SensoMotoric Instruments

Software Development Kit

Get access to the SMI iView X™ eye tracking interfaces

- Integration of SMI iView X™ eye tracking systems with popular stimulus environments and custom applications
- API with high-level and low-level functions and sample code
- Access to real-time data and tracking status visualizations
- Built-in calibration and validation

Dr. Thomas Kieninger, German Research Center for Artificial Intelligence (DFKI):

“ ...the sample code of the SMI SDK was of great help in developing a custom application which integrates eye tracking data with object recognition technologies ...”

www.smivision.com

SMI iView X™ SDK

The SMI Software Development Kit

The SMI iView X™ Software Development Kit (SMI SDK) allows integration of the SMI iView X™ systems with popular stimulus software (e.g. MATLAB, PST E-Prime®, Python, NBS Presentation®) and custom applications written e.g. in C/C++ and .NET.

The SMI SDK enables these applications to easily remote-control the eye tracker and receive real-time data from the eye tracker by using the network-based communication interface of the iView X™ system.

High and low level functions with sample code

The SMI SDK contains an Application Programming Interface (API) consisting of several high-level functions (e.g. "calibration" and "tracking visualization") and low-level functions (e.g. "get data").

The extensive user manual provides a detailed description of more than 30 functions and ready-to-go sample code for a constantly increasing number of stimulus software products and programming languages.

Request the SMI SDK including extensive manual and sample code here: www.smivision.com/SDK

Remote-control and synchronization

The SMI SDK allows a stimulus software or custom application to remote-control and to synchronize with an iView X™ eye tracking system:

- Calibrate/validate the eye tracking system including visualization of the results
- Start/stop the experiment, and store the recorded eye data and separate trials
- Synchronize with the stimulus software through real-time messages

Access to real-time data and visualizations

The SMI SDK provides access to real-time eye data and online tracking status information, thus supporting the implementation of gaze-controlled applications and gaze-contingent paradigms:

- Real-time binocular gaze data, pupil diameter, online fixation events
- Low latency of eye data transfer
- Online tracking monitor and live view of the eye image (for selected devices)

Example of C/C++ Sample Code

```
if( IV_Connect("127.0.0.1", 4444, "127.0.0.1", 5555) != 1)
    return;
if( IV_SetupCalibration(&calibrationSettings) != 1)
    return;
if( IV_Calibration() != 1)
    return;
if( IV_GetSample(&sampleData) != 1)
    return;

cout << "Timestamp:" << sampleData.timestamp << endl;
cout << "Right Gaze X:" << sampleData.rightEye.gazeX << endl;
cout << "Right Gaze Y:" << sampleData.rightEye.gazeY << endl;
cout << "Right Diameter X:" << sampleData.leftEye.diam << endl;

IV_Disconnect();
```

Example of .NET Sample Code

```
if( IV_Connect("127.0.0.1".ToCharArray(), 4444, "127.0.0.1".ToCharArray(), 5555) != 1)
  return;

if( IV_SetupCalibration(ref calibrationSettings) != 1)
  return;
if( IV_Calibrate() != 1)
  return;

if( IV_GetSample(ref sampleData) != 1)
  return;

textbox1.Text = "Sample data - Timestamp:" + sampleData.Timestamp.ToString() +
" – Right Gaze X:" + sampleData.rightEye.gazeX.ToString() +
" – Right Gaze Y:" + sampleData. rightEye .gazeY.ToString() +
" – Right Diameter X:" + sampleData.rightEye.diam.ToString() +

IV_Disconnect();
```

Example of MATLAB Sample Code

```
loadlibrary ('iView XAPI.dll', 'iView XAPI.h');

pSample = libpointer ('SampleStruct', Sample);
pCalibrationSettings = libpointer ('CalibrationStruct', CalibrationSettings);

calllib ('iView XAPI', 'IV_Connect', '127.0.0.1', int32 (4444), '127.0.0.1', int32 (5555))
calllib ('iViewXAPI', 'IV_SetupCalibration', pCalibrationSettings)
calllib ('iViewXAPI', 'IV_Calibrate')

calllib ('iView XAPI', 'IV_GetSample', pSample);
get (pSample, 'Value')

calllib ('iView XAPI', 'IV_Disconnect')

unloadlibrary ('iView XAPI');
```

Example of Python Sample Code

```
iViewXAPI = windll.LoadLibrary ("iViewXAPI.dll")

iViewXAPI.IV_Connect(c_char_p ('127.0.0.1'), c_int (4444), c_char_p ('127.0.0.1'), c_int (5555))

iViewXAPI.IV_SetupCalibration(byref(calibrationSettings))
iViewXAPI.IV_Calibrate()

iViewXAPI.IV_GetSample(byref (sampleData))

print "Timestamp: " + str(systemData.timestamp)
print "Right Gaze X: " + str(systemData.rightEye.gazeX)
print "Right Gaze Y: " + str(systemData.rightEye.gazeY)
print "Right Diameter X: " + str(systemData.rightEye.diam)

iViewXAPI.IV_Disconnect()
```

Technical Specification

Supported Operating Systems

- Windows XP 32/64 bit, Windows Vista 32/64 bit, Windows 7 32/64 bit, Linux/ Mac OS X (planned)

Sample Code

- C/C++ , .NET, MATLAB, Python, PST E-Prime®, NBS Presentation®

Supported Eye Tracking Devices

- SMI RED, SMI RED250, SMI RED500, iView X™ HED, iView X™ Hi-Speed, iView X™ Hi-Speed Primate, iView X™ MRI, iView X™ MEG

For more information on SMI eye tracking solutions visit our website at www.smivision.com/egts.

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Request the SMI SDK!

www.smivision.com/SDK

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