

# Milestone 3 : User Manual

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# Contents

<b>1</b>	<b>Introduction</b>	<b>2</b>
1.1	About The User Study System . . . . .	2
1.2	Requirements . . . . .	3
1.2.1	Hardware Requirements . . . . .	3
1.2.2	Software Requirements . . . . .	3
<b>2</b>	<b>Installation</b>	<b>5</b>
2.1	Obtaining the User Study System Installer . . . . .	5
2.2	Installation Procedure . . . . .	6
<b>3</b>	<b>Quick-Start - Conducting a User Study</b>	<b>7</b>
3.1	User Study: Setup . . . . .	7
3.1.1	Opening the Study Setup Utility . . . . .	7
3.1.2	Specifying a User Study's Details . . . . .	8
3.1.3	Specifying a User Study's Data Sources . . . . .	12
3.2	User Study: Running . . . . .	14
<b>4</b>	<b>Visualising a Recorded User Study</b>	<b>16</b>
4.1	Opening the Visualiser . . . . .	16
4.2	Selecting a Recording . . . . .	17
4.3	The Visualiser Interface: Explained . . . . .	18
4.4	Additional Functionalities . . . . .	20
4.4.1	Aligning Open Recordings by Common Events . . . . .	20

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## **Electronic Document**

Due to the limited real estate of physical paper, some of the screenshots in this user manual may be unreadable. For a high resolution, electronic copy of this document, please navigate to the following URL to download an electronic copy:

<http://dl.dropbox.com/u/21780/Docs/User%20Manual.pdf>

# 1 Introduction

In this document we will provide users of the User Study System (USS) with the details necessary to use the system. The USS is a system that allows researchers to manage, automate and visualise user studies via an intuitive interface. Whilst much of the system is reasonably straight forward, we provide this manual as a reference to the system.

## 1.1 About The User Study System

The User Study System (USS) was developed using the .Net framework version 4. This means the system is able to run on any system where the relevant .Net framework is installed (See section 1.2 for further details). The USS is a system that allows researchers to manage, automate and visualise user studies.

When managing a study, the system provides researchers with an experiment setup/management interface whereby they can create, view and modify an experiment's conditions. These conditions include who partakes in the experiment, what the participant should do and under what condition(s). Additionally the researcher can specify which metrics should be recorded during the experiment. These metrics include emotion information derived from the brain scanner, spoken word during the experiment, screen-shots of the participant's screen and the web events that occur during the experiment.

When conducting the study itself, the system requires no input from the researcher, it is completely automated. The system presents the participant with a standard web browser and they are free to perform their required task, whilst in the background the system is silently capturing the specified data

Having conducted the study, the system now allows researchers to “replay” the experiment through an intuitive interface. The interface includes all of the recorded data, which is presented to the researcher using standard data visualisations. The aim of the visualisations is to allow researchers to correlate two or more data points or actions and extract a meaningful evaluation of an interface.

## 1.2 Requirements

In this section we will specify the requirements of the User Study System (USS). These requirements are the minimum requirements needed in order for the system to function correctly.

### 1.2.1 Hardware Requirements

Below are the hardware requirements of the User Study System (USS).

- Core 2 Duo processor or greater (Core i5 recommended)
- 2GB of RAM
- 1TB Hard-drive recommended
  - System installation requires 15MB
  - Recording experiments requires 10Mb a minute
    - \* Therefore a 15 minute experiment requires 150Mb of storage
- Display
  - 17" Display (22"+ recommended)
  - 1280 x 768 resolution (1920 x 1080 recommended)
- Audio
  - Capture
    - \* A standard microphone input with the necessary drivers installed
  - Playback
    - \* A standard 2.1 stereo output connection with the appropriate playback device (Headphones or Speakers)
    - \* Necessary drivers must be installed
- CD-ROM Disk Drive
  - Only required if installing the USS from CD

### 1.2.2 Software Requirements

Below are the software requirements of the User Study System (USS).

- Windows 7 Home Edition or greater
- .Net Framework Version 4 or greater

- Available for download -  
<http://www.microsoft.com/en-us/download/details.aspx?id=17851>
- SQL CE version 4
  - Available for download -  
<http://www.microsoft.com/en-us/download/details.aspx?id=17876>
- Entity Framework Version 4.1
  - Available for download -  
<http://www.microsoft.com/en-us/download/details.aspx?id=8363>
- AvalonDock for .Net 4
  - Available for download -  
<http://avalondock.codeplex.com/>
- The Emotiv Tools Pack V 1.4 or greater
- Complete and up-to-date hardware drivers for your system

## 2 Installation

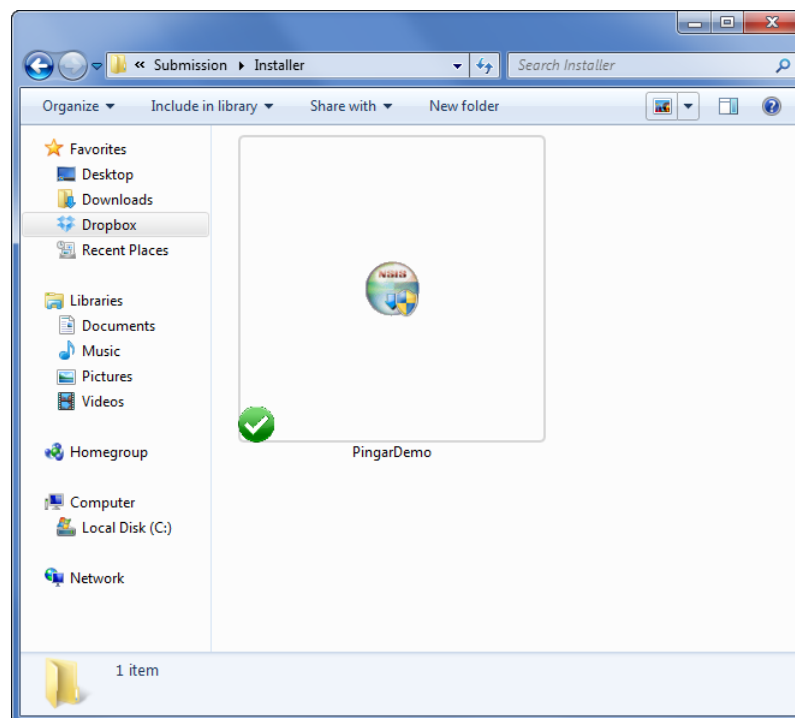
In this section we will provide a step-by-step guide on how to install the User Study System (USS). The USS includes a simple installation utility that completely automates the installation process.

### 2.1 Obtaining the User Study System Installer

The USS is available for download from the following URL:

<http://dl.dropbox.com/u/21780/PingarPublic/PingarDemo.exe>

Alternatively, insert the provided CD into your CD-ROM drive. Open Windows Explorer to the CD-ROM directory. Once there, navigate to the *Installer* subdirectory. Inside will be the installation utility - *PingarDemo.exe*. Your explorer window should resemble that displayed in Figure 2.1.



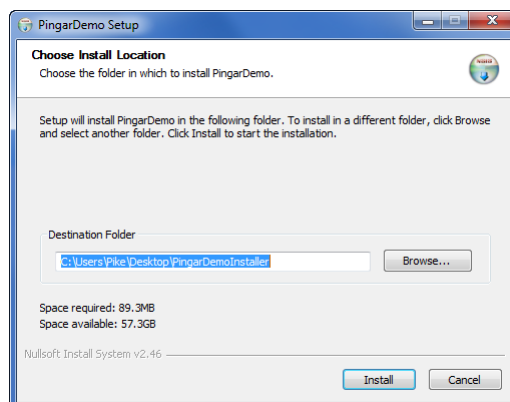
**Figure 2.1:** Windows Explorer showing the USS Installation utility.

## 2.2 Installation Procedure

In this section we will detail the installation procedure step-by-step.

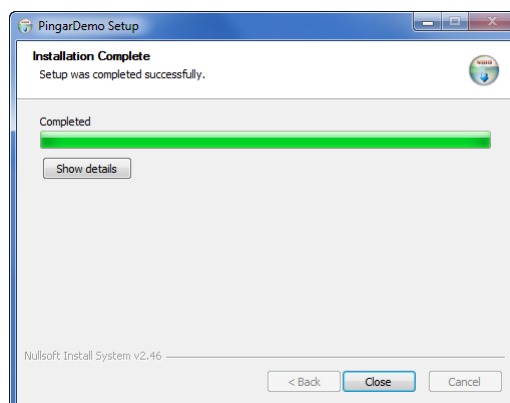
**Step 1 - Open the Installer** Double click on the Installer package (to obtain the installer, follow the instructions in section 2.1), to open the installer.

**Step 2 - Select the Installation Directory** When the installer is opened, you should be presented with the screen shown in Figure 2.2. The default setting is for the application to be installed to the user's desktop. Should you wish to change this, click the *Browse* button and select your desired installation directory.



**Figure 2.2:** The installer prompting for the installation directory.

**Step 2 - Install** Once you have chosen the desired installation directory, click the *Install* button (shown in Figure 2.2). This will proceed to install the application. Once complete, the installation screen will appear as shown in Figure 2.3.



**Figure 2.3:** The Installer after completing the installation process.



# 3 Quick-Start - Conducting a User Study

In this section we will detail the necessary steps required to conduct a complete user study. This section is split into a set of sub-tasks, which together provide the necessary operations to conduct a complete user study.

## 3.1 User Study: Setup

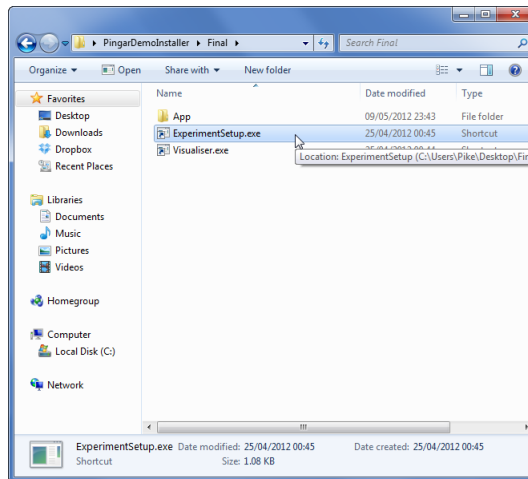
Before running the user study, we must first prepare the system. To do so we must:

1. Select the studies:
  - a) Experiment Name
  - b) Participant
  - c) Condition
  - d) Task
2. Select what data points we wish to record during the study
3. Select a starting URL

The following sub-sections describe how to specify each of these properties.

### 3.1.1 Opening the Study Setup Utility

To open the Study Setup utility, navigate to the installation path of the User Study System (USS) and double click on *ExperimentSetup.exe* shortcut (shown in Figure 3.1).



**Figure 3.1:** The shortcut that opens the Study Setup Utility.

Once completed, you should have the screen shown in Figure 3.2 presented on your desktop.



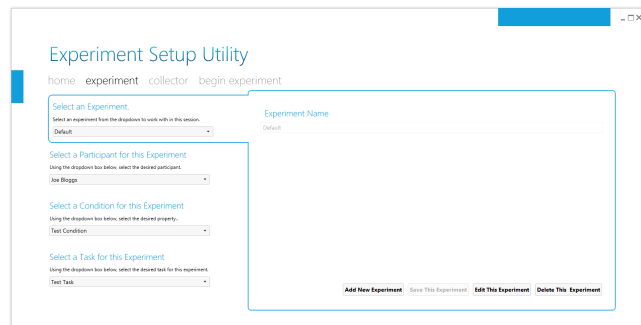
**Figure 3.2:** The welcome page of the User Study Setup utility.

### 3.1.2 Specifying a User Study's Details

The USS is designed to allow user studies to be organised according to the properties of each User Study. In this section we will outline how to Add, Modify, Edit and Delete various properties of a particular User Study. To begin however, we must first navigate to the User Study details screen. To do so, click on the *experiment*<sup>1</sup>

<sup>1</sup>**Note** - The application refers to a user study as an *Experiment*. The two are interchangeable and mean the same thing. *Experiment* was used in the application since there is limited screen space and the word is more concise than *User Study*.

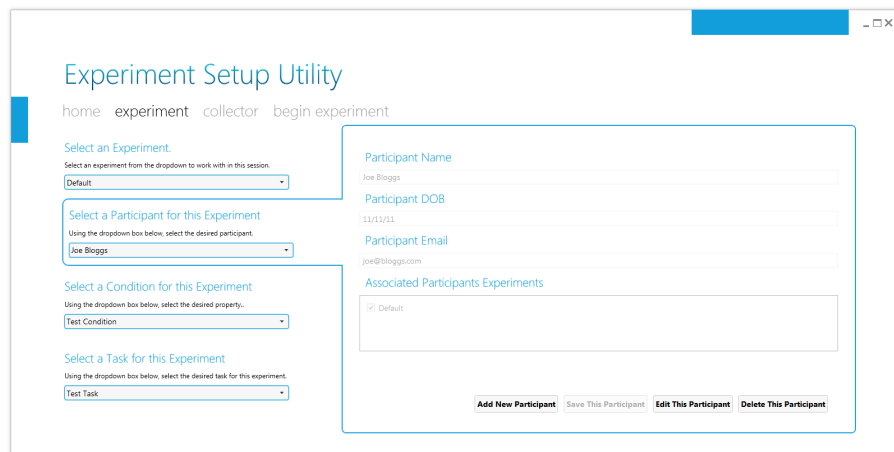
text on the top of the application. You should now be presented with the view shown in Figure 3.3.



**Figure 3.3:** The User Study details screen.

From Figure 3.3 we can see that the setup utility allows us to specify exactly 4 properties - Experiment Name, Participant, Condition and Task. To select any one of these properties, simply click on the desired properties tab, on the left-hand side of the application. Doing so will load the details of that property on the right-hand side of the application. The details that are displayed correlate to the chosen instance of the property from the associated drop-down box. We aid this explanation with an example.

Consider that we had chosen to use the default experiment. We must now decide on who will participate in the experiment (User Study). To do so we click on the **Participant** tab. Doing so loads the details of the currently selected participant. From Figure 3.4 we see that the currently selected participant is **Joe Bloggs**, and his details are displayed on the right hand side of the application. If you are happy with this selection, you are free to continue with selecting the other properties relating to the user study.



**Figure 3.4:** Selecting a Participant for the user study.

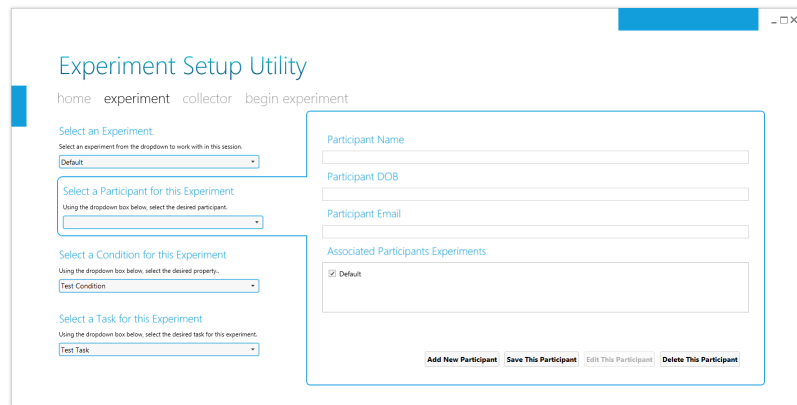
If however you wish to modify the selected participant in some way, then the following subsections will detail how this is done.

**Note** - Whilst the following subsections are specific to operations performed on a participant, the exact same actions are required on the other 3 properties - Experiments, Conditions and Tasks.

Finally, the chosen properties from the drop-down boxes represent the selected properties for the User Study you are about to initiate.

### 3.1.2.1 Adding a New Participant

To add a new participant to the USS, first navigate to the **Participants** tab on the **Experiments** page (demonstrated in subsection 3.1.2, and shown in Figure 3.4). Once there, click the **Add New Participant** button near the bottom of the application. You should now be presented with the view shown in Figure 3.5.



The screenshot shows a web application window titled "Experiment Setup Utility". The breadcrumb navigation is "home > experiment > collector > begin experiment". The form is divided into two main sections. The left section contains four dropdown menus for selection: "Select an Experiment" (with "Default" selected), "Select a Participant for this Experiment", "Select a Condition for this Experiment" (with "Test Condition" selected), and "Select a Task for this Experiment" (with "Test Task" selected). The right section contains input fields for "Participant Name", "Participant DOB", and "Participant Email". Below these is a section titled "Associated Participants Experiments" with a single checkbox labeled "Default" which is checked. At the bottom right of the form are four buttons: "Add New Participant", "Save This Participant", "Edit This Participant", and "Delete This Participant".

**Figure 3.5:** The view after pressing the **Add New Participant** button.

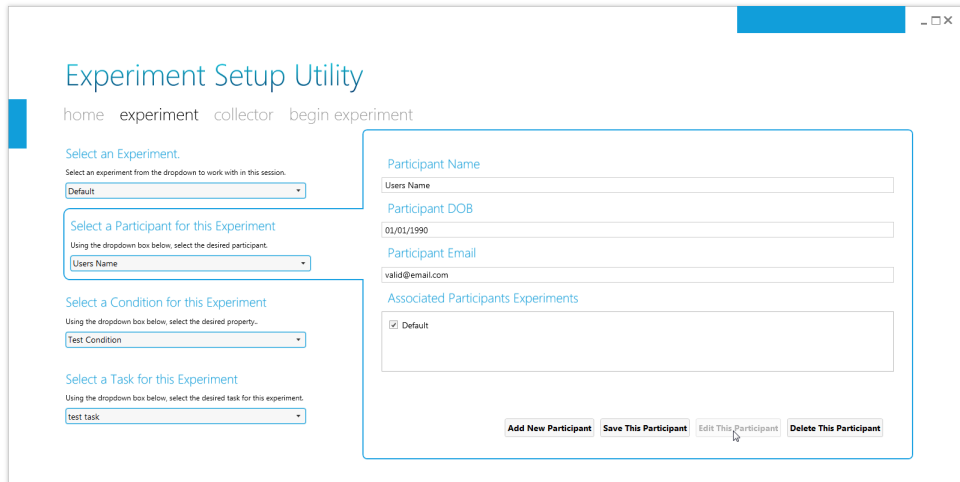
You must now enter the participant's details accordingly. Please ensure that valid dates and email addresses are provided, the application will alert you if they are not.

Also to explain the final field - **Associated Participants Experiments**. Should you wish for a participant to partake in multiple experiments then you may add them to each desired experiment by checking that experiment in the box. We note in this example that there is only a single experiment, and as such it is ticked by default.

Once you have completed entering the participant's details, all that remains is to save the details to the system. This is done by clicking the **Save This Participant** button.

### 3.1.2.2 Modifying an Existing Participant

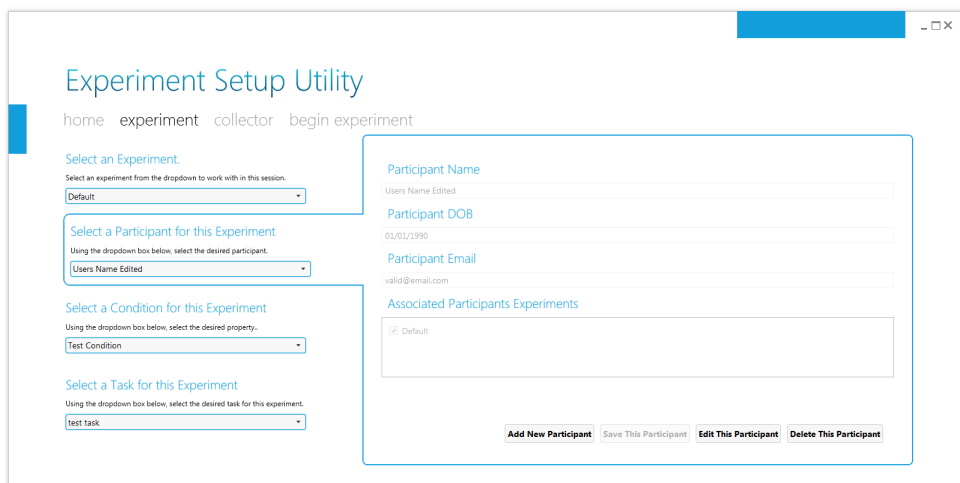
Should you require to update the details of an existing participant in the system you must begin by selecting the desired participant from the drop-down box. Once selected, you may then enable editing by clicking the ***Edit This Participant*** button. Doing so allows the input fields to become editable once again (as shown in Figure 3.6).



The screenshot shows the 'Experiment Setup Utility' interface. On the left, there are four dropdown menus for selecting an experiment, a participant, a condition, and a task. The 'Participants' dropdown is currently set to 'Users Name'. On the right, the participant details form is visible, with fields for 'Participant Name' (Users Name), 'Participant DOB' (01/01/1990), and 'Participant Email' (valid@email.com). Below these fields is a section for 'Associated Participants Experiments' with a 'Default' option checked. At the bottom of the form, there are four buttons: 'Add New Participant', 'Save This Participant', 'Edit This Participant', and 'Delete This Participant'. The 'Edit This Participant' button is highlighted with a mouse cursor.

**Figure 3.6:** Clicking the ***Edit This Participant*** button allows the details of a participant to be updated.

Once you have made the desired alterations, simply click the ***Save This Participant*** button to save the details to the system (shown in Figure 3.7).



This screenshot is identical to Figure 3.6, but the 'Save This Participant' button is now highlighted with a mouse cursor, indicating that the updated details have been saved to the system.

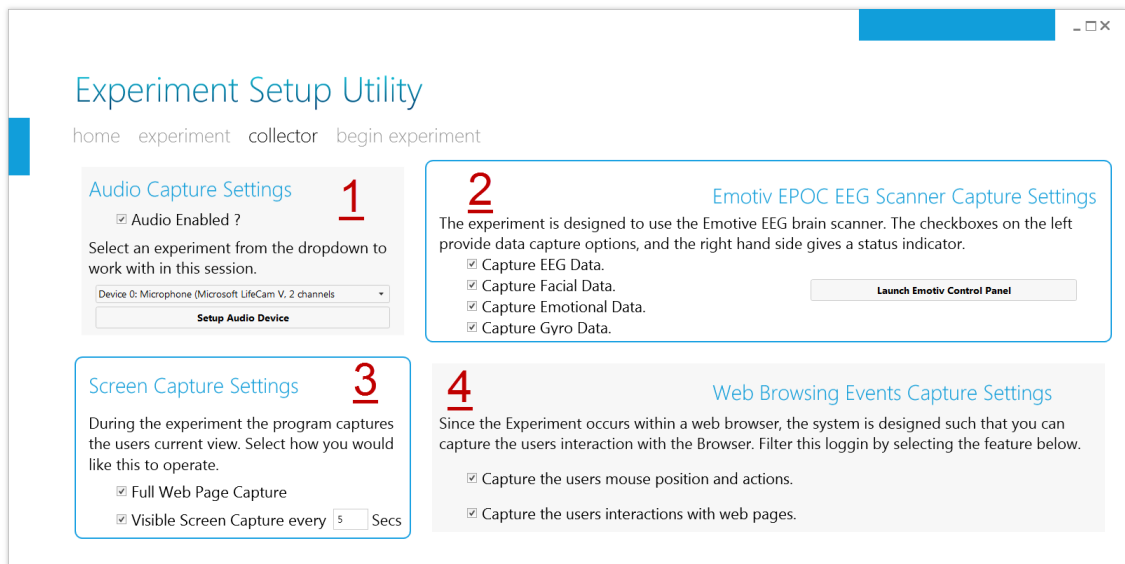
**Figure 3.7:** Clicking the ***Save This Participant*** stores the updated details in the system.

### 3.1.2.3 Removing an Existing Participant from the System

In a similar process to above, begin by selecting the desired participant from the drop-down menu. Having done so, click the **Delete This Participant** button. You will be prompted to ensure that you wish to delete the selected participant.

### 3.1.3 Specifying a User Study's Data Sources

Having selected the desired properties for your user study, you must now decide which data sources you wish to capture during the study. To do so, begin by clicking the **collector** tab item at the top of the page. This will load the page which allows you to configure your desired data collection sources. Your screen should resemble that shown in Figure 3.8.



**Figure 3.8:** The **collectors** page, where users can configure their desired data collection sources.

As you can see from Figure 3.8, numerous configuration options exist on this page. To aid in the explanation of each we have labelled each group of options with a number (1-4). We describe each group below. To enable or disable one of the options, simply check or un-check the associated option.

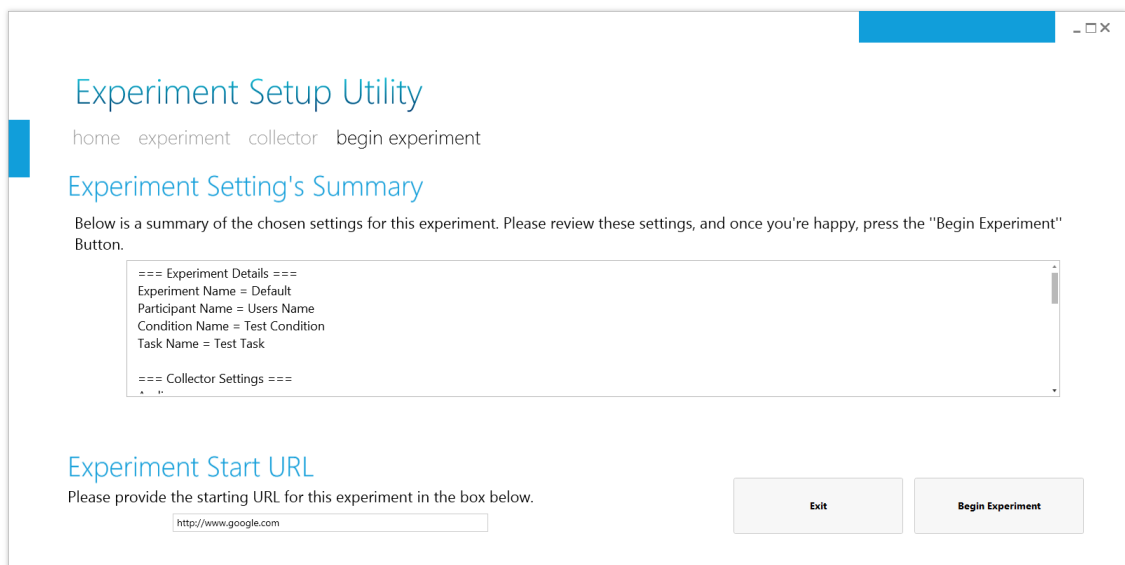
- 1 - Audio** These settings relate to the capture of audio from the host machine's input device during the user study.
  - **Audio Enabled** Check to capture audio during the user study. This will allow you to playback the recorded audio after the study has been conducted.

- **Device Selection** Use this drop-down menu to select the desired capture device for this experiment.
  - **Setup Audio Device** Allows you to configure the system's input devices.
- 2 - Brain Data** These settings allow you to decide which brain feature you would like to be recorded during the study.
- **EEG Data** Checking this option will ensure that the system captures the entire, raw Electroencephalography data from the participant during the user study. We advise researchers to consider that this data is incredibly voluminous, and as such significant storage space is required on the host system's hard drive.
  - **Facial Data** Checking this option will ensure that the system captures the participant's facial features during the user study.
  - **Emotion Data** Checking this option will ensure that the system captures the participant's emotions during the user study.
  - **Gyroscopic Data** Checking this option will ensure that the system captures the gyroscopic data from the EPOC headset during the user study.
  - **Emotiv Control Panel** Clicking this button will launch the Emotiv Manager utility that allows you to check the status and connection of the Emotiv EPOC device. This is highly recommended, especially on the first task of a study for a given participant.
- 3 - Screen Capture** These settings allow you to configure what the system captures of the participants browsing during the experiment.
- **Full Web Page Capture** Checking this option will mean that the system captures the entire web page that the participant is viewing. The system only captures the entire page once, and does so when the page is initially loaded.
  - **Visible Screen Capture** Checking this option will ensure that the system captures the participants current view of the web page (as opposed to the entire page). If checked, the system will perform this operation at the specified interval, which by default is every 5 seconds. You may however configure a custom value by altering the associated interval box.
- 4 - Web Event Data** These settings allow you to configure what the system captures from the participant's browsing behaviour.
- **Capture Mouse Data** Checking this option will ensure that the system records the participant's mouse location during the study.
  - **Capture Web Event Data** Checking this option will ensure that the system records the JavaScript derived events that occur whilst the participant uses the browser during a study.

Before proceeding, ensure that all the necessary data sources have been correctly configured.

## 3.2 User Study: Running

Once you have specified the necessary experiment details and selected the desired collection sources, you're almost ready to begin the User Study. To proceed to the final page, click on the *begin experiment* tab item at the top of the application. This will load the screen shown in Figure 3.9.



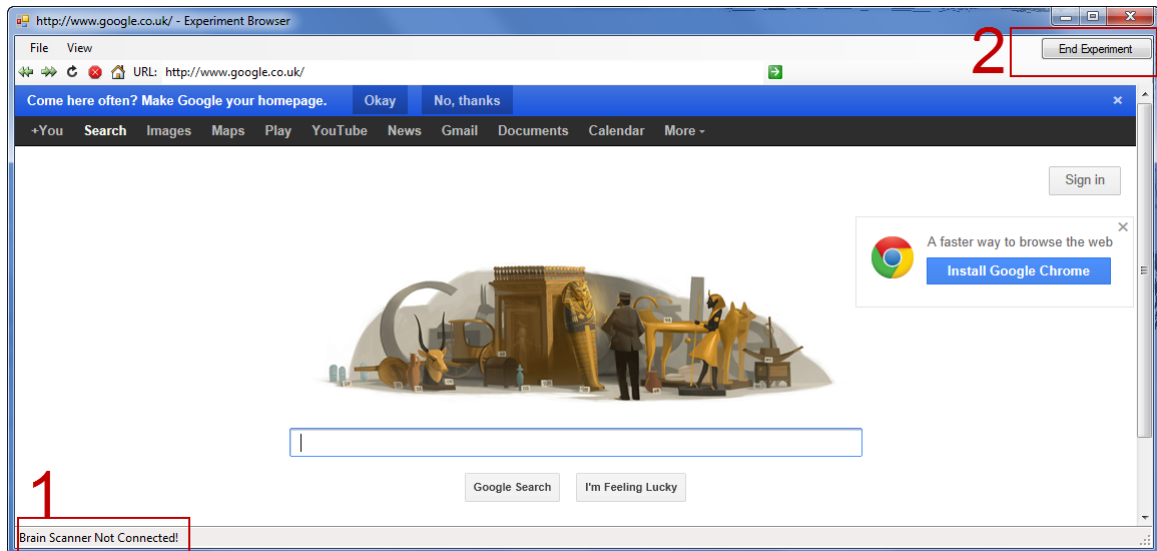
**Figure 3.9:** The *begin experiment* page, whereby you can review your settings and specify the starting URL for the user study.

The page is fairly straightforward. To begin, the screen provides a summary of the chosen properties for the current instance of user study. You should review this summary and ensure that all the settings are correct. Having done so you may additionally specify the starting URL of the study, that is, the first web page that the participant sees during the study.

If you wish to quit the process now, clicking the *Quit* button will close the setup application. Rest assured that all the entered details will be retained in the system, and will be selectable once again in the future.

Alternatively, if you wish to continue, and begin the User Study, clicking the *Begin Experiment* will launch the USS browser (shown in Figure 3.10).





**Figure 3.10:** The USS web browser. Whilst appearing to be an ordinary browser, a lot of work occurs silently in the background.

We see from Figure 3.10 that the USS Web Browser appears almost identical to a standard web browser that a participant uses on a day to day basis. In fact from the participants point of view, the browser functions just like a standard web browser. However the browser is performing a lot of work in the background, capturing the data that was specified in the setup utility.

Additionally, there are 2 minor interface features that differentiate the USS Web Browser. We have labelled these features in Figure 3.10, and they are explained below:

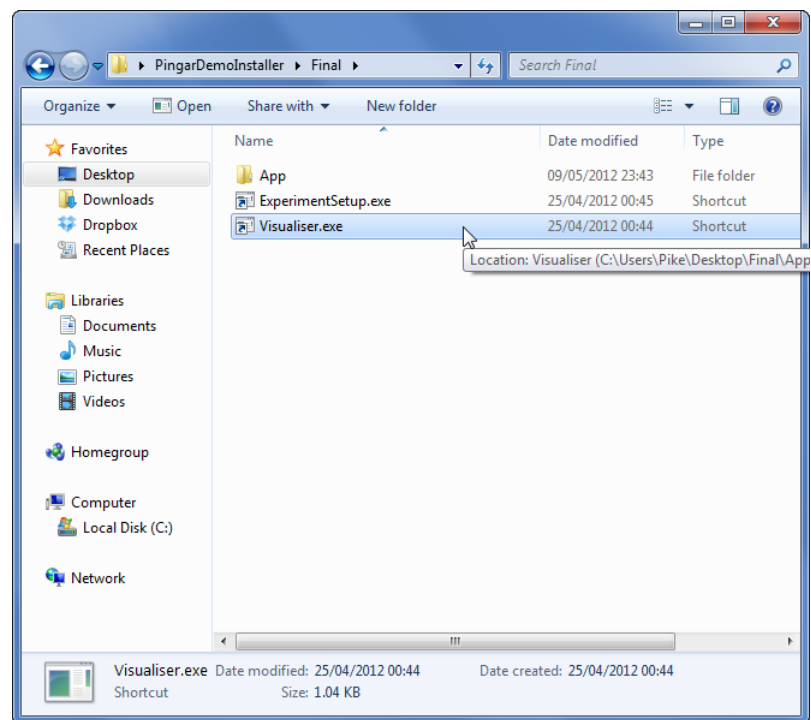
- 1 - Collection Status** This label provides the researcher with a status indicator on the collection sources. Should a data source fail, the browser will continue to function as normal, but will update this label such that the researcher is aware that a data source is unavailable.
- 2 - End Experiment** Once the participant has completed their set task, they should be informed to press the *End Experiment* button. This simply closes the browser application and saves the collected data to a single file.

## 4 Visualising a Recorded User Study

Having captured the desired data using the USS Web Browser, you are now able to visualise the recording using the USS visualiser. Follow the instructions below to get started.

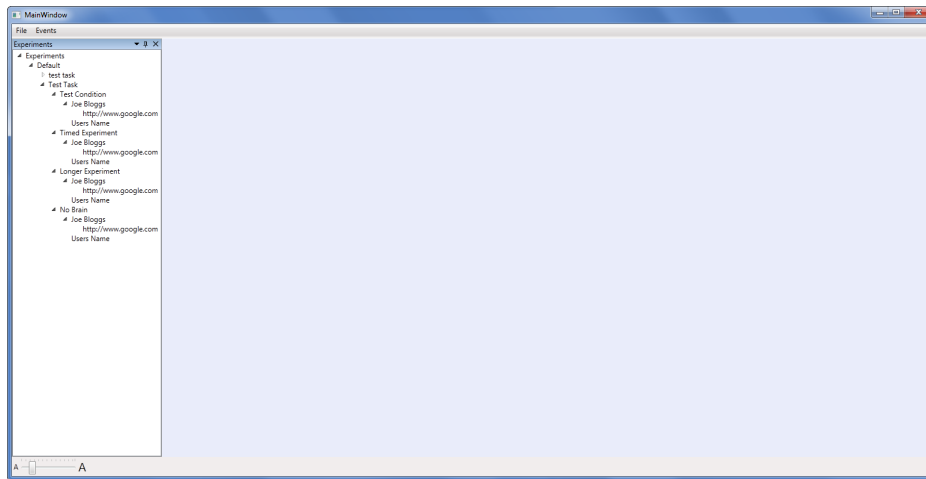
### 4.1 Opening the Visualiser

To open the Study Visualiser Utility, navigate to the installation path of the User Study System (USS) and double click on *Visualiser.exe* shortcut (shown in Figure 4.1).



**Figure 4.1:** The shortcut that opens the Study Visualiser Utility.

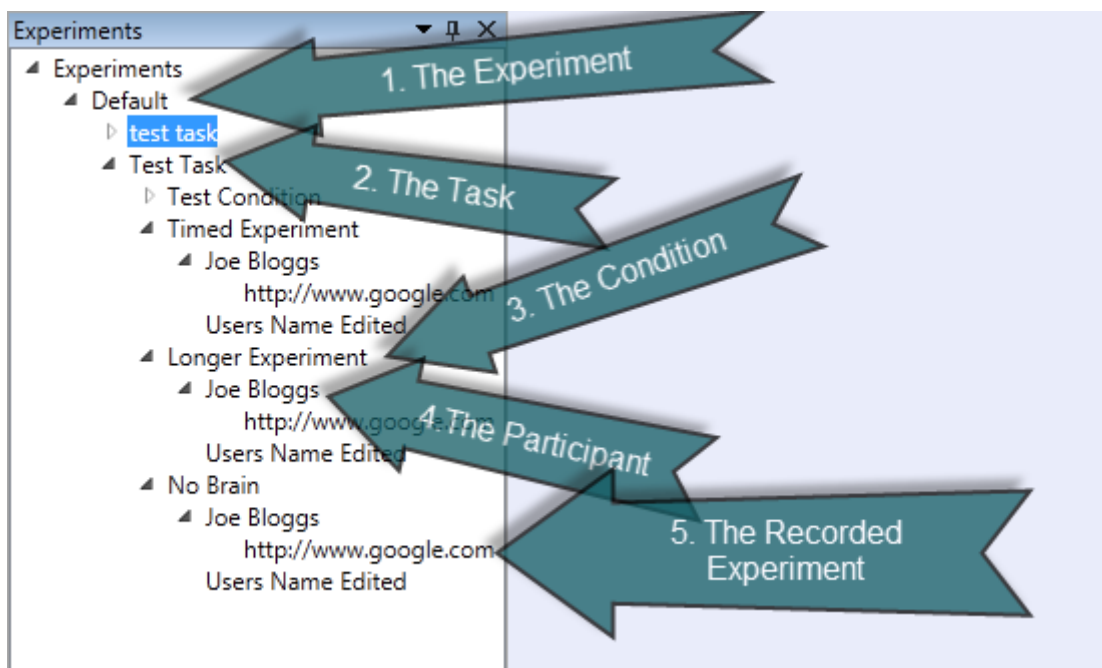
Once completed, you should have the screen shown in Figure 4.2 presented on your desktop.



**Figure 4.2:** The welcome page of the User Study Setup utility.

## 4.2 Selecting a Recording

Next you must choose which recording you would like to load into the visualiser. To select a recording, you must choose the desired recording from the tree component on the left-hand side of the application. The hierarchy of this tree is not entirely obvious, so we provide the graphic in Figure 4.3.



**Figure 4.3:** An explanation of the hierarchy in the visualiser.

Therefore, in order to load a recording into the visualiser, you must traverse the tree, until reaching the recorded instance (these are identifiable as the URL that was set at the beginning of the user study.)

When installing the USS system, a set of demonstration recordings are included. An example of such a recording can be found at:

Default -> Test Task -> Timed Experiment -> Joe Bloggs -> www.google.com

Opening this experiment causes the visualiser to display the experiment, as shown in

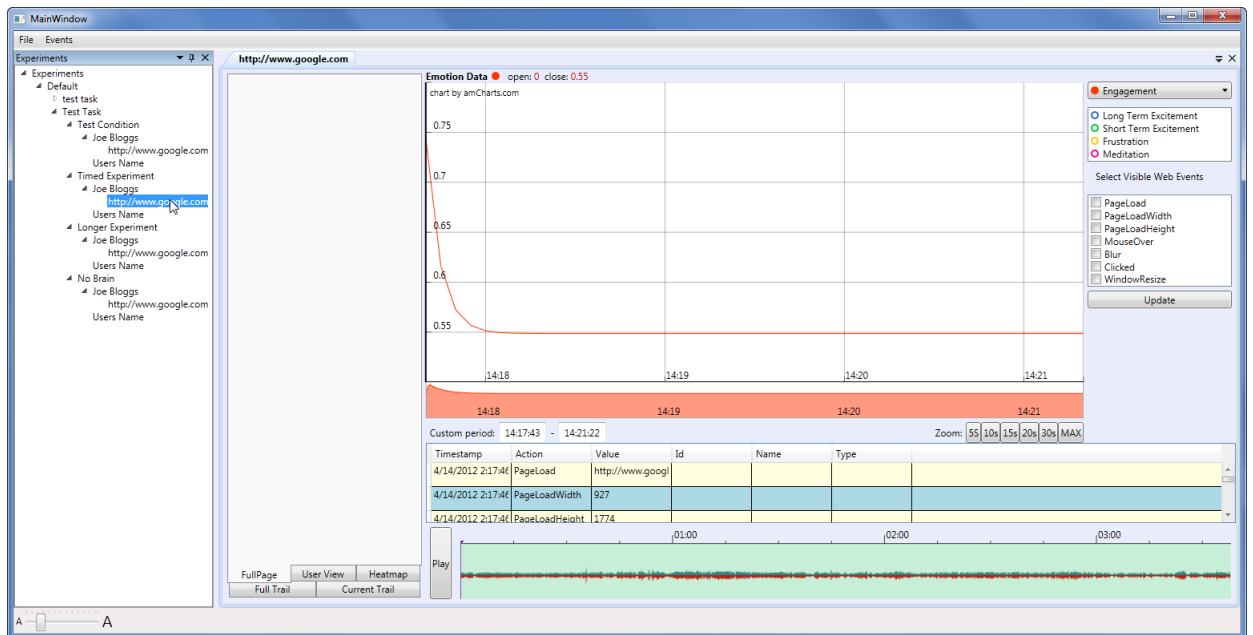


Figure 4.4: A visualisation of a recorded user study.

### 4.3 The Visualiser Interface: Explained

The Visualiser interface contains numerous functionalities in a single interface. In this section we aim to describe the functionality of each of these components in the Visualiser interface. For this section we will be using Figure 4.5 as a visual reference to the interface. We aim to describe each of the numbered components.

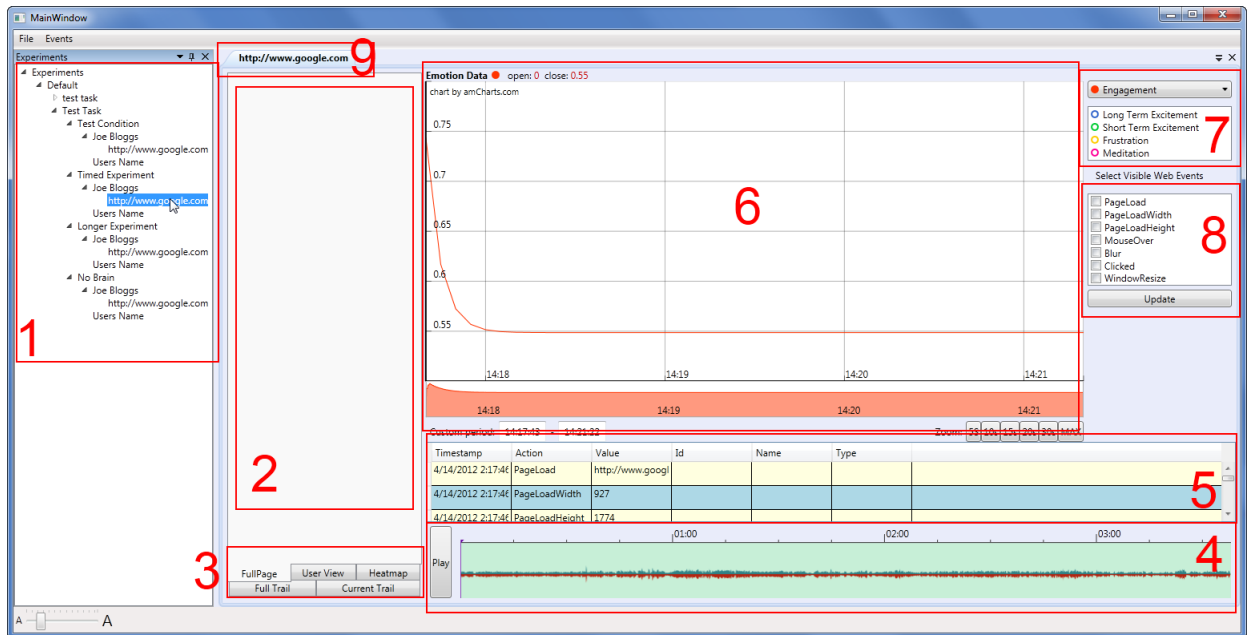


Figure 4.5: The Visualiser with key components highlighted and numbered.

1. **Experiment Explorer** This is the component that allows users to select their desired user study recording. See section 4.2 for further details.
- 2 & 3. **Screenshot display** In this tab component (3) the user can select their desired visualisation/view. The chosen visualisation will then be displayed in the image viewer (2). The displayed image correlates to the currently selected time in the audio timeline (4). Below is an explanation of what each tab visualises:
  - **FullPage** - The full page of the web page the participant was viewing at the point in time selected in 4.
  - **User View** - The view the participant had during the user study at the point in time selected in 4.
  - **HeatMap** - A heatmap visualisation of the full web page viewed by the participant during the experiment. The heatmap correlates to the participant's cursor position on screen.
  - **Full Trail** - A visualisation of the user's mouse trail (line based visualisation) on an entire web page.
  - **Current Trail** - A mouse trail visualisation of the view that the participant had during that time of the experiment.
4. **Audio Timeline** Provides a visualisation of the audio recorded during the experiment. The user may navigate to various points in the audio by simply clicking at the desired point in time, on the timeline itself. Additionally, the timeline

can advance automatically, by the user pressing the Play button. This will also cause the recording to be played through the system speakers.

**5. Web Events Editor** This component provides a detailing of the web events that occur during the user study. It is possible for users to add their own events for reference. This is achieved by scrolling to the bottom of the list and editing the empty row. The events will be saved when the visualiser is closed.

**6,7 & 8. Emotion Graph** This chart displays the participant's emotions during the study. The chart displays the emotions selected in (7), allowing for multiple emotions to be plotted on a single chart. Additionally the chart overlays the web events that occurred during the user study. The displayed events correspond to the events selected in (8). Clicking the Update button in (8) will refresh the displayed events on the chart.

**9. Study Tab** Each user study recording is loaded into its own tab. The Visualiser supports many recordings being open at once. Additionally the user may move the location of the tab to reposition the display of the visualisation. The Visualiser allows for recordings to be “snapped” into location, allowing for easy resizing of displayed sessions.

## 4.4 Additional Functionalities

In this section we detail functionality that is available in the Visualiser, but is not as frequently used as other parts of the application.

### 4.4.1 Aligning Open Recordings by Common Events

The Visualiser allows for events that occur in 2 or more open experiments to be automatically aligned in each open recording. To view common events, navigate to the *Events* menu item at the top of the Visualiser. Then click the *Align Panes by Common Event* menu item (shown in Figure 4.6).



**Figure 4.6:** Opening the event alignment utility.

Having done this, you will be presented with the dialogue shown in Figure 4.7.

Timestamp	Action	Value	Id	Name	Type
4/14/2012 2:17:46 PM	PageLoad	http://www.google.co.uk/ig?hl=en&source=webhp			
4/14/2012 2:17:46 PM	PageLoadWidth	927			
4/14/2012 2:17:46 PM	PageLoadHeight	1774			
4/14/2012 2:17:46 PM	MouseOver				
4/14/2012 2:17:46 PM	MouseOver		remote_iframe_17	remote_iframe_17	
4/14/2012 2:17:47 PM	MouseOver				text
4/14/2012 2:17:48 PM	Blur				text
4/14/2012 2:18:26 PM	MouseOver		header		
4/14/2012 2:18:29 PM	MouseOver		blq-mast		
4/14/2012 2:18:33 PM	MouseOver		main-content		
4/14/2012 2:19:08 PM	MouseOver		blq-container-inner		
4/14/2012 2:19:09 PM	MouseOver		blq-mast-bar		
4/14/2012 2:19:56 PM	MouseOver				submit
4/14/2012 2:20:26 PM	Clicked				

**Figure 4.7:** The dialogue showing the common events.

At this stage the user may select the desired event from the grid. Clicking the **OK** button will close the dialogue and align each open recording to the specified point where the event occurs. Clicking **Cancel** simply closes the dialogue.