

Specification Document

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1 Introduction

In this document we set out to provide a formal list of specifications for this project. These specifications are designed to fully implement the requirements identified in the requirements document. This document is split into 2 primary sections.

The first section (Specification) provides the formal list of specifications. The specifications are presented in tabular format and each specification has an associated identifier.

The second section (Cross References) is designed to tie each specification to the appropriate requirement. The purpose of this section is to demonstrate that the specification is complete, and that it fulfills all of the functionality identified in the requirements section.

1.1 Project Summary

The aim of this project is to develop a software application that allows the Client to gain qualitative insights to interface designs with the use of commercially available brain scanning equipment. The focus for this project is analysing web based documents, so standard web pages consumed through a web browser.

The first part of this project will aim to provide this browser, along with some additional functionality. The primary functionality of this modified web browser will be the ability to record data from many devices and user interactions. The primary source of data will be the Brain scanner, but additionally we will aim to capture data such as audio, screenshots and general (user derived) browsing events. This modified browser could then be deployed during a user study in order to record the proceedings of the study.

The second part of the project focuses on the presentation of this collected data in an easily conceptualised manner. This visualisation aspect of the project will aim to allow Researchers to gain insight into the recordings through a visualisation.

Term Definition

Term	Definition
Visualiser	The part of the system responsible for displaying the data visualisation.
Document	The web site or web based document being investigated in the user study.
Experiment	The study that is being conducted. Typically will contain a User and a Conductor.
Data Source	A device/ software/ location that is recorded by the Web Browse.
Recorded Instance	Since a single experiment on a single user can contain numerous conditions and task, we must distinguish what one unique combination of these properties are called. We have chosen 'Recorded Instance' to represent this. A Recorded Instance is an identifier for - Experiment -> User -> Condition -> Task.
Stack	A Stack is a part of the Visualiser UI that represents a single Recorded Instance. A Stack is therefore a UI component.

Persona's

Person	Responsibility / Relation to project
Conductor	The person responsible for performing the user study. This is typically a researcher who is aiming to prove a particular hypothesis.
Researcher	The person who is responsible for gaining insight from the user study. The Researcher and Conductor can typically be the same person, however this is not always the case, especially in a large research group. The Researcher is therefore a member of the research team who is wishing to use the data collected from the study.
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Person	Responsibility / Relation to project
User	The person who is sitting the user study. Their responsibility is to perform tasks provided to them by the conductor.
Client	The person who will be receiving the finished software project. In this case it is Pingar.

2 Specifications

In this section we provide the formal list of the functionality we intend to implement in this project. Since the project is naturally divided into 2 parts - Web browser and Visualisation, this section is also split to specify these parts independently.

2.1 Web Browser

Specification ID	Specification
WBSPEC1	Prior to beginning the Experiment the Web Browser will allow the Conductor to specify the Users details - Name, Email and DOB.
WBSPEC2	Prior to beginning the Experiment the Web Browser will allow the Conductor to specify the Experiment name.
WBSPEC3	Prior to beginning the Experiment the Web Browser will allow the Conductor to specify the Condition for the Experiment.
WBSPEC4	Prior to beginning the Experiment the Web Browser will allow the Conductor to specify the Task title for the Experiment.
WBSPEC5	Prior to beginning the Experiment the Web Browser will allow the Conductor to specify the initial URL for the Experiment.
WBSPEC6	Prior to beginning the Experiment the Web Browser will present the Conductor with a list of previously used Users.
WBSPEC7	Prior to beginning the Experiment the Web Browser will present the Conductor with a list of previously used Experiments.
WBSPEC8	Prior to beginning the Experiment the Web Browser will present the Conductor with a list of previously used Participants. These Participants must be relative to the Experiment.
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Specification ID	Specification
WBSPEC9	Prior to beginning the Experiment the Web Browser will present the Conductor with a list of previously used Conditions. These Conditions are relative to the Experiment.
WBSPEC10	Prior to beginning the Experiment the Web Browser will present the Conductor with a list of previously used Tasks. These Tasks are relative to the Experiment
WBSPEC11	The Web Browser must support the acquisition of data from the microphone.
WBSPEC12	The Web Browser must support the acquisition of data from Web Browsing based events.
WBSPEC13	The Web Browser must support the acquisition of data from mouse.
WBSPEC14	The Web Browser must support the acquisition of data from screen capture.
WBSPEC15	The Web Browser must support the acquisition of data from the Emotiv brain scanning device.
WBSPEC16	Prior to beginning the Experiment the Web Browser will present the Conductor with the option to enable or disable the microphone as a data source for that Experiment. By default this is enabled.
WBSPEC17	Prior to beginning the Experiment the Web Browser will present the Conductor with the option to enable or disable the User derived web browsing events as a data source for that experiment. By default this is enabled.
WBSPEC18	Prior to beginning the Experiment the Web Browser will present the Conductor with the option to enable or disable the mouse data as a data source for that Experiment. By default this is enabled.
WBSPEC19	Prior to beginning the Experiment the Web Browser will present the Conductor with the option to enable or disable screenshots as a data source for that Experiment. By default this is enabled.
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Specification ID	Specification
WBSPEC20	Prior to beginning the Experiment the Web Browser will present the Conductor with the option modify or permanently delete Experiments from the application database.
WBSPEC21	Prior to beginning the Experiment the Web Browser will present the Conductor with the option modify or permanently delete Participants from the application database. There will be additional functionality allowing the conductor to specify which Experiments a participants belongs to.
WBSPEC22	Prior to beginning the Experiment the Web Browser will present the Conductor with the option modify or permanently delete Conditions from the application database. There will be additional functionality allowing the conductor to specify which Experiments a Condition belongs to.
WBSPEC23	Prior to beginning the Experiment the Web Browser will present the Conductor with the option modify or permanently delete Tasks from the application database. There will be additional functionality allowing the conductor to specify which experiments a Task belongs to.
WBSPEC24	Prior to beginning the Experiment the Web Browser will present the Conductor with the option to calibrate the Emotiv brain scanning device through an intuitive user interface.
WBSPEC25	Prior to beginning the experiment the Web Browser will present the Conductor with the option to calibrate the audio capture device through an intuitive user interface.
WBSPEC26	The Web Browser will feature a “Back” button, that will navigate to the previously viewed page in the Users history.
WBSPEC27	The Web Browser will feature a “Forward” button that will navigate one page ahead in the Users history.
WBSPEC28	The Web Browser will feature a “Go” button that will load a specified URL into the Web Browser.
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Specification ID	Specification
WBSPEC29	The Web Browser will feature an address bar that allows users to input URL's.
WBSPEC30	The Web Browser will render pages using the IE9 rendering engine.
WBSPEC31	The Web Browser will store the captured data using a custom file format. This format must however viewable using existing standard tools e.g. Archive browsing utilities
WBSPEC32	The Web Browser will contain a status panel displaying the status of the data sources.
WBSPEC33	The Web Browser will feature a "Finish" button that will allow the experiment to be ended safely.
WBSPEC34	The Web Browser will continue to run in the event of data source failing.
WBSPEC35	The Web Browser will be clear and emulate the look of existing Web Browsers.
WBSPEC36	The Web Browser will be multi threaded, and allow asynchronous capture from data sources.
WBSPEC37	The Web Browser will be extensively commented in its source code.
WBSPEC38	The Web Browser will be implemented using appropriate and efficient data processing structures and algorithms.
WBSPEC39	The Web Browser will come with an extensive user manual.
WBSPEC40	The Web Browser will be run on a machine with the necessary hardware requirements.
WBSPEC41	The Web Browser will contain interfaces for adding additional collectors to the program.
WBSPEC42	The Web Browser will contain interfaces for adding additional User Interface items to the Browser.

2.2 Visualisation

Specification ID	Specification
VSSPEC1	The Visualiser will allow the researcher to specify records to be added to the visualisation based on Experiment properties. These properties are - Experiment / User / Condition / Task.
VSSPEC2	The Visualiser will present the data recording for a recorded instance in its own individual Stack.
VSSPEC3	The Visualiser will provide a parent frame that will hold many Stacks within it. These Stacks will be aligned.
VSSPEC4	Each Stack will display a timeline. The X axis will represent time, which will have a range of 0 -> length of Experiment. The Y axis will represents amplitude, and have a range between 0 -> 1.
VSSPEC5	Each Stack will display a snapshot of the interface relative to the time currently selected in the timeline.
VSSPEC6	The snapshot of the user interface will have the option to overlay mouse trail data - relative to the time in the timeline.
VSSPEC7	The snapshot of the user interface will have the option to overlay a heatmap over the user interface - relative to the time in the timeline.
VSSPEC8	The Visualiser will contain a strip (linked to the timeline) with a log of the events as they occurred during the experiment.
VSSPEC9	The timeline will be scrollable.
VSSPEC10	The Visualiser will allow the researcher to align events in all stacks (where possible - e.g. Only if 2 recordings share the same event, can they be aligned).
VSSPEC11	The visualiser will link all displays to the central control, which will be the timeline.
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Specification ID	Specification
VSSPEC12	The Visualiser will allow the Researcher to add custom events that act as annotations of the experiment.
VSSPEC13	The Visualiser will contain a form that will allow the user to select a particular time frame and view that data in the visualiser.
VSSPEC14	The Visualiser will be designed to ensure it is intuitive to use and logical. It will be designed using standard HCI practices.
VSSPEC15	The Visualiser will use intuitive and recognized data visualisations.
VSSPEC16	The Visualiser's code will be extensively documented.
VSSPEC17	The Visualiser will be multi-threaded in order to ensure it is responsive and efficient at handling vast amounts of data.
VSSPEC18	The Visualiser will be accompanied by an extensive user manual.
VSSPEC19	The Visualiser will be run on the appropriate hardware.
VSSPEC20	The Visualiser will exploit some of the programming languages constructs for effectively processing vast amounts of data.

3 Cross References

In this section we demonstrate that the specification provided above does in fact fully fulfill the requirements identified in the requirements document. Since the requirements were split into 2 types of requirements (Functional and Non-Functional), this document is also split to provide clarity.

3.1 Functional Requirements

Below are the specifications that fulfill the functional requirements for each part of this project.

3.1.1 Web Browser

Requirement ID	Specification ID
WBFREQ1	WBSPEC1, WBSPEC2, WBSPEC3 , WBSPEC4, WBSPEC5
WBFREQ2	WBSPEC6, WBSPEC7, WBSPEC8 , WBSPEC9, WBSPEC10
WBFREQ3	WBSPEC11, WBSPEC12, WBSPEC13 , WBSPEC14, WBSPEC15, WBSPEC15, WBSPEC16, WBSPEC17, WBSPEC17, WBSPEC19
WBFREQ4	WBSPEC20, WBSPEC21, WBSPEC22, WBSPEC23
WBFREQ5	WBSPEC24, WBSPEC25
WBFREQ6	WBSPEC26, WBSPEC27, WBSPEC28, WBSPEC29
WBFREQ7	WBSPEC30
WBFREQ8	WBSPEC31
WBFREQ9	WBSPEC32
WBFREQ10	WBSPEC33

3.1.2 Visualisation

Requirement ID	Specification ID
VSFREQ1	VSSPEC1
VSFREQ2	VSSPEC2, VSSPEC3
VSFREQ3	VSSPEC4
VSFREQ4	VSSPEC5, VSSPEC6, VSSPEC7, VSSPEC8
VSFREQ5	VSSPEC9
VSFREQ6	VSSPEC10
VSFREQ7	VSSPEC11
VSFREQ8	VSSPEC12
VSFREQ9	VSSPEC13

3.2 Non-Functional Requirements

Below are the specifications that fulfill the non-functional requirements for each part of this project.

3.2.1 Web Browser

Requirement ID	Specification ID
WBNFREQ1	WBSPEC34, WBSPEC35
WBNFREQ2	WBSPEC35
WBNFREQ3	WBSPEC36, WBSPEC38
WBNFREQ4	WBSPEC37, WBSPEC39
WBNFREQ5	WBSPEC40
WBNFREQ6	WBSPEC41, WBSPEC42

3.2.2 Visualisation

Requirement ID	Specification ID
VSNFREQ1	VSSPEC14
VSNFREQ2	VSSPEC15
VSNFREQ3	VSSPEC16, VSSPEC18
VSNFREQ4	VSSPEC19
VSNFREQ5	VSSPEC17, VSSPEC20