquire feedback on gestures and UI and acquire feedback

By the end of Week 4, Semester 2:

* Integrate some motion control to the PDF reader. This is our Alpha version
* Test Alpha version for bugs and the feel of the motion controls and acquire feedback
* Start to add more motion controls to our software

By the end of Week 8, Semester 2:

* Beta version of software with the majority of motions added
* Beta version to be presented at progress meeting on the 17th March 2017
* Submit summary of progress and work-to-do
* Start to write project report over Easter break.

By the end of Week 10, Semester 2:

* Submit project report and all deliverables.

### References

1 - <https://www.engadget.com/2014/05/17/motionsavvy-uses-gesture-recognition-to-give-sign-language-a-vo/>

## Appendix A. How ethical issues are addressed

There are potential accessibility issues for people with physical disabilities, such as those with arthritis or amputees. Accessibility options could be provided in the software to alleviate any problems users may have with particular motions.

User testing will require informed consent from testers. Users should remain anonymous in the report on feedback. As feedback may contain sensitive information it should be secured in password protected files.

Code that has been borrowed will be credited to the original writer/source. This includes classes and .jar packages.