3D face tracking for augmented reality apps and digital characters control

SentiMask SDK
SentiMask SDK

3D face tracking for augmented reality apps and digital characters control

CONTENTS

Features and capabilities ....................................................... 3
SentiMask SDK components ................................................... 4
System requirements ............................................................. 5
Specifications and usage recommendations ................................. 8
SDK Trial and related products ................................................. 8
Licensing SentiMask SDK ....................................................... 9
Prices .................................................................................. 11

SentiMask is designed for development of augmented reality applications, which use real-time 3D face tracking technologies for motion capture and controlling 3D digital character’s facial expressions or mapping animated avatars on user’s face. The technology works with regular cameras and common PC or smartphones.

Available as a software development kit that provides for the development of 3D face tracking systems for Microsoft Windows, Android and Linux.

- Real-time face detection and tracking.
- Facial pose, landmarks, shape and expression estimation.
- 3D facial mesh generation.
- Works with regular webcams and smartphone cameras.
- Easy integration with other software like 3D modelling software or game engines.
- Reasonable prices, flexible licensing and free customer support.

See demo video:
http://youtu.be/z_zRa6S9eV0
Features and Capabilities

SentiMask provides real-time 3D face tracking and facial expression estimation using video from a regular webcam or smartphone camera. The possible applications of the SentiMask technology include:

- **Motion capture** for 3D characters’ face animation in entertainment applications, like computer games, communication apps etc.;
- **Augmented reality** applications, like virtual makeup, appearance changes evaluation, etc.
- **Facial expression analytics** for interactive applications.

The SentiMask technology has these capabilities for 3D face tracking applications:

- **Real time performance.** SentiMask technology performs facial features detection and tracking from live video in real time. The technology provides fast performance on a regular PC or smartphone.
- **Facial features estimation.** SentiMask algorithm is able to recognize facial pose, landmarks, shape and expression from a video.
- **3D facial mesh generation.** The algorithm reconstructs a 3D facial mesh (wireframe model) from a facial image. A custom texture can be applied to the mesh, or the mesh points can be used as a reference for changing the appearance of an animated character.
- **Common camera required.** A video for the 3D face model reconstructions can be captured with an off-the-shelf camera or a smartphone. No depth sensors or other advanced hardware needed. The recommendations and specifications contain more detailed information about camera setup.
- **Easy integration with other software.** SentiMask generates 3D point cloud, facial rotation angles (roll, pitch, yaw) and estimations of facial expression. This data can be used in a custom application or easily passed to a 3D modelling software like Blender, as well as game engines.
SentiMask SDK components

SentiMask SDK is intended for developers who want to use 3D face tracking for motion capture and digital character or avatar control in their applications or projects. The SDK allows rapid development of augmented reality applications using functions from the SentiMask library for Microsoft Windows, Android and Linux platforms. Developers provide video streams from cameras as data input, and have complete control over the output data; therefore SentiMask SDK functions can be used with any user interface or third-party software, like 3D modelling packages or game engines.

SentiMask SDK distribution package contains these components:

- SentiMask installation license for PC (1 single computer license)
- SentiMask installation license for Android (1 single computer license)
- Device manager library
- C++ programming samples for Microsoft Windows and Linux platforms
- Java programming samples for Android platform
- SentiMask SDK documentation
System requirements

There are specific requirements for each platform which will run SentiMask-based applications.

**Microsoft Windows platform requirements**

- Microsoft Windows Vista / 7 / 8 / 10, 32-bit or 64-bit.
- PC or laptop with x86 (32-bit) or x86-64 (64-bit) compatible processors.
  - At least 2 GHz processor is required. 3 GHz or faster CPU is recommended for performing real-time face tracking in applications, which also require lots of CPU resources (i.e. computer games).
  - **SSE2 support is required.** Processors that do not support SSE2 cannot run the SentiMask algorithm. Please check if a particular processor model supports SSE2 instruction set.
- At least 256 MB of free RAM should be available for a SentiMask-based application.
- **Free space on hard disk drive (HDD):**
  - at least 1 GB required for the development.
  - 100 MB required for SentiMask components deployment.
- Any webcam or camera, which is accessible using DirectShow interface, is supported by SentiMask on Microsoft Windows platform.
- Microsoft .NET framework 4.5 or newer (for .NET components usage).
- Microsoft Visual Studio 2012 or newer (for application development under C/C++, C#, Visual Basic .Net)

*Continued on the next page*
Android platform requirements

- A smartphone or tablet that is running Android 4.4 (API level 19) OS or newer.
  - API level 22 is the recommended target for code compilation.
  - If you have a custom Android-based device or development board, contact us to find out if it is supported.
- ARM-based 1.5 GHz processor recommended for real-time face processing. Slower processors may be also used, but the face processing will take longer time.
- At least 20 MB of free RAM should be available for the application.
- At least 30 MB of free storage space (built-in flash or external memory card) required for SentiMask component deployment for each separate application.
- Any smartphone’s or tablet’s built-in camera which is supported by Android OS. The camera should have at least 0.3 MegaPixel (640 x 480 pixels) resolution.
- PC-side development environment requirements:
  - API Java SE JDK 7 (or higher)
  - API Eclipse Oxygen (1a) IDE
  - API Android development environment (at least API level 19 required)
  - Gradle 4.3.1 or newer
  - Internet connection for activating SentiMask component licenses

Continued on the next page
Linux x86 / x86-64 platform requirements

- Linux 2.6 or newer kernel (32-bit or 64-bit) is required. **Linux 3.0 kernel** or newer is recommended.
- PC or laptop with x86 (32-bit) or x86-64 (64-bit) compatible processors.
  - At least 2 GHz processor is required. 3 GHz or faster CPU is recommended for performing real-time face tracking in applications, which also require lots of CPU resources (i.e. computer games).
  - **SSE2 support is required.** Processors that do not support SSE2 cannot run the SentiMask algorithm. Please check if a particular processor model supports SSE2 instruction set.
- At least **256 MB of free RAM** should be available for a SentiMask-based application.
- **Free space on hard disk drive (HDD):**
  - at least 1 GB required for the development.
  - 100 MB required for SentiMask components deployment.
- Any *webcam* or camera, which is accessible using *GStreamer* interface, is supported by SentiMask on Linux platform.
- glibc 2.11.3 library or newer
- GStreamer 1.2.2 or newer with gst-plugin-base and gst-plugin-good is required for face capture using camera/webcam. GStreamer 1.4.x or newer is recommended.
- Specific requirements for **application development:**
  - wxWidgets 3.0.0 or newer libs and dev packages (to build and run SDK samples and applications based on them)
  - Qt 4.8 or newer libs, dev and qmake packages (to build and run SDK samples and applications based on them)
  - GCC-4.4.x or newer
  - GNU Make 3.81 or newer
Specifications and Usage Recommendations

- Only one face in a frame is processed. If there are more than one face in a frame, the largest one is processed.

- 32 pixels is the recommended minimal distance between eyes for a face on image or video stream to perform face detection reliably. 64 pixels or more recommended for better face detection results. Note that this distance should be native, not achieved by resizing an image.

- The SentiMask engine has certain tolerance to face posture:
  - head roll (tilt) – ±180 degrees.
  - head pitch (nod) – ±25 degrees from frontal position.
  - head yaw (bobble) – ±35 degrees from frontal position.

- Face detection and facial features estimation in a video frame is performed in 8 milliseconds on a PC with Intel Core i7-4790 processor running at 3.6 GHz clock rate.

SentiMask SDK Trial and Related Products

SentiMask 30-day SDK Trial is available for downloading at www.neurotechnology.com/download.html.

These products are related to SentiMask SDK:

- VeriLook SDK – for person identification using facial biometrics. Also includes algorithms for detecting person’s gender, emotions and facial expressions.

- NVeiler Video Filter – a plug-in for VirtualDub video processing application that is able to detect and hide faces in videos.
Licensing SentiMask SDK

Product Development
An integrator should obtain SentiMask SDK (EUR 339) to develop an end-user product based on SentiMask 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 “SentiMask SDK components” chapter (page 4) for the list of component licenses included with the SentiMask 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 integrator’s product. Integrators can purchase additional SentiMask 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 SentiMask 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 SentiMask 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 SentiMask components in the following ways:

  1. **Activating single computer licenses** – An installation license for a SentiMask 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 SentiMask 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 SentiMask component may be used as a dongle, allowing the SentiMask 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/sentimask_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 SentiMask-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 SentiMask enterprise license allows an **unlimited use** of SentiMask 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 for SentiMask SDK**

- The prices are **effective December 4, 2017**. 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.

### SentiMask SDK

<table>
<thead>
<tr>
<th></th>
<th>SentiMask for PC</th>
<th>SentiMask for Android</th>
</tr>
</thead>
<tbody>
<tr>
<td>SentiMask SDK</td>
<td>€ 339.00</td>
<td></td>
</tr>
</tbody>
</table>

### Component installation licenses (prices per single computer license)

<table>
<thead>
<tr>
<th>Quantity</th>
<th>SentiMask for PC</th>
<th>SentiMask for Android</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 9</td>
<td>€ 20.00</td>
<td>€ 13.00</td>
</tr>
<tr>
<td>10 - 19</td>
<td>€ 15.00</td>
<td>€ 10.00</td>
</tr>
<tr>
<td>20 - 49</td>
<td>€ 13.00</td>
<td>€ 8.70</td>
</tr>
<tr>
<td>50 - 99</td>
<td>€ 11.00</td>
<td>€ 7.50</td>
</tr>
<tr>
<td>100 - 199</td>
<td>€ 10.00</td>
<td>€ 6.70</td>
</tr>
<tr>
<td>200 - 499</td>
<td>€ 9.00</td>
<td>€ 6.00</td>
</tr>
<tr>
<td>500 - 999</td>
<td>€ 8.00</td>
<td>€ 5.30</td>
</tr>
<tr>
<td>1000 - 1999</td>
<td>€ 7.00</td>
<td>€ 4.70</td>
</tr>
<tr>
<td>2000 - 3999</td>
<td>€ 6.40</td>
<td>€ 4.20</td>
</tr>
<tr>
<td>4000 - 7999</td>
<td>€ 5.80</td>
<td>€ 3.80</td>
</tr>
<tr>
<td>8000 and more</td>
<td>Please contact us for more information</td>
<td></td>
</tr>
</tbody>
</table>

### License management

<table>
<thead>
<tr>
<th>Volume license manager</th>
<th>€ 16.00</th>
</tr>
</thead>
</table>

### SentiMask SDK enterprise license

<table>
<thead>
<tr>
<th>SentiMask SDK enterprise license</th>
<th>Please contact us for more information</th>
</tr>
</thead>
</table>

SentiMask 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)