This User’s Guide was written by

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Intended Reader:
Users with psychological and computational background you have already used the programs Edf2Asc, Eyetrack, Eyedoctor, Eyedry and Edprep. This user’s guide will give some minor explanations about the steps within the whole analysis process, and have some information about the output.

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The project’s website:
http://www.cl.uni-heidelberg.de/~manke/bba.htm

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1. General Information about the Program

EyeSimplify is a framework for processing eyetracking .edf files (recorded with the “Eyetrack 0.6.1” Program) to an analysis textfile representing four standard eye movement measurements: First Fixation (FF), First Pass (FP) and Total Time (TT).

In numerical order: You can clean up the eyetracking files with “Eyedoctor”, add your regions of interest to the stimulus-source eyetracking file (.script → .del), and run a standard eye movement analysis.

You can change your order of processing the files, but this would lead to some complications. So provided order is highly recommended.

If you are lost: Click on this button to get some help.
2. Installation

Please check the following requirements before you start to run the software.

**System Requirements:**
- OS: Microsoft Windows 2000/XP (should also run with Win 98/Win ME)
- ca. 155 MB of free disk space (including Python 2.4 with PMW 1.2 and the source code)

This program is only optimised for .edf files created by the Eyelink II apparatus and experiments created with Eyetrack 0.6.1.

**Installation from Python Source Code**

Extract the EyeSimplify_source.tar.gz.

The Program runs with Python 2.4. Please install also Python Mega Widgets 1.2 as site-package.

You can found Python 2.4 at: [http://www.python.org/download/releases/2.4.4/](http://www.python.org/download/releases/2.4.4/)
And PMW at: [http://sourceforge.net/projects/pmw/](http://sourceforge.net/projects/pmw/)

You don’t need to install other site packages, because the GUI is written with Tcl/Tk (Tkinter).

Run EyeSimplify.py and make sure that every other python modules and listed programs in the same working directory.
3. How to use the Program

The following sections will explain how to perform all steps of data processing with EyeSimplify.

3.1 Start

Click on the Help-Button to view the online help.

You can quit the application any time by clicking on the Exit Program – Button.

Go from one tab to another by clicking on it. Please go in a numerical order.
3.2 Converting .edf Files to .asc Files

Click on this tab to open the conversion-screen:

What it is:
A tool to convert binary .edf files to ascii files.

What it does:
Given an input file (.edf), it converts the file with the help of
the tool EDF2ASC (running in background), to an ascii file (.asc).

How to use it:

Be aware of to have each file named according to the DOS 8.3 convention.
It means, a filename consisting of 8 characters (no special char!) and
3 characters for filetype, e.g. 'myfile123.asc'
You can convert one file at a time.

You can also use the original EDF2ASC program and give it more files for processing or use the Windows version of EDF2ASC. Output comming from these programs can also be used with EyeSimplify.

1. Open an .edf file with the 'Browse file' - Button. You will see the filename written in the text field.

2. Click on the 'Convert'-Button. You will be asked where to save the .asc file.

3. Tab 1, Step 1, finished.

3.3 Clean Up .asc Files:

Click on this tab to open the clean up- screen:

What it is:
A tool to view each trial and item for each subject's eye movement data.

What it does:
Import the .asc file and represents all fixations and saccades on a trial for a subject. Exports files to .da1 format.
How to use it:

1. Open an .asc file to view it:

   1.1 Click the button 'start Eyedoctor'. Now the Eyedoctor program should be open. If not, check, if the 'eyedoctor0.5.0.exe' is in the same folder where you started the program.

   1.2 Go to the Eyedoctor program and look at the left side of the window. You'll see that you can change the size of the window with your mouse and therefore appearing some more options of Eyedoctor. Do that with the upper bottom line of the program.

   1.3 Click on 'File', 'Import'. (Open is only for Eyedoctor created .edd files) You can now open your .asc file for viewing.

   1.4 First of all: You cannot undo changes! So be aware of what you do. Change fixations by clicking on a fixation and changing the values on the left side of the program window, with the arrow keys.

Further information about the usage of Eyedoctor can be found in the corresponding documentation folder.
2. Export a cleaned up file:

2.1 Click on 'File', 'Export', 'Eyedry Data'. Now you'll see a short window, where you can make some changes, which fixations should be merged together. You can take given default values.

2.2. Now you'll be asked where to store the file. Store it somewhere you want as .da1 file. (This is convention)

3. Close the Eyedoctor program.

You finished Tab 2, Step 2.

3.4 Adding Regions of Interest:

Click on this tab to open the editor- screen:

What it is:
It is an editor to edit a text file written by the experimental software EyeTrack 0.6.1.

What it does:
Opens a .script file (or an already delimited file .del), and and let the user insert a delimiter character (e.g. '^' or '$') to mark a region of interest.

You can also use another text editor, if you like. But please save the files as .del files. This is important for the next steps.
How to use it:

Add a Delimiter Character to the .script File:

1. Open the .script file which you used for your experiment, by clicking on the 'Open File' - Button. Your .script file will now appear.
Example: An open .script file. Add your delimiter character within the lines beginning with “inline”.

2. Add a delimiter char (a special character, that is NOT used the .script file) to specify a region of interest (= which part of the sentence is interesting for the later analysis).

3. Save the file by clicking on the 'Save' -Button. Be aware to do save it as .del file.

4. You can re-open the file by clicking again on the 'Open'-Button.

3.5 Get Region Data:

Click on this tab to open the screen:

What it is:
EDPREP is a tool to convert the marked regions of interest in the .del file (without delimiter char: .script) into an output file containing the region limits for each item and its condition.

What it does:
Read through the .del file and convert the each region to number of characters, representing the limit of each region. This also includes the standard line size of 160 characters (convention by original EDPREP program) and therefore enables the user (and EyeSimplify) to identify in which line this region lies. The output is needed for the analysis part.

How to use it:
1. Choose which part of the items and subjects should be used:

Change the small scales from minimum to maximum of conditions, and the sentence no., e.g. if you want to have cond 1-7 and items 5-30, then the smallest no. of conditions is 1, and the largest 7, as well as the smallest no. of sentences is 5 and the largest 30.

2. Choose a delimiter character:

The delimiter character is the kind of character you used to mark the regions in the delimited .del file. Per default, this is '"', but you can also every character you want, but no character is allowed which is already in the .script file, like '%' or '|'.

3. Run EDPREP now:

Click on the red "Create a .cnt File" - Button and find your .del file for conversion. Afterwards, give a filename and folder where to save your .cnt file. You'll need this for the analysis in step 5.

3.6 Load Data and Preparation for Analysis:

Click on this tab to open the screen:

![Screen shot]

What it is:
This tool is the core of the whole analysis process. Based on assumptions and premissions by the original EYEDRY program, it computes standard eye movement measurements First Fixation, First Pass and Total Time.

What it does:
Read through the .da1 files that are listed in the .lst file and uses the .cnt file for filtering computed fixations within a region of interest.
How to use it:

1. Create a list of all .da1 files you want to use:

   1.1. Click on "Add" and click on the .da1 files in a specified folder. You can change your list by clicking on a .da1 (or more) file and click on the "Remove Selected" - Button, this will remove your selected items. You can also delete the whole list by clicking on "Clear".

   1.2. Save your .lst file: Click on "Write List" and choose a folder where to save your .lst file. But you don’t need to save a .lst file to run the analysis.

2. Open your .cnt file:
Go to the input field below the small window, where you added your .da1 files. Click on "Browse" to find your .cnt file (had been created with EDPREP, see "Get Region Info" in EyeSimplify help). Now you see the path of your .cnt file.

3. Choose Cut Off of fixations:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Longest Fixation</td>
<td>600 ms</td>
</tr>
<tr>
<td>Shortest Fixation</td>
<td>80 ms</td>
</tr>
</tbody>
</table>

You can cut off all fixations longer than 600 ms and shorter than 80 ms, automatically. Please change it, if you like, but the default values are already given.

4. For output: add "0"s to the output table:

Choose Output Format:
☑ Unmark for no '0' in output file.

Per default, all empty space in your output analysis table are filled with 0. Please click and therefore unmark the small box if you don't want to have any 0 in your output file.

5. Run Analysis now:

☑ First Fixation    ○ First Pass    ○ First Pass Regressions Out
☑ Total Time        ○ Second Pass

Be aware of: Fill out each input field (otherwise an error message will appear). Click on "Generate"-Button to process listed files. If the analysis is finished, it will automatically change to the next tab in the program and you will see the output:
6. Save the Output:

You can save the output by clicking on the "Save As..." - Button and choose a folder where to save the file.
4. Output Files:
This section is added for the user who does not feel confident the interpretation of the output files. It represents an overview about the components of each file.

4.1 Data Types:

4.1.1 .asc (Eyetracking File)
Generally spoken, it contains all coordinates of stimulus and eye movement data as well as error messages and calibration messages of the apparatus.

| SFIX L 1152912 |
| EFIX L 11529121153552 644 619.4 444.6 764 |
| SSACC L 1153556 |
| ESACC L 11535561153588 36 620.4 447.9 574.2 314.9 5.41 289 |
| SFIX L 1153592 |
| BUTTON 1154659 2 1 |
| MSG 1154660 ENDBUTTON 2 |
| EFIX L 11535921154664 1076 579.0 315.4 755 |
| END 1154680 EVENTRES . . |
| MSG 1154681 TRIAL RESULT 2 |
| MSG 1154681 TRIAL OK |
| MSG 1154701 TRIALID P1I3D0 |
| MSG 1154710 REGION WORD 0 3 Das 32 256 88 398 |
| MSG 1154711 REGION CHAR 0 1 D 32 256 55 398 |
| MSG 1154712 REGION CHAR 1 1 a 55 256 72 398 |
| MSG 1154713 REGION CHAR 2 1 s 72 256 88 398 |
| MSG 1154714 REGION WORD 3 1 88 256 97 398 |
| MSG 1154715 REGION CHAR 3 1 88 256 97 398 |

Coordinates of fixations and saccades.

Start of a new trial, general info as TRIALID, and first part of stimuli („Das“, followed by „D“, „a“, „s“).

4.1.2 .da1 (Data File)

<table>
<thead>
<tr>
<th>General Info of a Trial</th>
<th>Fixation of a Trial</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 2 2 6077 2 0 0 23</td>
<td>0 0 772 908 15 0 944 1152</td>
</tr>
<tr>
<td>2 2 6 4379 2 0 0 17</td>
<td>0 0 718 886 15 0 922 1150</td>
</tr>
<tr>
<td>4 4 12 6722 2 0 0 21</td>
<td>0 0 1387 1547 10 0 1579</td>
</tr>
<tr>
<td>6 2 14 8317 2 0 0 27</td>
<td>0 0 1286 1438 16 0 1470</td>
</tr>
<tr>
<td>7 3 11 6426 2 0 0 23</td>
<td>4 0 1054 1198 18 0 1234</td>
</tr>
</tbody>
</table>

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The first part consists of 10 columns, where the first row represents the following:
1  = Trial No., as shown in experiment
2  = Condition No.
2 = Trial - No., as coded in Eyetrack Program
6077 = Duration of a Trial: Begin = representation of stimulus, End = Button pressed by subject
2 = pressed Button/-state (represented internally with a number)
23 = Amount of all fixations of this item

The second part consists of more than shown 8 columns, the number of fixations is different between all trials.

0 = Coordinate of Fixation 1 (no. of characters, starting with 0, x-Coordinate)
0 = Coordinate of Fixation 1 (line number, starting with 0, y-Coordinate)
772 = Begin 1.Fixation (in ms)
908 = End 1.Fixation (in ms)
15 = Coordinate of Fixation 2: 15 characters distance from first fixation
0 = Coordinate of Fixation 2: Line 0
944 = Begin 2.Fixation (in ms)
1152 = End 2.Fixation (in ms)

4.1.3 .del (Delimited .script File)

```
trial E3I21D0
trial_type =       Satz
max_display_time = 65000
inline = |^Dieses Semester war der^ Literaturkurs^ wie immer
überfüllt.^\nHeute musste^ der^ Mann^ schon wieder
auf der Treppe sitzen.^\n
end E3I21D0
```

4.1.4 .cnt (Region Info File)

Contains the all information about the region limitations per item and condition, based on the delimited .del file.

<table>
<thead>
<tr>
<th>Item #</th>
<th>Cond. #</th>
<th># Reg.</th>
<th>Region Limit =No. of characters within a region</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>9</td>
<td>15 33 48 174 178 185 201</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>9</td>
<td>15 33 48 174 178 185 201</td>
</tr>
<tr>
<td>1</td>
<td>3</td>
<td>9</td>
<td>15 30 45 174 178 185 201</td>
</tr>
<tr>
<td>1</td>
<td>4</td>
<td>9</td>
<td>15 30 45 174 178 185 201</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>9</td>
<td>25 36 59 191 195 202 218</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>9</td>
<td>25 36 59 191 195 202 218</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>9</td>
<td>25 36 59 191 195 202 218</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
<td>9</td>
<td>25 36 59 191 195 202 218</td>
</tr>
</tbody>
</table>
4.1.5 .lst (Data List File)
Contains a list of all .da1 files without any path names:

Example taken from a .lst file:

mb1n12.da1
mb1n23.da1
mb2n7.da1
mb3n5.da1
mb6n8.da1
wb1n18.da1

4.1.6 .txt (Analysis File)
It contains the subject, item and condition numbers as well as region numbers:

<table>
<thead>
<tr>
<th>subject</th>
<th>item</th>
<th>cond</th>
<th>reg1</th>
<th>reg2</th>
<th>reg3</th>
<th>reg4</th>
<th>reg5</th>
<th>reg6</th>
<th>reg7</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>156</td>
<td>388</td>
<td>308</td>
<td>0</td>
<td>264</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>380</td>
<td>244</td>
<td>350</td>
<td>0</td>
<td>149</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>192</td>
<td>0</td>
<td>0</td>
<td>132</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>4</td>
<td>4</td>
<td>0</td>
<td>264</td>
<td>328</td>
<td>0</td>
<td>0</td>
<td>289</td>
<td>0</td>
</tr>
</tbody>
</table>

4.2 Log Files:

General Log File:
This log file is updated each time you run EyeSimplify and parts on it. It contains the starting date and time and several states, e.g. whether Edprep has been successfully finished.

EDPREP Log File:
This log file is written when you've processed tab 4, “Get Region Data”. It contains date and time of the process and for each experimental condition and sentence the stimulus with delimited regions. It enables the user to check whether there are error made while adding the delimiter character.

Example taken from edprelog.txt:

05-10-2006 16:29:08

Condition 1, Sentence 1
^Oft haben^ Installateure^ viel zu tun oder^ ^kommen erst spät nach Hause. Trotzdem^ ^verrichten^ diese^ Männer^ die Arbeit^ ^ohne viel zu murren.^