

Project Plan

Version 4.0



Revision Signatures

In signing below, each team member acknowledges that he/she has read the following document, given feedback as to the completeness of the document, and checked the document for grammatical and typographical errors.

Member Name	Signature	Date Signed
Kevin Lawhon		
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Revision History

The chart below demonstrates revisions on the current document:

Version	Changes Made	Date Edited
Version 1.0	Initial draft to be delivered October 6, 2011	10/5/2011
Version 1.1	Schedule revisions, Page numbering, Update information	11/1/2011
Version 1.2	Schedule revisions, formatting changes, updated Gantt Chart	11/13/2011
Version 1.3	Updated scope and objectives to reflect new organization	12/10/2011
Version 4.0	Schedule revisions and final submission	04/16/2012



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1. Introduction

1.1. Scope and Objectives

The objective of *TheraTouch* is to work with Texas Health Resources and the Director of Physical Medicine & Rehabilitation for their Hurst-Euless-Bedford facility to develop a system that utilizes the multi-touch technology of the Microsoft Surface in a therapy setting to track patient progress. Not only can positive physical results be expected from the use of this system, but also cognitive growth and improvement. By using activities and games that capture accuracy, speed, and other measurable conditions, statistics will be collected and gathered into reports for Physicians and Physical Therapists to review. The software created by *TheraTouch* will provide an interesting way for patients to heal and learn using the newest of technologies.

The objective of the Fall Semester is to bring both teams together to build a common framework for the project. This structure shall allow for simple additions and changes to games/tasks, universal database use, and a user-friendly interface. In conjunction with updating the framework during the Spring Semester, the group will also be creating and deploying therapeutic activities to the Microsoft Surface. By April, the project should be close to finalized, rolled out to the client, and ready to be presented.

1.2. Background

The Microsoft Surface started as merely an idea of an "interactive table that could understand the manipulation of physical pieces" in 2001. As part of the prototyping process, Surface developers used an IKEA table as a model for their product, originally called "T1". Along with this prototype came a few games – pinball, a photo browser, and a video puzzle. After the success of these games, and the five cameras strategically placed within the unit to capture gestures, developers began brainstorming on how to incorporate object recognition into the Surface system. Finally, it was decided that a "domino tag" (8-bit, ¾ inch tag) could be read to initiate a digital response after being recognized by software running on the system. Nearly six years after the initial idea, in 2007, the 30-inch display in a table-like shell was released to the general public. **"The History of Microsoft Surface" – Richard Chen & Leslie Felarca**

The use of a tablet device in therapy practice is a new technology being utilized by many clinics around the world. Studies have shown immense improvement in patients using the activities developed on the multi-touch surfaces. Commonly, these therapeutic games were created for those with upper extremity issues to provide an interactive way to promote stretching and reaching. Also, this form of therapy is being used to treat cognitive disorders in patients by providing activities that cover things such as speech development, memory, and forming storylines. It has been proven that by using these fun activities, children and adults are more engaged during their therapy sessions, making them progress faster.



The following were referenced to research therapy on multi-touch devices:

- <http://online.wsj.com/article/SB10001424053111903461104576460421541902088.html>
- <http://www.youtube.com/watch?v=J5WIMoJm5Kc>
- <http://online.wsj.com/video/using-multitouch-therapy-to-reach-autistic-kids/C91DDB68-7F42-4229-A7ED-58314672130B.html>
- <http://kotaku.com/multitouch/>
- <http://www.youtube.com/watch?v=YTQpQjvyHIA>
- <http://www.youtube.com/watch?v=J5WIMoJm5Kc>
- [http://sdr.seas.harvard.edu/sites/default/files/Accelerometer Feedback on a Multitouch Display - Dunne et al - June 28 2010.pdf](http://sdr.seas.harvard.edu/sites/default/files/Accelerometer%20Feedback%20on%20a%20Multitouch%20Display%20-%20Dunne%20et%20al%20-%20June%2028%202010.pdf)
- <http://webdocs.cs.ualberta.ca/~wfb/publications/C-2009-OzChi.pdf>
- http://en.video.canoe.tv/video/news/across_canada/1896809958/touchscreen-table-helps-rehabilitation/645217799001/page/8

2. Glossary of Terms

THR	<i>Texas Health Resources</i>
Therapeutic	<i>Relating to the treatment of disease, injury, or disorders by remedial methods</i>
Microsoft Surface	<i>A multi-touch hardware device developed by Microsoft</i>
Cognitive	<i>Scientific term for a mental process</i>
HIPAA	<i>Health Insurance Portability and Accountability Act</i>



3. Overview of Project

The *TheraTouch* system utilizes multi-touch technology to provide therapeutic benefit in a clinical setting. By developing activities to capture data found in common therapy practices, and providing these collected results to physicians and clinicians for analysis, *TheraTouch* hopes to help bridge the gap between technology and healthcare.

3.1. Overview of System

For this project, it is essential to have a strong framework that supports compatibility and overall cohesiveness. At the beginning stages of development, this framework will be built off of the *Healing Touch* project from 2010-2011 by both current Senior Design teams combined.

There are two major components that are stored within a database on the server – sensitive and non-sensitive patient records. The pieces of data considered sensitive include information such as a patient's name or date of birth. To be determined by the client, there will only be one piece of sensitive patient data stored in the database to uphold HIPAA laws. Non-sensitive patient data is collected after game-play and stored as statistical numbers relating to fields similar to speed, accuracy, and other measurable conditions.

On the Microsoft Surface, itself, there will be a common structure to house activities created for a therapeutic purpose. The planned benefit of providing such a design is to allow for smooth changes for developers, including the ease of adding activities and creating sessions, and user-friendly conditions once the unit has been delivered to the client.

The clinician will have secure access to a web-based application to add or edit patient information, choose specific activities for therapy sessions, and review patient reports and results from testing. In order for this to adhere to policies set by the government and Texas Health Resources, this program must protect all sensitive data, and only those with special permissions will be allowed access to patient data.



4.Resource Specification

4.1. Software

The following software is critical for development:

- **Primary Support Environment**
 - Operating System
 - Windows 7 – 32-bit
 - File Sharing
 - Subversion
 - Tortoise SVN
 - CoreFTP Lite
 - Server
 - Microsoft SQL Server 2008 R2 SP1
 - Software Necessary for Project
 - Microsoft Word 2010
 - Microsoft Excel 2010
 - Microsoft PowerPoint 2010
 - Adobe Creative Suite CS4/CS5
 - Camtasia Studio 7
 - Microsoft Visio 2010
 - Microsoft Project 2010

- **Microsoft Surface Environment**
 - Development of Activities/Framework
 - Surface Simulator Running on PC
 - Microsoft Surface Simulator
 - Microsoft XNA Framework 2.0 Redistributable
 - Microsoft Surface SDK 1.1
 - Microsoft Visual Studio 2008 SP1
 - Surface Deployment
 - XNA Game Studio 3.0
 - Microsoft Surface SDK 1.1
 - Microsoft Visual Studio 2008 SP1
 - Microsoft XNA Framework 2.0 Redistributable
 - Microsoft Surface
 - Microsoft Surface SDK 1.1
 - Windows 7 – 32-bit
 - Windows Presentation Foundation 4.0
 - Microsoft XNA Framework
 - .NET Framework



4.2. Hardware

The following hardware will be utilized in the development process:

- Microsoft Surface 1.1
- Development Workstations
 - Lab Computers
 - Windows 7
 - PCs
 - Personal Desktops/Laptops
 - Macs and PCs
 - Windows 7

4.3. Contacts

TheraTouch will be working closely with Texas Health Resources to develop this system. The main technology contact with THR is Mike Skupien, an Application Architect. We also have the knowledge and assistance of Jeanie Parsley, the Director of Physical Therapy with Texas Health Harris Methodist Hospital (Hurst-Eules-Bedford), and Dr. Malcolm Stewart, Director of Human Performance Lab at Texas Health Presbyterian Dallas and a neurologist specializing in Alzheimer's and Parkinson's disease. In cognitive therapy activity definition, *TheraTouch* will be working with Rachel King, Rob Robinson, Makiko Ogawa, and Michelle Luckey, all therapists from Texas Health Resources.

4.4. Constraints

Resource Constraints	<ul style="list-style-type: none"> - Team members will only be available on a part-time basis due to employment and other class obligations - Contacts are intermittently unavailable during project specification - So many contacts can lead to lengthy response times - Working with multiple customers from different backgrounds and goals - Technical issues may occur with Microsoft Surface or Development Workstations - Equipment used at THR is unfamiliar
Delivery Constraints	<ul style="list-style-type: none"> - Project timeline is limited to May 2012 - Deliverables may require working days for review
Environmental Constraints	<ul style="list-style-type: none"> - Development environment is unfamiliar to team members - Must incorporate former framework completed previously - Compatibility of <i>TheraTouch</i> system with THR system may be an issue
Functionality Constraints	<ul style="list-style-type: none"> - Specific project activities are currently undefined - Piece of project depends on receiving patient information from THR system - Activities must be user-friendly for many different types of patients



5. Project Management

5.1. Phase One

5.1.1. Environment Development

Within the Senior Design Lab, there are three HP desktop computers containing development software including Adobe Creative Suite CS4/CS5, Microsoft Office 2010, Microsoft Project 2010, Microsoft Visio 2010, Microsoft Visual Studio 2008 SP1, Microsoft Visual Studio 2010, Camtasia Studio 7, Tortoise SVN, CoreFTP Lite, Microsoft Surface SDK 1.0 SP1, Microsoft XNA Framework 2.0 Redistributable, and Microsoft XNA Game Studio 3. These workstations work in conjunction with the Microsoft SQL Server 2008, also located in the Senior Design Lab, where the database and Subversion repository are located.

Each team has been allocated one Microsoft Surface unit. These units were donated to the TCU Computer Science Department by Radio Shack in 2010 for the use of the Senior Design classes. In an effort to better understand the Microsoft Surface, the previous year's project has been redeployed by each team. Also, a demo game has been pushed to the unit to help provide a better understanding of how the Microsoft Surface works and the development that takes place in the background.



5.1.2. Team Roles and Responsibilities

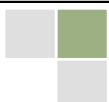
The members of *TheraTouch*, with their respected roles and majors at TCU, are listed below:

Kevin Lawhon	<p>Activity Developer <i>Computer Science Major</i></p> <p>Kevin is responsible for designing and implementing technical aspects of the project. In conjunction with other group members, he will be programming and developing code to push to the Microsoft Surface. Kevin is the developer for the Maze and Sequence activities.</p>
Nipuna Perera	<p>Activity Developer <i>Computer Science Major</i> <i>Mathematics Major</i></p> <p>Nipuna will also be held responsible for the design of the framework and activities created for the Microsoft Surface. He will be responsible for the Card Match, Odd One Out, and Find the Way activities.</p>
Mason McGlothlin	<p>Database Lead/Web Application Developer <i>Computer Information Technology Major</i> <i>Business Minor</i></p> <p>Mason not only is in charge of understanding and maintaining the database used for the project, but will also play a large role in developing the web-based application.</p>
Mandy Seremet	<p>Project Manager/Testing <i>Computer Information Technology Major</i> <i>Business Minor</i></p> <p>Mandy is responsible for the organization of all tasks related to the project. Her hands will be in all aspects of the project to ensure deadlines of milestones and deliverables are met. She will be leading the definition of all activities being deployed to the Surface and working closely with THR staff to ensure requirements are met. She also must be involved with system testing.</p>
John Farris	<p>Web Application Developer <i>Computer Information Technology Major</i> <i>Business Minor</i></p> <p>John is accountable for maintaining a current and updated team website. Along with this, he will also be responsible for developing the web-based application.</p>



5.2. Milestones and Deliverables

Project Support Environment	September 27, 2011 <i>Setup of PSE including software installation, familiarization with hardware/software, website, and starting development on database and Surface</i>
Project Proposal	September 27, 2011 <i>Brief summary of project</i>
Project Plan Document (Version 1.0)	October 6, 2011 <i>Initial plan of project including layout of team, structure of systems, project overview, and scheduling</i>
Project Plan Review	October 6, 2011 <i>PowerPoint containing information from the Project Plan to be presented to the class as a whole, and reviewed</i>
Requirements Document (Version 1.0) & Review	October 20, 2011 <i>The collective organization of requirements provided by the client and understood by the team</i>
Design Document (Version 1.0)	November 13, 2011 <i>The first iteration of a design for the project based on client specifications and decisions made as a team</i>
Walkthrough	November 14, 2011 <i>A review of the Design Document</i>
Test Plan (Version 1.0)	November 29, 2011 <i>Pre-determined criteria to test aspects of the project as pieces are developed and completed</i>
Iteration 1	December 13, 2011 <i>Basic framework operational Add user from Staff Web Application skeleton → database Trivial activity deployed to Surface → database Documents V1.x complete</i>
Iteration 2	January 24, 2011 <i>First set of activities deployed and operational Web application functionally complete except reporting Documents V2.x complete</i>
Iteration 3	March 1, 2012 <i>Framework complete and finalized (passed testing) Second set of activities deployed and operational Web application revised to include basic reporting Deliver working project to THR for testing Documents V3.x complete</i>
Iteration 4	March 29, 2012 <i>Final activities deployed All activities tested and finalized Web application completed with full reporting capabilities Documents V4.x complete</i>



North Texas Area Student Conference Submission	March 13, 2012 <i>Abstract submission</i>
North Texas Area Student Conference	March 31, 2012 <i>Presentation at Midwestern State University in Wichita Falls, TX</i>
Student Research Symposium Submission	April 7, 2012 <i>Poster submission</i>
User Acceptance Testing	April 17, 2012 <i>Deliver working product to THR for user acceptance testing</i>
Student Research Symposium	April 20, 2012 <i>Present project at TCU</i>
User Manual and Developer's Guide (Version 1.0)	April 24, 2012 <i>User Manual and Developer's Guide complete for review. All other documents finalized.</i>
Final Roll Out	April 30, 2012 <i>Deliver finalized project to THR</i>
Final Presentation	May 3, 2012 <i>Final presentation of project to clients, TCU staff, and peers</i>
Final Submission	May 4, 2012 <i>Submit all documents/DVD SVN cleaned up Website complete</i>

5.3. Control

5.3.1. Meetings

Meetings occur weekly on Tuesday evenings in the Senior Design Lab at the Tucker Technology building. These meetings will be a time where group members can bring up concerns, discuss current task progress, and present new findings to the rest of the team. At these meetings, tasks for the week will be assigned based upon upcoming deadlines. After this, Weekly Activity Reports will be updated on the team website within 24 hours (by Wednesday evenings).

There is also a possibility of schedule changes and tasks that required more time to complete than expected. Within these meetings, plans of action will be discussed and evaluated as a team.



5.3.2. Communication

Communication is crucial to the success of the project. Our team has chosen to get in touch using not only phone and e-mail, but also Google+ and the features it offers. This social networking framework allows our team to communicate via video conferencing and through instant messaging within each member's "Senior Design" circle. If there is something to be discussed that does not require hands-on interaction, Google+ provides our team a way to communicate effectively.

5.3.3. Requirements Control

Members of the group will be responsible for keeping requirements documents up to date as the project progresses. When new requirements are discovered or discussed with the client, it is crucial that all members understand the additions or revisions so that positive advancements within the scope of the project are maintained. Any changes that are to be made must be clearly discussed and decided upon with the group as a whole.

5.3.4. Feature Control

It is common for above and beyond features to become an overwhelming focus, even though there are important development stages being missed. It is important for our group to maintain a grasp on specific requirements, and add features if time permits. This will require a close interaction with each other and the client to ensure that client needs are being met before project extras are added.



6. Risk Analysis

Contingency	Probability/Severity	Mitigation Strategy
Loss of Team Member	Low/Severe	Keep all team members in all aspects of project to ensure zero gaps in case of loss
Unfamiliar Areas of Development Take Longer Than Expected	Moderate/Moderate	Work together to combine knowledge and use readily available online resources
Development Tools Do Not Work as Expected	Low/Severe	Before reaching critical path, check for understanding of tools and test for use
Legal Issues with Data Protection	Moderate/Severe	Maintain contact with client regarding patient protection rules and regulations
New Requirements Discovered Mid-Project	High/Moderate	Stay organized and develop with thought that new requirements may be introduced last minute
Client Communication Time is Slower than Expected (specifying requirements, reviewing prototypes, etc)	Low/Moderate	Allow for plenty of time to receive answers from client, and use client meetings wisely
Compatibility Issues Arise During Rollout	Moderate/Moderate	Maintain contact with client and IT department to stay in line with their specifications
Team Members Do Not Work Efficiently Together	Low/Severe	Keep communication open and ensure that all members feel included during process



7. Appendix

Gantt Chart

