Mirametrix Viewer

USER GUIDE

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1 INTRODUCTION

Mirametrix Viewer provides and fast and efficient method for observing exactly where someone is looking on a screen. After connecting to the Mirametrix Tracker server, Viewer will overlay a scanpath showing fixations and saccades on a video of the desktop screen. The video recording and overlay can be saved for further offline viewing and analysis. See Figure 1-1.

Figure 1-1: Viewer

2 SETUP

Viewer automatically attempts to connect to the eye-gaze Tracker server on the last known IP address and port. Data recording can be collected on a remote computer, however to record the desktop video the server must also be running on the same machine as Viewer (typically using IP address *127.0.0.1* or *localhost* and on port *4242*.)

2.1 Home

This tab provides quick access to the main features of the Viewer software: *Start Recording, Stop Recording* and *Calibrate*. When a user begins a recording, the software asks where the video and numeric data files are to be saved for later review.

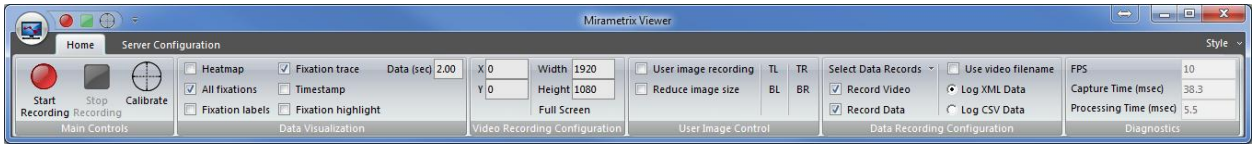

Figure 2-1: Toolbar Options

Data Visualization

By default a fixation map is drawn with fixations connected in sequence, and the duration of the fixation proportional to the size of the fixation circle drawn. Alternatively, a heatmap representation may be drawn (*Draw heatmap* checked) in which color is used to indicate the regions of the screen viewed longest.

The *Data history* value specifies the eye-gaze data history length in seconds to be overlaid on the screen. This value controls how long the tail of the eye-gaze trace is on the recording or how much time the heat map represents.

The *Draw all fixations* checkbox controls whether the entire data history is shown, or only the last fixation. The *Draw fixation trace* checkbox controls the trace connecting the sequence of fixations. The fixations can be labelled with the sequence order and fixation duration using the *Draw fixation labels* checkbox. The *Draw fixation highlight* can be used to shade the portion of the screen that is not currently being viewed, and highlight the region that is being viewed. The *Draw timestamp* checkbox will overlay the latest data record timestamp on the screen.

Video Recording Configuration

The region of the screen recorded can be specified by entering values for the *Width* and *Height* as well as *X* and *Y* offsets. Note that the recorded screen size will be truncated to a multiple of 4 before saving to optimize the images for compression.

Press *Full Screen* to automatically discover the settings needed to capture the entirety of the screen.

For multiple monitor systems, the tracked display can be chosen in the Tracker application.

User Image Control

To embed the diagnostic user display image in the recorded video, select the *Enable user image recording* checkbox. The image can be placed at either of the four corners of the image:

- TL = Top Left
- TR = Top Right
- BL = Bottom Left
- BR = Bottom Right

If the default image size is larger than desired, select the *Reduce user image size* option.

Data Record Configuration

The drop down menu under *Recording* allows the user to choose between recording video, numeric data, or both types of files simultaneously.

If the *Use video filename* checkbox is not selected a prompt will ask for the data filename, otherwise the filename provided during the video selection will be used. The eye-gaze data can be recorded in either the XML (eXtensible Markup Language) or CSV (Comma Separated Values) file formats. This option is presented under *Save File Type.* The CSV log file is equivalent to the XML file with the exception that each data value is separated by a comma (,) delimiter and all element names are removed. The data records that are logged can be specified in the *Select data records* dialog box shown in Figure 2-2: Select Data Records

Figure 2-2: Select Data Records

With the exception of latency, all the data records are explained further in the eye-gaze API document. The *Viewer time tick* is a recording of the CPU timer tick the instant a data record is received and is only available in the CSV data record. To compute the eye-gaze data packet latency you must also be recording the eye-tracker *Time tick* data record, and calculate latency as (*Viewer time tick* - *Time tick*) / (TIME_TICK_FREQ). This technique for latency measurement only works when operating both the tracker and Viewer on the same computer.

In addition to the data records, the log file contains the calibration average error and number of successful calibration points (CALIB_AVE_ERROR and CALIB_VALID_POINTS), file format version number (FILE_FORMAT_VER), the frequency of the CPU timer (TIME_TICK_FREQ), the size of the screen the user was looking at (SCREEN_SIZE), as well as the region on the screen that was recorded (VIDEO_REGION). An example XML data file for a 1680x1050 pixel screen with a single data record is shown below.

```
<DATA>

<CALIB_ERROR AVE_ERROR="25.45" VALID_POINTS="9" />

<FILE_FORMAT VER="1.1" />

<SCREEN_SIZE WIDTH="1680" HEIGHT="1050" />

<VIDEO_REGION X="0" Y="0" WIDTH="1680" HEIGHT="1048" />

<REC CNT="69652" TIME="1145.675" FPOGX="0.38393" FPOGY="0.52952"

FPOGS="1145.033" FPOGD="0.641" FPOGID="1498" FPOGV="1"

BPOGX="0.37440" BPOGY="0.52190" BPOGV="1" CX="0.38512" CY="0.55143" CS="0"/>

</DATA>
```

Diagnostics

This section shows the FPS (Frames per Second), the Capture Time (in milliseconds) and the Processing Time (in milliseconds) of the application. If the FPS rate drops below 8, it means that Viewer is lagging, and the system is not fast enough (or does not have enough) processing speed.

Although the FPS might be low it does not affect the generation of the video which will be slower than expected. It does not affect the reliability of the system.

2.2 Server Configuration

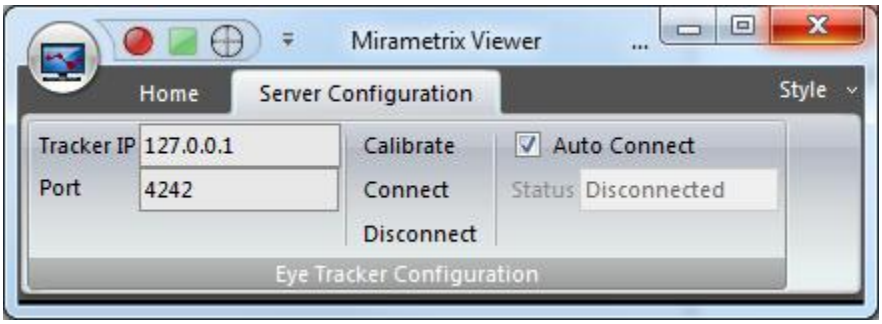

Figure 2-3: Server Configuration

Eye Tracker Configuration

The server connection options are controlled with the Server Configuration dialog shown in Figure 2-3. The *Server address* should be the IP address or computer name of the computer running the Tracker software and the *Server port* should be the same in both Viewer and Tracker. Use the *Connect* and *Disconnect* buttons to control the connection with the server. The *Calibrate* button can be used to send a calibration command remotely, without having to use the Tracker calibrate button. The *Auto connect* checkbox will enable attempts to auto-reconnect to the tracker if the communication connection is broken.

3 VIEWING

When observing user interactions in real-time it is recommend to connect a second monitor on which Viewer is running. This allows the observer to watch the user's interactions without interfering with the desktop experience.

3.1 Eye-gaze

Eye-gaze is drawn using small red circles. When viewing fixations, the radius of the circle is proportional to the duration of the fixation. Sequential fixations are connected with lines indicating a saccade.

3.2 Cursor

The mouse cursor position is shown as a green dot on the screen. Mouse events are shown as large blue or yellow circles that appear for a short period of time around the green dot. Mouse events include any up or down mouse button clicks, for either the left or right mouse button where left is blue and right is yellow.

4 RECORDING

The real-time screen capture and eye-gaze overlay can be recorded for later viewing and analysis. Simply select the *Start recording* option from the main menu or options dialog to begin.

4.1 Compression

The recording mechanism uses the freely available FFDSHOW codec.

5 TROUBLESHOOTING

5.1 Slow screen capture

If the Viewer is capturing the screen slowly (less than 10 frames per second), ensure that you have the most up to date driver for your video card. The video card hardware acceleration is required to perform fast screen capture.

5.2 Slow video recording

If the video recording is slow, try reducing the size of the screen you are recording. Modifying the CODEC encoding options may also allow faster encoding of the recorded video.