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TRACKER

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ECTtracker v15.1.x
User Guide

About ECTtracker

ECTtracker is an eye-tracking program, allowing the real-time analysis of the user's eye (open or closed). This application is a part of the complex of assistive technology software created by EyeComTec (LAZgroup SA). ECTtracker implements low cost computer mediated communication for people suffering from various forms of paralysis or significantly impaired mobility.

The program is used in conjunction with applications for capturing video from webcams or other devices connected to your computer (ex: ECTcamera, Skype). The program assigns different key codes to different states of the user's eye, which can later be transmitted to any application (ex: ECTmorse, ECTkeyboard). Thus, by opening and closing one or both eyes, the user can control programs and type texts.

Using a special recognition structure ECTtracker compares the image received in real-time from the camera with pre-stored user samples. Samples are small static images with accurate focus on the area of the user's eyes: on some samples the user's eyes are open, on other - one or both eyes are closed. The program selects the samples with the highest match through comparing the image samples obtained with the camera.

ECTtracker is fully customizable. The program contains more than 45 settings with which you can change the appearance and functionality. The user has a full control over the video processing speed (frames per second). Some settings can significantly reduce the requirements for computer resources, so the program runs stably even on low-end computers.

ECTtracker doesn't require installation or modifying the registry of the operating system and works with portable devices. Supports simultaneous launch of multiple copies of the program; Possibility to save all table samples and user settings in separate files.
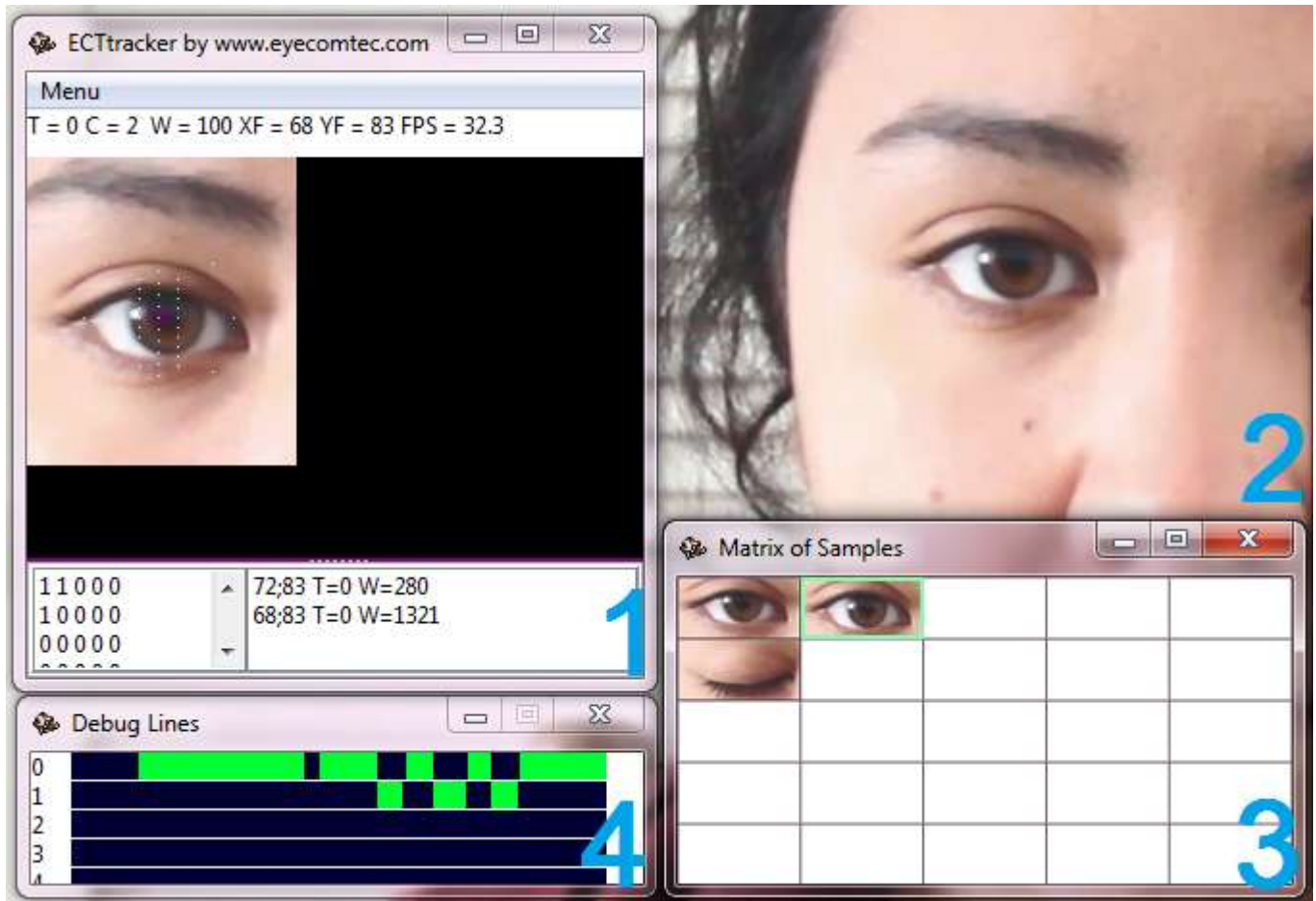
The main interface of the program is shown in Fig. 1.
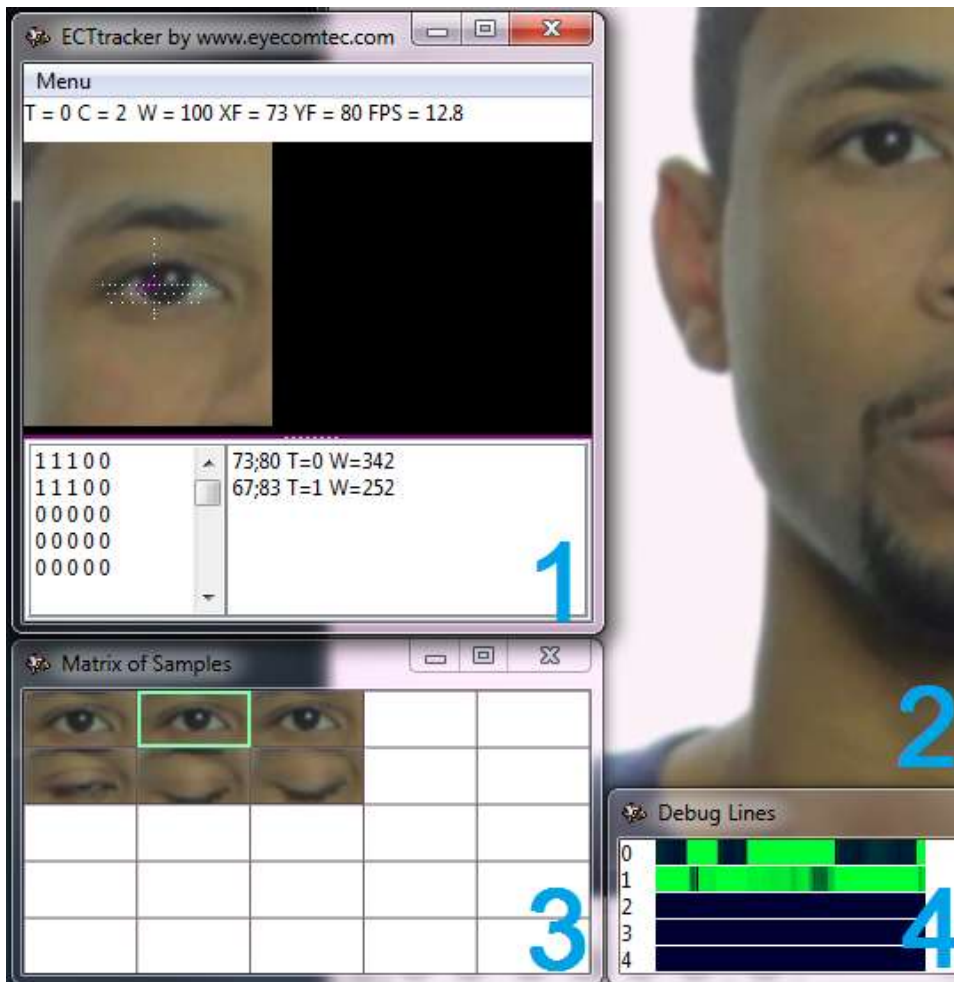
(Fig. 1a. The main interface of the program; Main window, Video Source, Matrix of Samples, Debug Lines)
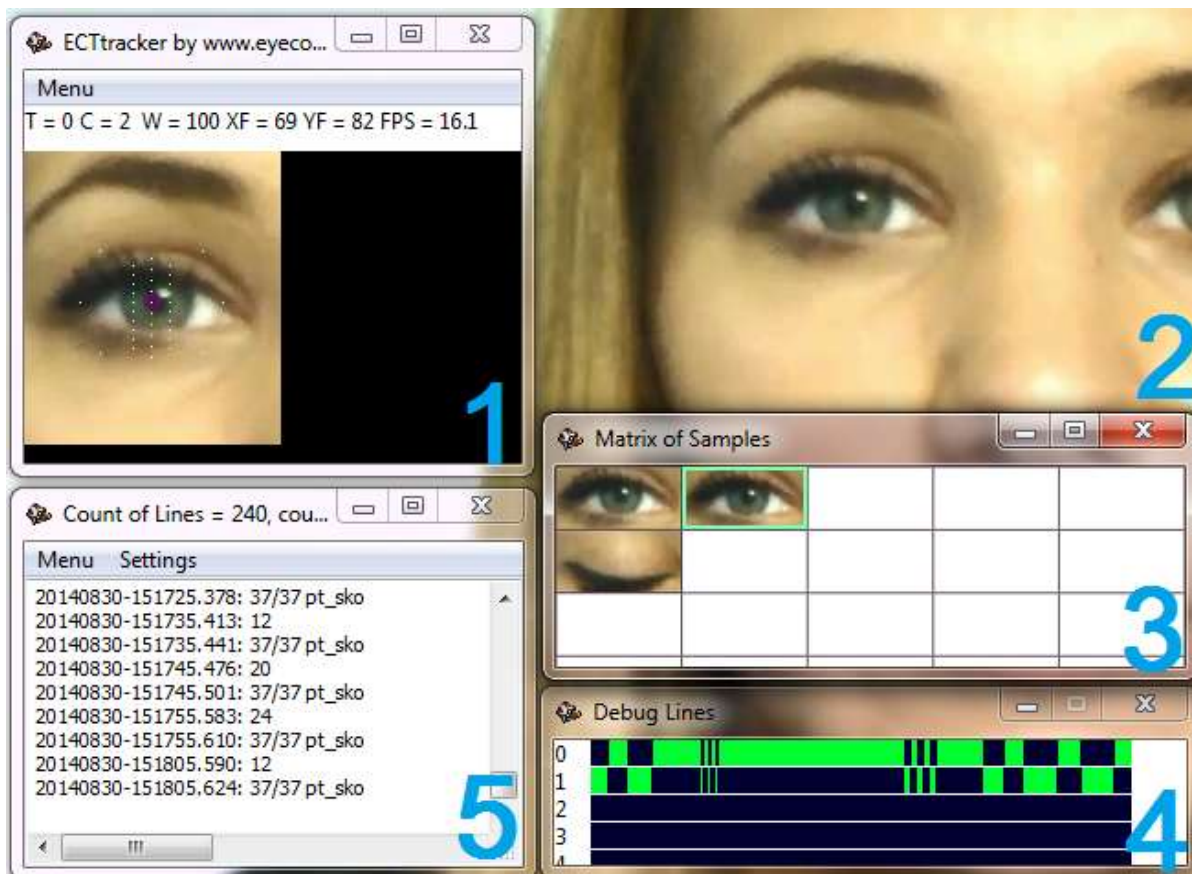
(Fig. 1. The main interface of the program; Main window, ECTcamera, Matrix of Samples, Debug Lines, Event Log)

(Fig. 1. The main interface of the program; Main window, ECTcamera, Matrix of Samples, Debug Lines)

The illustration above displays the standard interface of ECTtracker, as well as the active window of the video capturing software ECTcamera through which ECTtracker receives the images required to analyze the sample. Various elements of the program are marked with numbers:

1 - The main window of ECTtracker displays the processed portion of the image; coordinate recognition grid and fields of statistics;
2 - The window of ECTcamera, which displays the image from the connected to the computer camera, webcam or other video recording device;
3 - Sample matrix is a special ECTtracker table in which are entered fragments of images on which the eyes of the user are open, closed, or only one eye closed. They are used for further recognition.
4 - ECTtracker window of graphic indicators shows which of the samples in the matrix match with the current image in the main window.

For the program to successfully analyze the images obtained from an external device or windows media player, some additional settings must be made. This is particularly important at the first start of the application.

ECTtracker Getting Started (First Run)

The procedure for the initial setup of ECTtracker and its subsequent work consists of the following steps:

1. Identifying the source of images (video) is necessary prior to launching ECTtracker. Running this application first is necessary, if the program is used in conjunction with an application that uses the function of capturing video from your camera or other device connected to your computer. If you use stored video, you need to open the media player.

2. Once the necessary software is launched, the application must include eye tracking running file ECTtracker.exe.

3. To use previously saved custom profile settings, select the menu item "**Profile**" - "**Load Settings**" in the dialog box after starting the program, then select the desired configuration (*.cfg) file. All settings of the program will take effect after the selection of the configuration file.

4. In order for ECTtracker to work correctly with window media player or an application that displays an image from a connected camera, you must correctly place the target window. At start, the user sees a black rectangle, which is designed to capture a portion of the image and transfer it in the window. To configure the video capture, the target window should be placed over the window of the player or another application displaying the video in a manner to make it cover the user's face (see Fig. 1).
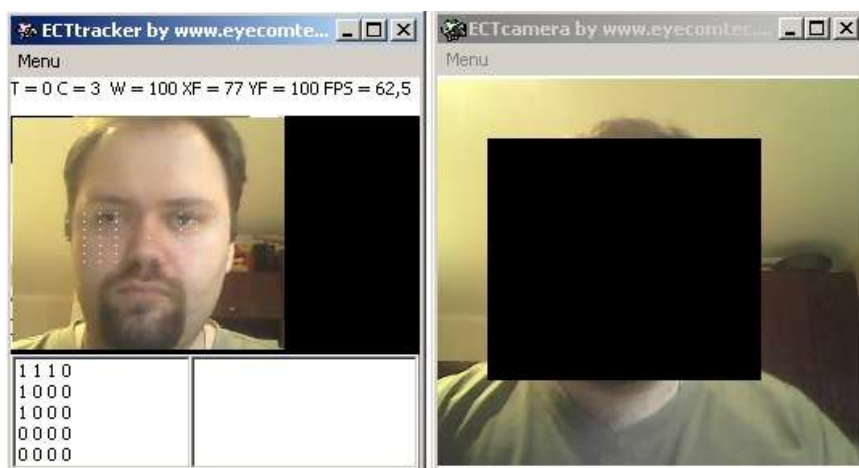

(Fig.2 Capturing a portion of the image using a fragment of the target window)

5. To enable the program perform image recognition; the user must load the table of samples after selecting a profile. If the user has already created a sample table (Matrix of Samples), he can select it through the menu item **"Samples" - "Load Matrix of Samples"** and then selecting the desired file.

6. If the samples table has not been created earlier, the user must create it either manually or using the automatic calibration. To start the calibration, select the menu item **"Samples" -" Autocalibration"**. An icon with a countdown timer, located in the middle, and at the top right of the screen (see Fig. 3) will be sequentially shown to the user. Depending on the type of icons different action should be performed: if the icon represents two open eyes, the user just needs to look at it before the timer countdown runs out and a short beep is played; if the icon represents two closed eyes, the user should keep his eyes closed until the alarm; if one open and one closed eye are displayed - the user must keep one eye closed until the signal. Automatic calibration procedure takes less than a minute and allows to quickly create the Matrix of Samples. *After the default calibration the sample table will contain five elements: three images of the user with both eyes open, both eyes closed, and one eye closed (see Fig. 4).*

(Fig.3. Auxiliary icons for automatic calibration)
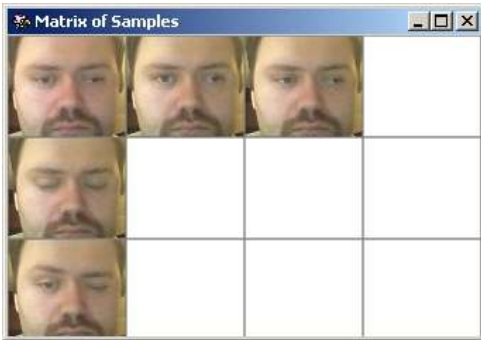
(Fig.4. Result of the automatic calibration with filled table samples)

7. In that case, if the result of the automatic calibration is not satisfactory for the user (fuzzy images, displacement of the face from the focus of the camera, too weak or strong lighting), it is possible to clean the Matrix of Samples at the menu item "**Samples " - "Clear All** ", then change the capturing conditions and calibrate again.

8. The user can manually fill out the Matrix of Samples, without using the auto-calibration. To do this, the image capture must be enabled through "**Start**" menu command or pressing the corresponding menu item "hotkey" **F11** and then by clicking on the image with the mouse right button (see Fig. 5). This pauses the "video output" and draws a rectangular area with the center point that lies at the point of the mouse click (representing the current sample within the video-frame). The user now has to decide whenever this frame could be a good sample (should be added to "Matrix of Samples"). If the user is not satisfied by the area selected by right-clicking and wants to select a different portion of the image he may reject current selection by clicking somewhere on the "video output" with the left button, that will continue the tracking process. However, if the paused frame is of the good quality, it may be added to the "Matrix of Samples" by clicking the left mouse button directly on the desired (destination) cell. If selected cell begins to display a part of the recently added frame, it means that sample was correctly added to the ECTracker's database. If the cell used to contain a different fragment, the latter will be replaced. In this way, it is possible to replace the failed samples created with automatic calibration without resetting it from the beginning.
Clicking the left mouse button, in this case "video output" will not be paused can make the area selection.
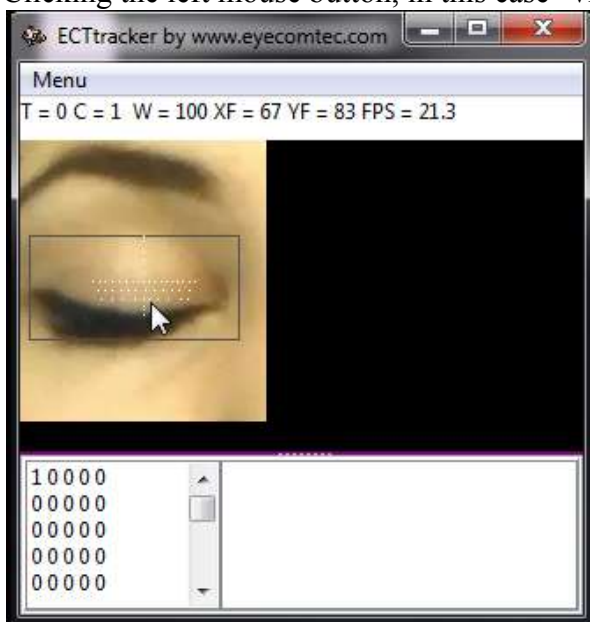
(Fig.5a. Filling Matrix of Samples manually, Step1 – click the right button on the eye in the Video Output of the Main Window.)
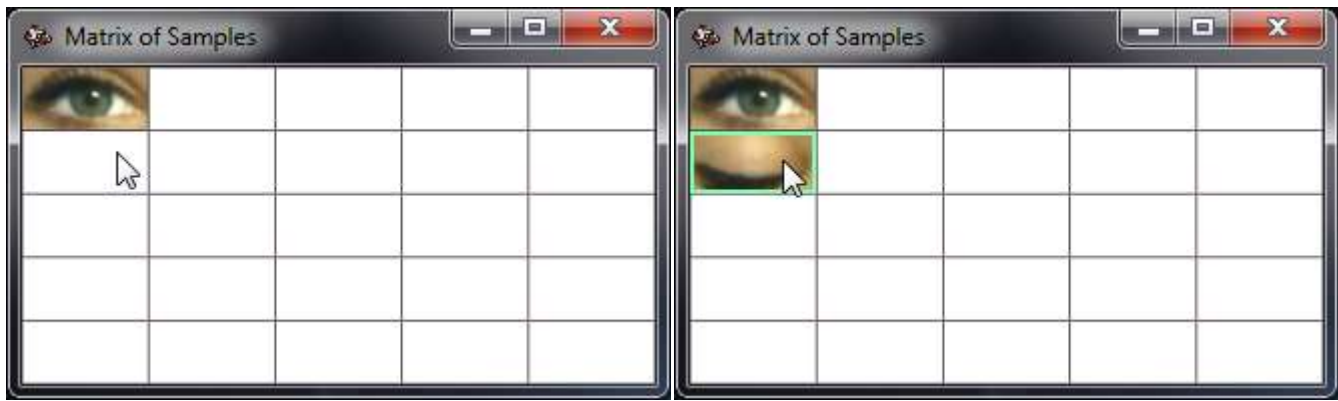
(Fig.5b. Filling Matrix of Samples manually, Step2 – click the left button on the destination cell of the Matrix of Samples.)

9. For the initial setup of the program the user will also need to specify the following options in the settings panel of ECTtracker (called through the menu item "Profile" - "Show Settings" or by pressing "the hot key" F2):

   a) Parameter 1 – The matching percentage of the sample and the analyzed image. The higher this value is the more accurately will be determined the matching with the output image sample. But if the parameter value is too high, the program does not always determine the coincidence. Optimal value percent match - 80.
   b) Parameter 5 - the maximum displacement of the sample relative to the analyzed image (maximum shift in pixels of an eye per one frame). ECTtracker searches for matches not only at the initial point of the image, but in a certain area around it.
   c) Parameter 10 - the title of the receiver software (Application-Receiver). In this application ECTtracker will send keyboard events (specific buttons being pressed or/an un-pressed).
   d) Parameters 60-64 - the actual key and status codes. In these fields, the key codes are specified and preconfigured keyboard event is sent to the destination program when the image in the ECTtracker matches one of the samples.

10. ECTtracker can be started once the user has set all the necessary settings of the program, defined through the target window the image area to be analyzed and chosen the structure and created a table of samples. To start working with the program the user needs to choose the "Start" menu item in the main menu or by pressing F11.

At the start of image recognition the search position of the sample matching with the image is placed exactly in the center of the window containing the image. To move the search point of the match with the specimen you must press the left mouse button and move the cursor to the desired search area (the user's face, bridge of the nose). The search position moves, aligning the center of the sample to the coordinates set with the mouse click. The comparison of the analyzed image with samples from the table is done at each frame, the coordinates of the centers of samples exceeding a specified percentage of matches are displayed in a window and the information about the sample with the highest level of matches is displayed in the ECTtracker information field.

When the program determines the sample that matches the image the most, its coordinates become the new search position center. In the table of samples the matching sample is highlighted with a red border. The key code to be transmitted to the receiver application is determined based on the row of the "Matrix of Samples" in which the current sample is found. In the case when no samples in the table match the image, the program moves the search point at the center of the analyzed image and resumes the search after a specified time. In the case when there are no matching images, the number of waiting frames can be configured through the parameter 6 of the program settings.

ECTtracker main menu and features

All items of the main menu ECTtracker are conveniently grouped: starting and stopping image recognition, displaying additional windows, loading and saving profiles, recording and uploading samples for recognition (including the use of the automatic calibration), showing or hiding additional elements of the main window. The appearance of the main menu of the program is displayed in Fig. 6.
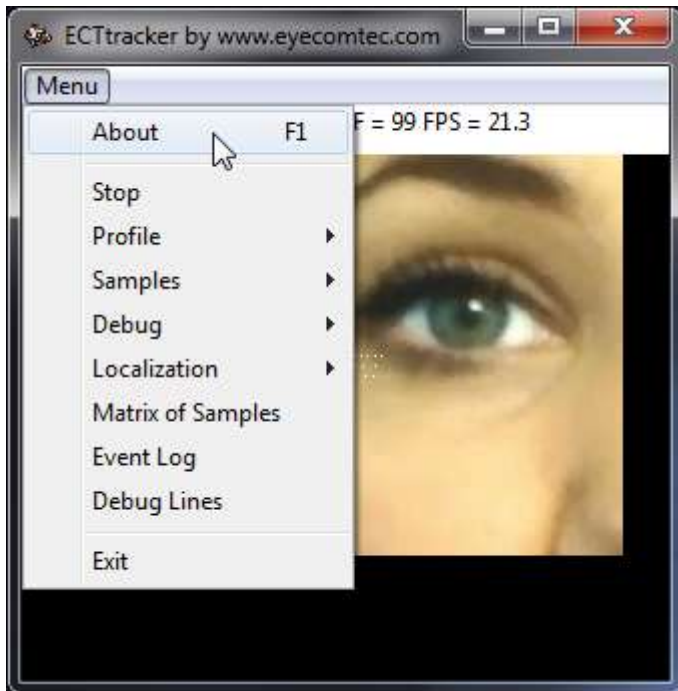

(Fig. 6. The main menu of the program)

In the present version of ECTtracker, main window has the following menu structure (sub-menu items are expanded and marked in blue):

```
About (F1)
Start/Stop (F11)
Profile
        Show Settings (F2)
        Set Current
        Load Settings
        Save Settings
        Reset to Default
Samples
        Autocalibration (F6)
        Open Structure
        Load Matrix of Samples
        Save Matrix of Samples
        Erase Matrix of Samples
Debug
        Video
        Statistics
        Structure
        Recognized
Localization
        Set Language File
        Set English
        Set Russian
        Dump Current Language
Matrix of Samples (F4)
Event Log (F3)
Debug Lines (F5)
Exit (F10)
```

Let us consider in details the items of the menu.

«**About**», Hotkey **F1**. This menu item allows accessing ECTtracker help window that contains information about the release of the program, its brief description and information on the development team (see Fig. 8).
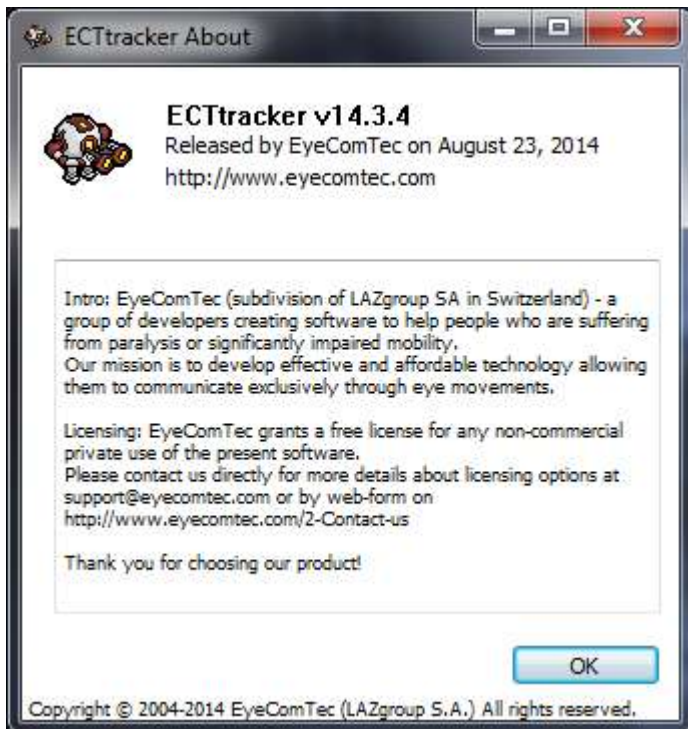

(Fig. 8. About window of the program)

«**Start**»/«**Stop**»**,** Hotkey **F11**. At initial startup ECTtracker additional settings are required - select the profile settings, if more changes are necessary, create or download from a file the table of samples for further recognition. Therefore, by default, the image recognition is disabled. In order to use it, the item «Start» must be selected in the ECTtracker main menu. In the case where the image recognition process has already started and the user needs to make additional adjustments to the program settings, select other samples or temporarily stop the recognition, he must use the main menu item «Stop». In this case, the program will stop the recognition, the menu item and its corresponding «Settings» window will become available.

Using the «**Profile**» submenu (see Fig.13) the user can load and save profiles of program settings, apply them after additional adjustment or reset all settings to their original values.
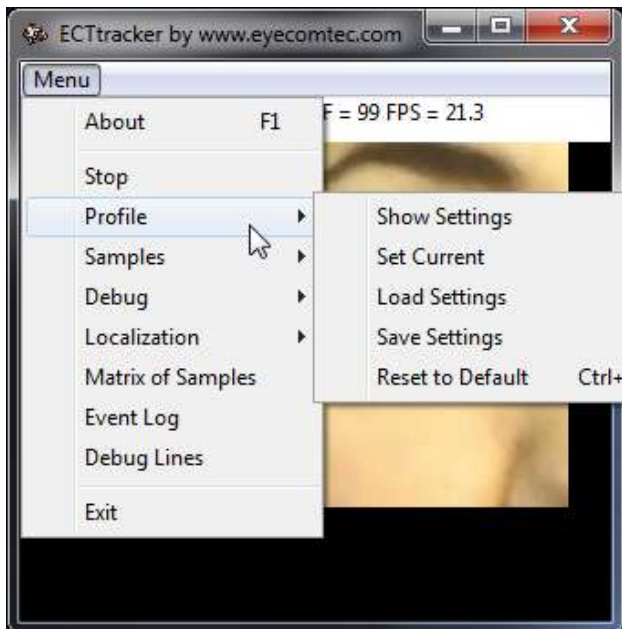
(Fig.13. Profile Submenu)

«**Show Settings**», Hotkey F2. This additional window contains all the settings that can be modified at will by the user: image matching threshold boundaries, the size of the target window, the video recognition speed and the wait interval for video loss, the name of the program to which will be transferred all the data obtained from ECTtracker, key codes, display parameters of additional windows and etc. over 45 customizable values. (See Fig. 9). Additional information about all the program settings can be found in the chapter "Settings and Advanced settings ECTtracker" of the current user manual.
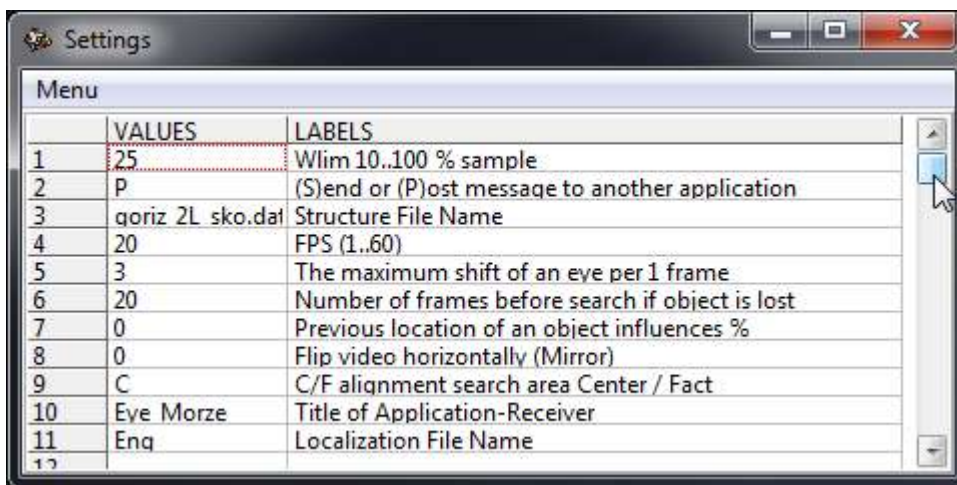
(Fig. 9. Settings window of ECTtracker)

«**Set Current**» The above sub-menu item «**Profile**» allows to apply any of the current settings made by the user through the options panel. Changing application settings using the menu commands (and not in real time by changing the settings) is useful for creating different profiles that do not require the mandatory application of settings to the current session of ECTtracker and for executing the program on low-end computers.

Warning, executing "Set Current" will erase all the photographs in the Matrix of samples! We strongly advise you to Save Matrix of Samples prior to running that menu item.

«**Load Settings**» From this menu the user can load previously saved profile settings. The possibility of using an unlimited number of profiles allows to change program settings instantly, including those parameters the manual selection of which can be time consuming for each; for example, the maximum displacement of the user's eye, speed capture and processing of the video, the match threshold limit of the image for the analyzed samples and other. Also, the use of profiles makes it comfortable to work with a

program stored on an external storage device. Many settings require fairly high-performance computer, for this reason it is advisable to use different profiles on computers of different configuration.

«**Save Settings»** The menu item for recording in a separate configuration file all available to change settings of ECTtracker. Selecting this menu item opens the standard dialog box of the operating system, where the user can select a location on the storage media to save the settings file, and specify its name. File will be saved in a user-specified directory with the specified name and extension. Cfg. Configuration files have small size allowing to easily store, sort and move them to external media.

«**Reset to Default»** If necessary, all settings in ECTtracker can be automatically reset to default. To do this, use the «Reset Settings» option in the «Profile» submenu. Resetting is recommended if the user specified parameters require a too high performance for your computer to handle or when ECTtracker is unstable.

«**Samples»** submenu (see Fig. 14) allows the user to create a set of samples for recognition using the functions of automatic calibration, saving and loading the table of samples from an image file and selecting one of the several available structures of recognition.
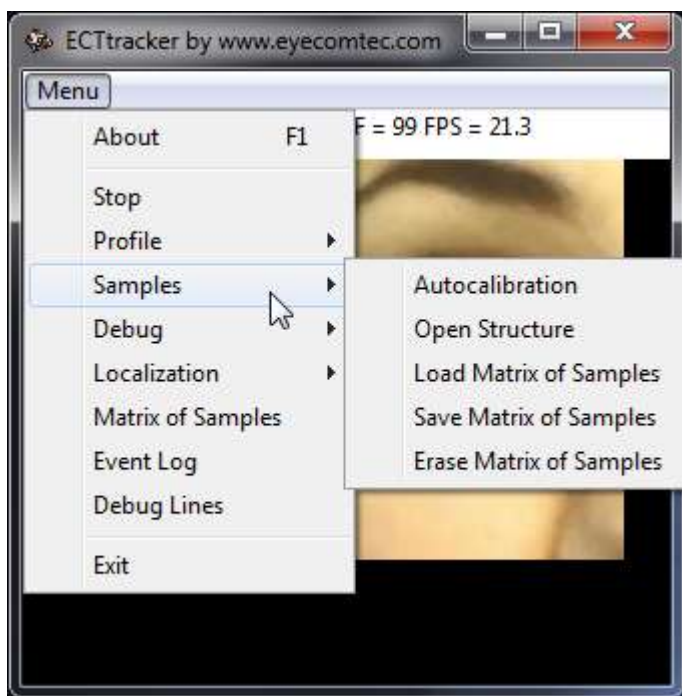
(Fig. 14. Submenu with samples)

«**Autocalibration**», Hotkey **F6**. Allows to launch the process of the automatic creation of samples needed for the recognition (Matrix of Samples). When starting the automatic calibration an icon showing both eyes open with a countdown timer in the center of the screen is displayed to the user. The user is expected to stare at this icon and repeat the recommended action with his eyes (keep both eyes open).

Once the timer reaches zero the user is shown the identical timer icon in the different position of the screen and again the user is expected to stare at it an repeat the recommended action.
Every time the timer reaches zero, it beeps, and a cell in the table is filled with images.
Following the instructions of intuitive icons-tips will help to quickly create a Matrix of Samples with samples where the user's eyes are open, closed, or only one is closed. Different variants of the icons are displayed in Figures 3 and 15.

(Fig. 15. Auxiliary icons for automatic calibration)

«**Open Structure**» This menu item allows selecting the structure to be used by the recognition algorithms. Structure contains relative coordinates of pixels analyzed during tracking. Simply speaking it is responsible for the organization and placement of unique visual detectors. Different structures are suitable for different users - for example, in the case when the patient has retained the mobility of only one eyelid it is recommended to use the structure universal_sko, while 2GL_sko is to determine the position of both eyes. Structures differ by the number and the location of points on which the program compares the analyzed image with the samples in the table. In certain cases other structures should be used for better recognition of the user's eye activity.

«**Load Matrix of Samples**» Using the submenu item «**Samples**» the user can open any of previously saved sample sets. Each set of samples is recorded in a separate graphic file, making it easier to switch between them, as well as allowing quick previewing with the operating system.

«**Save Matrix of Samples**» In the case, when the user creates a specific set of samples for recognition, it is advisable to save them to disk for later use. Using the item «**Save Matrix of Samples**» it is possible to save all samples as separate bitmap files (grouped by folders representing different rows of the "Matrix of Samples" (see Fig. 16). Saving of samples is extremely useful when multiple users work alternately with one program. For that you need to move a set of images from one computer to another or run application from a portable device.


(Fig. 16. Example of an image stored in a set of samples for recognition)

«**Erase Matrix of Samples**» In the case if automatic calibration has given fuzzy samples (for example, the person in the picture is displaced from the central part of the sample, the eyes are slightly open, the lighting is too weak or on the contrary too bright, and so on), there might be the need to recalibrate automatically or manually the sample creation. In this case, it would be helpful to use the command «**Erase Matrix of Samples**» submenu «**Samples**» which removes all the samples from the table.

Submenu «**Debug**» (see Fig. 17) to enable or disable the various components of the ECTtracker main window - video display area, structure on the top of the displayed image, statistics, coordinate sample matching. The components of the main window displayed in real time are marked with a check mark.
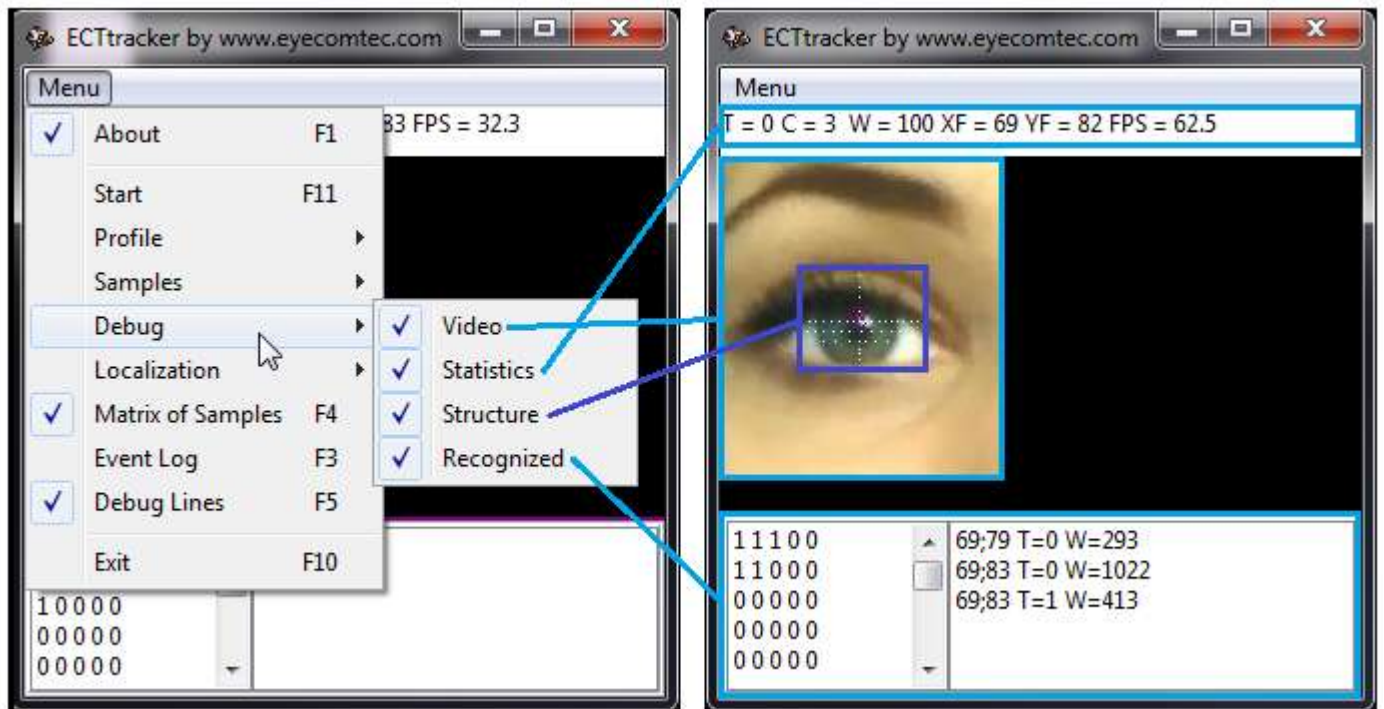
(Fig. 17. Submenu «Debug» and Video, Statistics, Structure, and Recognized displayed on the Main Window)

«**Video**» This item allows the user to display or hide at will the ECTtracker window with an image displayed from another program. The structure will no longer be displayed once the video window disabled. This option is useful when using the program on low-end computers, as it allows to better use the system resources. Despite the fact that the structure of the video footage will not be displayed in the program window, the recognition will still continue; the statistical data in the main window and the window ECTtracker «**Debug Lines**» will be updated, all the values of the pressed keys will be transferred to the destination program.

«**Statistics**» The main window displays some useful to the user statistical data: row and column of the sample matching with the current image, the match degree, the coordinates of the best sample, display and processing speed of the video. By disabling the display of statistics using the corresponding menu item the user will get a slight decrease in the program resource requirements or save the screen space when using ECTtracker on computers with low-resolution monitor.

«**Structure**» Displaying the mesh structure in the window allows to obtain images in real time to assess whether the right portion of the image is processed by the program, how well ECTtracker "follows" the eye area, whether focus does not get lost for the predetermined area.   If the program is configured correctly and the mesh structure is moved over the image of the user's eyes, the display of the structure can be disabled. This also reduces the required computer resources.

«**Recognized**» This item allows to show or hide the additional area of the main window that contains the table of samples, coordinates and maximum match levels with the image in the video window. Disabling the list, as with any other component of the main window, allows the program to use fewer system resources of the computer.

In the case, if the activation of the item «**Recognized**» does not make appear in the main window the appropriate area with a list, it is necessary to move the mouse pointer to the lower border of the window and once it changes its appearance, hold down the left mouse button and drag the border up (see Fig. 18).
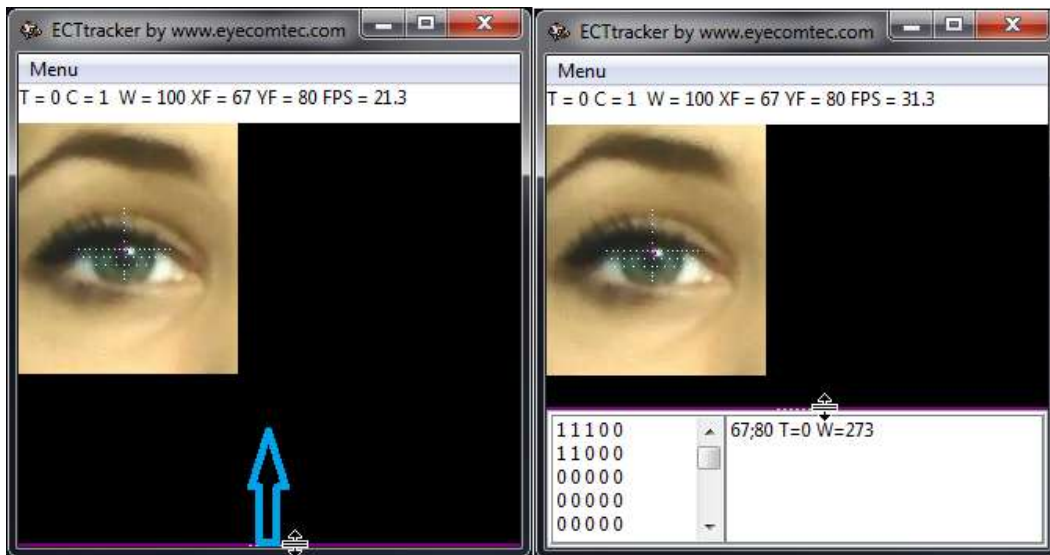
(Fig. 18. Displays the list of matching samples)

Submenu «**Localization**» – Allows the user to change the designated language from English to any language within the program. New languages are still being added. To change the language back to default English, you may "*Set English*" or load alternate system configuration settings.

«**Matrix of Samples**», Hotkey **F4**. ECTtracker works by comparing the fragments of images with user-defined samples. This table of samples is a 5x5 dimension matrix (see Fig. 11).
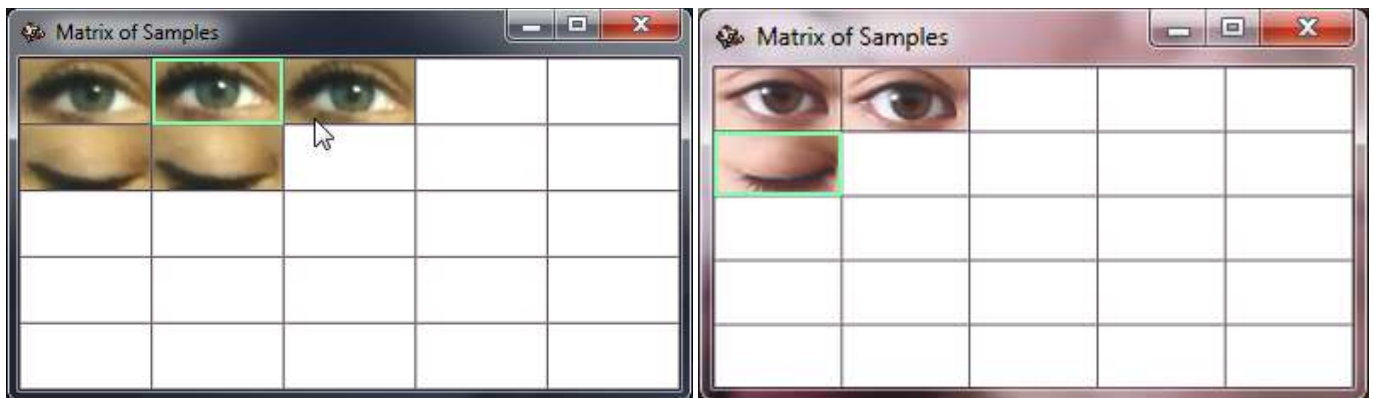
(Fig. 11. ECTtracker - Matrix of Sample)

In all the user can specify up to 5 different samples (for example, both eyes open, both closed, only the right or only the left eye open), and make up to 5 different images for each image (for example, a small change in angle or illumination). A correctly filled table allows the program to locate and identify matching sample more accurately.

«**Event Log**», Hotkey F3. The present additional window displays a list of all the important actions performed in ECTtracker: starting and stopping the recognition process, loading and saving profiles, changing settings. The appearance of the event log is shown in Figure 10.
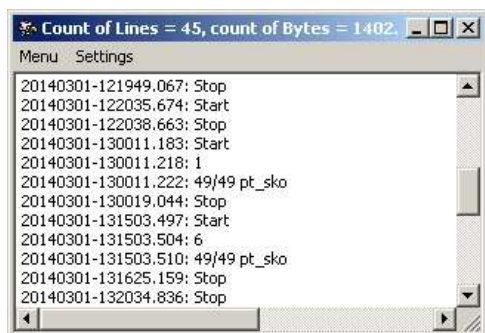
(Fig. 10. Program Event Log)

  The title bar of the event log indicates the number of rows in the current protocol and the total size of the protocol in bytes. The display of this information can be enabled or disabled through the menu items of the form «Settings» - «Information...» (info ...) or key combination Ctrl + H. Through basic menu items the user can also reset the current log of the events of the program («**Menu»** – **«Clear»** or **Ctrl**+**R**), save the log to a text file («**Menu»** (Меню) – **«Save»** or **Ctrl**+**S**), or simply close the event log window («**Menu»** – **«Close»** or **Ctrl**+**E**).

«Debug Lines», Hotkey **F5**. Additional window, displaying in real-time the match ratio of the analyzed in the program window image fragment with user-defined samples in the table. (See Fig. 12).
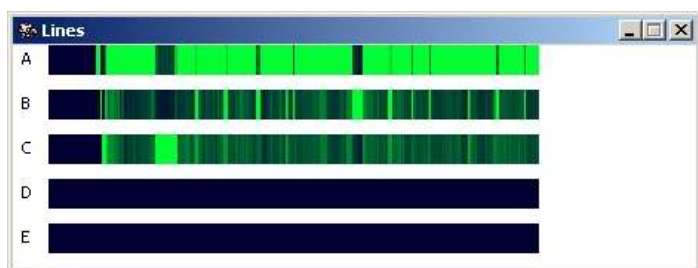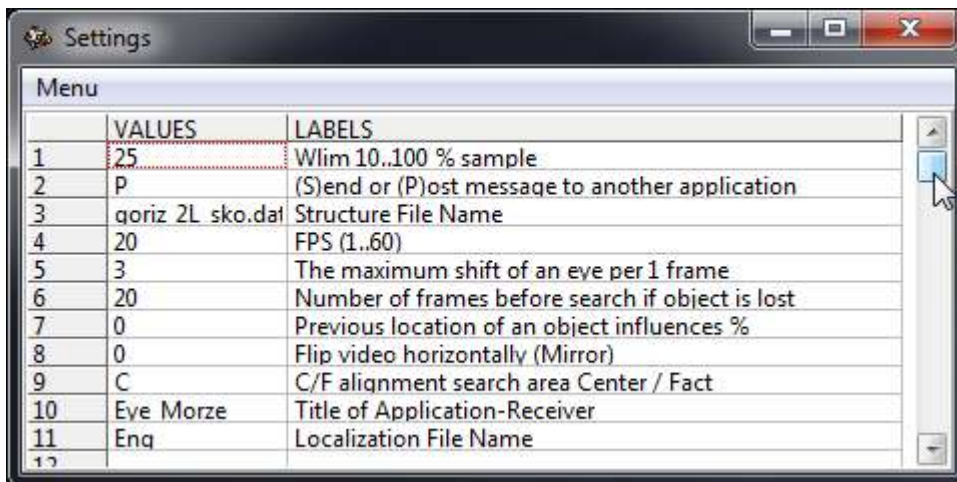

(Fig. 12. «Debug Lines» Window)

  The number of possible images or lines is equal to five. When the process of image recognition using ECTtracker is running, the line area begins to fill in real time from left to right. Color lines vary from blue for no match to green for full match between the image in the program and the corresponding sample. The window « Lines » is used to quickly determine the accuracy of image recognition by the program.

  «Exit», Hotkey F10. This menu item stops the process of comparing the image with the table of samples if running and then sequentially closes all the open windows of the program ECTtracker and exits the application. On exit all customized settings (window positions and dimensions, their display or hide options and other program parameters) are automatically saved and applied at the next ECTtracker startup.

ECTtracker Settings and advanced parameters

To open the settings panel, the user must select in the main window of the program the item «Show Forms»– «Settings» or press the key **F2** (see Fig. 9, 19). The opened settings window contains all the parameters of the program, the values of which can be modified by the user.

(Fig. 19a. ECTtracker Settings window 1-11)

The program settings are grouped into several columns. From left to right: parameter number, its value (VALUE column) and a brief description (LABELS column).

Let us consider the program settings in more detail.

1.Wlim 10..100 % sample. Wlim is the match limit of the sample with the analyzed image. This parameter can vary from 10 to 800, the recommended value is 50. In the settings the default value is 35 Wlim. The greater is the value of the parameter specified by the user, the more accurate is the match of the sample with the analyzed portion of the image. Increasing the value of Wlim is useful with well-lit rooms and large resolution cameras. The value can also be increased in the case when several samples correspond to the set match limit - it can usually be seen when simultaneously two or more diagram lines are filled with green. Conversely, in low-level recognition, where the image does not match with any of the samples, it is necessary to reduce the value of Wlim. The appropriate value should be selected in a manner to at any time allow only one green line on the diagram.

2.(S/P) Send/Post - message. ECTtracker contains two types of message transmissions to the destination program - Send and Post. This parameter can take two values - S for transmitting messages with "Send" and P "Post". The default value when the program starts – P.

3.Structure file name. The program can use one of several predefined structures for image analysis and verification of its fragments to match user-defined samples. In this field, the user can specify the structure file name for image analysis. If the field is left blank, the built-in structure will be the one to be used. 2GL_sko.dat is the default structure for recognition of the state of two eyes.

4.Frames per second 1..60. Capture speed and video processing for subsequent recognition. When operating ECTtracker receives an image from the source located under the target - the windows media player or an application that displays an image with the camera connected to the computer. Then the portion of the image displayed in the main window of ECTtracker, and the key points of the structure are compared with the downloaded or user-created samples, the information gets updated in the main window, in the "lines" window and based on the received information ECTtracker defines key codes to transmit to the destination program. After this the program performs the analysis of the next acquired image, and so forth. Despite the resource consumption, the program handles up to several tens of frames per second. The optimal speed of capture and processing is 15 frames per second; the default value in the settings is set to 10 frames

per second. The available adjustment range goes from 1 to 60 frames per second. On low-power computers it is recommended to reduce the speed of video processing to 6 frames per second or less.

5.Maximum shift of eyes per 1 frame. The image of the user's face obtained from the camera is not static. Head tilts and various movements result in position changes, making it necessary for the program to adjust the location of the structure in order to enable it to "track" the user's eyes. Therefore, the coordinates of the centers of the matching samples also change. The faster and stronger is the user's head movement, the greater the value of shift for one frame should be. In order not to lose the target, the maximum shift should also be increased for close-up shots of the video. The shift range can be changed from 0 to 100 pixels. By default, the minimum shift is equal to 4 pixels. The value of the parameter should be increased if the program loses focus on the eyes of the user, and decreased if ECTtracker is running on low-end computers.

6.Number of frames before search if object is lost. The waiting time of the program at target loss. In the case where the analyzed image does not coincide with one of the samples in the table, the program waits for a user-specified number of frames, after what it moves the search point in the center of the image. The structure is not displayed during the wait enabling the user to timely notice that the target is lost. The default value is 30. Thus, when processing 15 frames per second in the case of target loss the wait time is 2 seconds. The user can set any waiting time in the range of 1 to 1,000 frames.

7.Previous location of an object influences %. The proximity factor of the previous target. When comparing the current image with the downloaded sample the program can take into account the distance to the matched samples and choose the closest of them. The value of the variable is set in the range from 0 to 100, respectively the benefit ratio of selecting the closest samples varies from 0 to 100%. The default value is 0, which means that ECTtracker will select matching samples regardless of their location.

8.Flip video horizontally (Mirror). Mirroring of the Video. The parameter can take the values 0 and 1. When set to 0 the video in the main window of ETCtracker displays exactly in the same way, as in the program window, on which the target window is set. When the value is equal to 1 the image in the window ECTtracker is mirrored from right to left. The default value is 1.

9. (C/F) Center/Factual - Alignment search area. Detecting search area.

10.Title of receiver-application. The name of the receiver program. When working ECTtracker generates key codes based on samples that match with the image and their location in the table. Subsequently, they are transferred to destination program that will handle these codes by performing certain actions. In this field of the settings panel, the user can enter the name of the destination program.

11.Localization File Name. Sets the language file
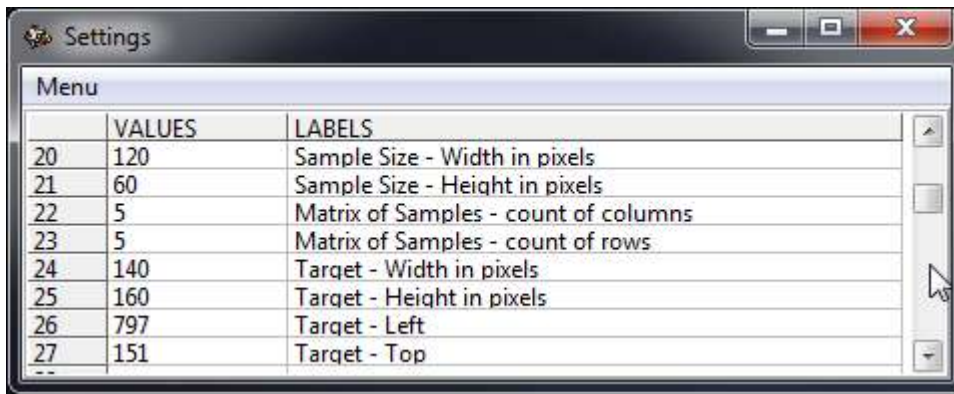
(Fig. 19b. ECTtracker Settings window 20-27)

20. Sample Size - Width in pixels. Sample width. The width and the height of the sample in the matrix should be selected in a way to contain the majority of the points for better recognition of the structure of the image, but in the same time it mustn't be too large not to narrow the range of the target displacement. The user in the range can set the width of the sample from 10 pixels to the current window width of the target. By default, at first start the image width is 140 pixels.

21.Sample Size - Height in pixels. The height of the sample. Is to be configured in the previous paragraph of the settings panel; the height of the sample ranges from 10 pixels to the current height of the target window of ECTtracker. Default sample height - 120 pixels. The structure of points in the main window of the program should be placed on the most frequently variable region.

22.Matrix of Samples - count of columns

23.Matrix of Samples - count of rows

24.Target - Width in pixels

25.Target - Height in pixels

26.Target – Left. Target Position Left**.** Target position, left indent. This parameter stores the information about the horizontal position of the target window. The value of the variable - the indentation in pixels from the left edge of the screen to the left border of the target window.

27.Target – Top. Target Position Top**.** Target position, left indent from above. This parameter contains the data from the vertical spacing. The value of the variable - distance in pixels from the top of the screen to the upper limit of the target window.
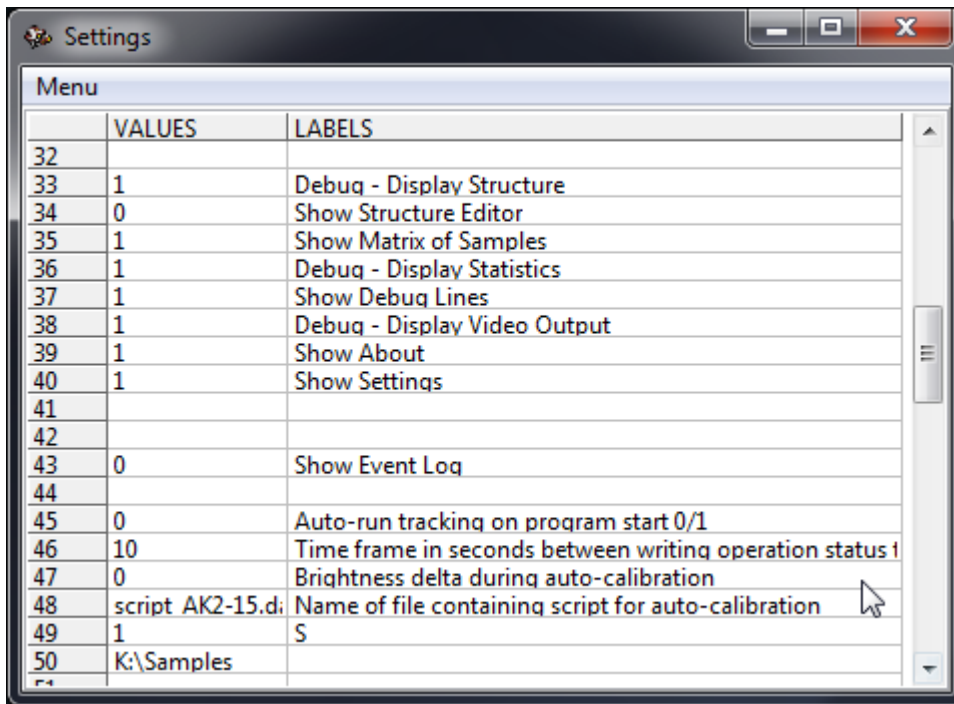
(Fig. 19c. ECTtracker Settings window 33-50)

33.Debug - Display Structure. Parameters from 33 to 44 are responsible for the appearance of various ECTtracker elements and can take the values 0 and 1. If the value is 0 the element of the program is hidden, when 1 - displayed. This parameter is responsible for displaying the structure over the image in the video window. By default at the first start the program displays the structure - it allows real-time monitoring of how the program displaces the search area by changing the image and in which cases the image is lost.

34.Show Structure Editor. This parameter is responsible for the visibility of the window of the structure of the editor. By default, the structure of the editor is not displayed.

35.Show Matrix of Samples. This parameter is responsible for the visibility of the window containing the table of samples. The window is displayed by default, allowing the user to see which set of samples to detect is currently loaded.

Also, when program runs a red frame highlights the sample with the highest proportion of match with the current image in the video window - this allows the user to quickly identify the most successful designs and, if necessary, replace the other ones or perform an automatic calibration to update the matrix of samples.

36. Debug – Display Statistics. This parameter is enabled by default and responsible for displaying statistics in the main window of ECTtracker. At the same time the main window contains the coordinates of the sample that matches the most with the analyzed image, its position in the table of samples, the degree of overlap, as well as the speed of video frames per second.

37.Show Debug Lines. This parameter is responsible for displaying "Lines" window and is enabled by default; this means that the window containing diagrams of groups of samples matching with the analyzed image is displayed to the user. The user can Enable the display of the "lines" window by changing the value of this parameter from 0 to 1, or by using the appropriate menu item of the main window.

38.Debug - Display Video Output. This parameter is responsible for displaying the video window in the main window of ECTtracker. By default this option is set to 1, that is, the video window is active and the image is displayed in the window. This parameter should only be disabled if ECTtracker runs on a computer with low productivity - as the absence of the displayed image will help increase productivity.

39.Show About. This parameter is responsible for displaying the window "About". The default value - 0, and the information window of the program is not displayed when starting and running ECTtracker.

40.Show Settings. This parameter is responsible for the appearance of the settings window. The default value is equal to 1, the program settings panel is displayed If you set this variable to 0, then the menu will not be displayed at each new start of the program, which can be useful when you start ECTtracker on computers with low-resolution monitor, lack of space on the screen to place the window settings, as well as in the case if program settings do not need to be changed often.

43.Show Event Log. This parameter is responsible for displaying the event log of the program. The default value is 0, which means that the event log is not visible to the user. To turn it on the map, you must either set the variable to 1, or enable the display of the magazine through the main menu of the program.

45. (1/0) On/Off - Auto-run tracking on program start. Keyless recognition. This parameter can be set to 0 (autostart disabled) and 1 (autostart enabled). By default the recognition autorun is disabled, since the start of the program may require additional tuning - changing the parameters, choosing the structure, loading samples from a saved file or automatic calibration if the set sample is not created yet. In the case if all program settings have already been made, and the table of samples loads automatically each time, to speed up the program, it is possible to enable the automatic detection, replacing the value of this parameter on 1.

46.Time frame in seconds between writing operation status to file. Time between recording the statistics in the file. The program keeps an event log, which periodically logs all-important actions such as starting and stopping the automatic recognition, the choice of the structure, and other. With this option, you can choose the time interval between making new entries in the protocol software. The default value for this parameter is 10 seconds. Possible range of changes - from 1 to 1000 seconds.

47.Brightness delta during auto-calibration. Threshold brightness changes during the auto-calibration. This parameter can take values from 0 to 200 and is responsible for changing the brightness with automatic calibration. The default value is 0.

48.Name of file containing script for auto-calibration. Name of the file containing the script for automatic calibration. The file selected by default **script_AK.dat**.

49.Reserved.

50.Name of file containing default Matrix of Samples. Sample filename. To avoid selecting the sample file every time you start the program, you can register it in this field, and then at the start of each new session ECTtracker will automatically upload the selected file. This may be useful when the user continuously operates with the same set of stored samples and eliminates the need to select another file when the user works with the program.

60-64. Keyboard Action for the Recognized Sample. This parameter is responsible for emulating keyboard actions when the portion of the frame in the video output of ECTtracker matches with one of the samples in the Matrix of Samples.

Keyboard action is made of two integer numbers (separate from each other with the space). First number represents a key code – every button on a keyboard has a unique number "key code" associated with it (search for "List of Virtual Codes" to obtain more information). And the Second number represents an action to be taken over that button (0 - no action, 1 - press and hold a key, 2 – release (un-hold) the key, 3 - press and then release the button).

Example 1 – "*32 3*": Spacebar pressed and immediately released
Example 2 – "*37 1*": Press and hold the Left arrow key
Example 3 – "*13 3*": Enter pressed and immediately released

93. Key Code for Arrow Key - Right (+dx). By moving the target along the horizontal axis (X) the program also sends specific key codes to the destination program. Using this setting, the key code sent to the destination program can be changed by increasing the target coordinates on the X axis.

Unlike with Recognized Samples, an action code for cursors is fixes to 3 (press and release the button).
By default cursor buttons are set to 0 for better performance.

94. Key Code for Arrow Key - Down (+dy). This setting allows you to change the key code of the target transmitted to the destination program when increasing its coordinates on the Y-axis.

95. Key Code for Arrow Key - Left (-dx). This setting allows you to change the key code of the target transmitted to the destination program when decreasing its coordinates on the X-axis.

96. Key Code for Arrow Key - Up (-dy). This setting allows you to change the key code of the target transmitted to the destination program when decreasing its coordinates on the Y-axis.

Updates

The latest version of ECTtracker can be downloaded directly from our site:
http://www.eyecomtec.com/ECTtracker.zip

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