Real-time eye movement tracking using webcam and PC

SentiGaze SDK
## SentiGaze SDK

Real-time eye movement tracking using webcam and PC

**CONTENTS**

- Features and capabilities ........................................... 3
- SentiGaze SDK components ......................................... 4
- System requirements .................................................. 5
- Specifications and usage recommendations .................... 6
- SDK Trial, demo application and related products .......... 6
- Licensing SentiGaze SDK ............................................. 7
- Prices ................................................................. 9

SentiGaze is designed for developers who want to use computer vision-based gaze tracking in their applications. The technology works with webcam and common PC. Usage convenience is ensured by contactless gaze tracking and calibration to specific screen size and user position.

Available as a software development kit that provides for the development of gaze tracking systems for Microsoft Windows.

- Real-time gaze tracking.
- Heat map generation and other gaze-based statistics for single and multiple subjects.
- No physical contact for gaze tracking.
- Application control with user’s gaze as a pointer.
- Accessibility for disabled people.
- No specialized hardware required, only webcam and common PC.
- Calibration to screen size and distance from screen.
- Compatibility with other Neurotechnology products like face biometrics SDK.
- Reasonable prices, flexible licensing and free customer support.

See demo video: [https://youtu.be/B7P6V4GRGE](https://youtu.be/B7P6V4GRGE)
Features and Capabilities

SentiGaze is a proprietary eye movement tracking technology which is designed to be used on a common PC with a common camera. The possible applications of the gaze tracking technology include:

- **Heat map based research and analytics** for single and multiple subjects, i.e. usability of websites and applications, film screening, advertising research for both TV and static ads (posters, product placement etc).
- **Device and application control**, like full or auxiliary control of an application or device, working with multiple screens, video games, accessibility for disabled people.
- **Medical** and **scientific** research which needs to detect and track subject’s eye movement.

The SentiGaze technology has these capabilities for gaze tracking and session recording:

- **Real-time gaze tracking.** SentiGaze tracks user’s gaze and provides results in real time. The gaze tracking session can be also saved for future use.
- **Heat map generation.** Gaze tracking session can be represented as a heat map which can be generated on top of screen contents like web pages, applications, static images or videos. Live preview of the heat maps is available. SentiGaze generates heat maps for single subjects and can also merge individual heat maps for multiple subjects gaze statistics.
- **Application control.** SentiGaze functionality can be used for enabling computer, device or application control using gaze as a pointer. The possible applications may range from gaze-controlled software to additional input method for computer games.
- **Accessibility.** Specialized software for **disabled people** can be developed to provide gaze-based control where other accessibility options are not suitable.
- **Simple usage.** SentiGaze technology is designed to work with regular **webcams** and requires no special hardware like specialized gaze-tracking cameras or fixing person’s head in a rigid position. Proprietary algorithms are used to detect subject’s eyes on the captured video and track their movement. **No physical contact** required at any stage of gaze tracking.
- **Adaptive to screen size and distance from screen.** A simple short procedure calibrates SentiGaze for specific environment before gaze tracking session. Users are guided to fix their gaze at several points on the screen during the calibration procedure.
- **Compatible with other Neurotechnology products.** SentiGaze can be used with other Neurotechnology products for applications which require additional biometric data. For example, biometric algorithms from **VeriLook SDK** can be used to determine subject’s gender and detect emotions, or even identify a previously enrolled subject.
SentiGaze SDK components

SentiGaze SDK is intended for developers who want to use computer vision-based gaze tracking in their applications. The SDK allows rapid development of gaze tracking applications using functions from the SentiGaze library for Microsoft Windows platform. Developers have complete control over SDK data input and output; therefore SDK functions can be used in connection with most cameras (including webcams) and with any user interface.

SentiGaze SDK includes tools for heat map generation on images or videos with gaze statistics for multiple subjects.

SentiGaze 1.1 SDK distribution package contains these components for Microsoft Windows:

- SentiGaze installation license (1 single computer license)
- Device manager library
- Programming samples for C, C# and Visual Basic .NET languages
- SentiGaze SDK documentation
System requirements

- PC or laptop with x86-64 (64-bit) compatible processors.
  - At least 2 GHz processor is required. 3 GHz or faster CPU is recommended for performing real-time gaze analytics on applications, which also require lots of CPU resources (i.e. high resolution videos, computer games etc.).
  - SSE2 support is required. Processors that do not support SSE2 cannot run the SentiGaze algorithm. Please check if a particular processor model supports SSE2 instruction set.
- At least 256 MB of free RAM should be available for a SentiGaze-based application.
- Camera or webcam. The camera should be accessible via DirectShow interface. Cameras with at least 640 x 480 pixels resolution should be used. High resolution cameras can be also used, as the algorithm is capable to rescale picture size for optimal performance.
- Microsoft Windows Vista / 7 / 8 / 10, 64-bit only.
- Microsoft .NET framework 3.5 or newer (for .NET components usage).
- Microsoft Visual Studio 2008 SP1 or newer (for application development under C/C++, C#, Visual Basic .Net)
Specifications and Usage Recommendations

- **Camera should be placed under the screen.** Laptop build-in cameras are not suitable due to their fixed placement, thus a separate external webcam is recommended.

- **User should be positioned at 45 - 80 cm (1’6” - 4’0”) from the screen.** 60 cm (3’0”) is the **optimal distance** from the screen for convenient gaze tracking.

- **Screen sizes up to 24” (61 cm) are supported by SentiGaze.**

- **Calibration** should be performed before a user will start working with SentiGaze based application at particular computer and camera. The calibration process is simple and convenient, as it guides the user to gaze at specific points on the screen. Three calibration modes with 9, 12 and 16 points are available; more points increase the accuracy of gaze tracking.

- **Binocular** eye data is used for gaze tracking.

- Tracking performance is more than **30 frames per second** on a PC with Intel Core i7-3770 processor running at **3.4 GHz** clock rate.

SentiGaze SDK Trial, Demo application and Related Products

SentiGaze **30-day SDK Trial** and **technology demo** application are available for downloading at [www.neurotechnology.com/download.html](http://www.neurotechnology.com/download.html).

These products are related to SentiGaze SDK:

- **VeriLook SDK** – includes algorithms for detecting person’s gender, emotions and facial expressions, which can be used together with gaze tracking for advanced statistics. Generally, VeriLook SDK is designed for person identification using facial biometrics.

- **VeriEye SDK** – for person identification using iris biometrics. Note, that VeriEye SDK requires special cameras for iris capture and does not work with webcams.

- **NPointer** – a freeware application for gesture-based computer control that captures hand movements with a webcam. Can also accept voice commands.
Licensing SentiGaze SDK

Product Development
An integrator should obtain SentiGaze 1.1 SDK (EUR 890) to develop an end-user product based on SentiGaze technology. The SDK needs to be purchased just once and may be used for all projects and by all the developers within the integrator’s company.

See the “SentiGaze SDK components” chapter (page 4) for the list of component licenses included with the SentiGaze SDK.

Integrators can obtain additional component licenses if more component licenses are required for the development process.

Product Deployment
To deploy their developed products, an integrator needs to obtain licenses of components for every computer or device, where component will be installed together with the integrator’s product. Integrators can purchase additional SentiGaze component licenses if required at anytime.

License activation options
The components are copy-protected. The following license activation options are available:

- **Serial numbers** are used to activate licenses for particular SentiGaze components on particular computer or device. The activation is done via the Internet or by email. After activation, the network connection is not required for single computer license usage.
  
  Note: activation by serial number is not suitable for virtual environments.

- **Internet activation.** A special license file is stored on a computer or a mobile or embedded device; the license file allows to run particular SentiGaze components on that computer or device after checking the license over the Internet. Internet connection should be available periodically for a short amount of time. A single computer license can be transferred to another computer or device by moving the license file there and waiting until the previous activation expires.

- **Volume License Manager.** Licenses may be stored in a volume license manager dongle. License activation using volume license manager may be performed without connection to the Internet and is suitable for virtual environments. Volume license manager is used on site by integrators or end users to manage licenses for SentiGaze components in the following ways:
  
  1. **Activating single computer licenses** – An installation license for a SentiGaze component will be activated for use on a particular computer. The number of available licenses in the license manager will be decreased by the number of activated licenses.
  2. **Managing single computer licenses via a LAN or the Internet** – The license manager allows the management of installation licenses for SentiGaze components across multiple computers or mobile/embedded devices in a LAN or over the Internet. The number of managed licenses is limited by the number of licenses in the license manager. No license activation is required, and the license quantity is not decreased. Once issued, the license is assigned to a specific computer or device on the network.
  3. **Using license manager as a dongle** – A volume license manager containing at least one license for a SentiGaze component may be used as a dongle, allowing the SentiGaze component to run on the particular computer where the dongle is attached.

Continued on the next page
Licenses Validity

All SDK and component licenses are perpetual and do not have expiration. There are no annual fee or any other fees except license purchasing fee. It is possible to move licenses from one computer or device to another. Neurotechnology provides a way to renew the license if the computer undergoes changes due to technical maintenance.

Licensing Agreement

The Licensing Agreement ([http://neurotechnology.com/sentigaze_sdk_sla.html](http://neurotechnology.com/sentigaze_sdk_sla.html)) contains all licensing terms and conditions.

Note that you unambiguously accept this agreement by placing an order using Neurotechnology online ordering service or by email or other means of communications. Please read the agreement before making an order.

Other licensing options

- **VAR License.** The above described licensing model is intended for end-user product developers. Integrators who want to develop and sell a SentiGaze-based development tool (with API, programming possibilities, programming samples, etc.), must obtain permission from Neurotechnology and sign a special VAR agreement. For more information please contact us.

- **Enterprise License.** The SentiGaze enterprise license allows an unlimited use of SentiGaze components in end-user products for a specific territory, market segment or project. Specific restrictions would be included in the licensing agreement. The enterprise license price depends on the application size and the number of potential users of the application within the designated territory, market segment or project. For more information please contact us.
Prices

- The prices are **effective October 12, 2015**. The prices may change in the future, so please **download and review the latest version** of the brochure before making an order.
- Quantity discounts do not accumulate over time.
- Prices do not include local import duties or taxes.
- Product shipping costs depend on delivery country
- Customers with Solution Partner status are eligible for product discounts.

### SentiGaze SDK

| SentiGaze 1.1 SDK | € 890.00 |

#### Component installation licenses

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Price per license</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 9</td>
<td>€ 20.00</td>
</tr>
<tr>
<td>10 - 19</td>
<td>€ 15.00</td>
</tr>
<tr>
<td>20 - 49</td>
<td>€ 13.00</td>
</tr>
<tr>
<td>50 - 99</td>
<td>€ 11.00</td>
</tr>
<tr>
<td>100 - 199</td>
<td>€ 10.00</td>
</tr>
<tr>
<td>200 - 499</td>
<td>€ 9.00</td>
</tr>
<tr>
<td>500 - 999</td>
<td>€ 8.00</td>
</tr>
<tr>
<td>1000 - 1999</td>
<td>€ 7.00</td>
</tr>
<tr>
<td>2000 - 3999</td>
<td>€ 6.40</td>
</tr>
<tr>
<td>4000 - 7999</td>
<td>€ 5.80</td>
</tr>
<tr>
<td>8000 and more</td>
<td>Please contact us for more information</td>
</tr>
</tbody>
</table>

#### License management

| Volume license manager | € 16.00 |

#### SentiGaze SDK enterprise license

SentiGaze SDK and related products can be ordered:

- online, at [www.neurotechnology.com/cgi-bin/order.cgi](http://www.neurotechnology.com/cgi-bin/order.cgi)
- via a local Neurotechnology distributor; the list of distributors is available at [www.neurotechnology.com/distributors.html](http://www.neurotechnology.com/distributors.html)