MDT for Windows Instruction

February 19, 2016

The NeuroSky® product families consist of hardware and software components for simple integration of this biosensor technology into consumer and industrial end-applications. All products are designed and manufactured to meet consumer thresholds for quality, pricing, and feature sets. NeuroSky sets itself apart by providing building block component solutions that offer friendly synergies with related and complementary technological solutions.

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NeuroSky's **Mind Developer Tools** (hereafter abbreviated **MDT** or **Developer Tools**) are a set of software tools that make it easy to create innovative applications that respond to a user's brainwaves and mental state.

If you already have a NeuroSky headset (such as **MindWave Mobile**), you are already able to take full advantage of it with our Developer Tools. If you are trying out the Developer Tools before purchasing a headset, thank you for reviewing the toolset. However, please note that a NeuroSky headset will be needed when you are developing your own app using the Developer Tools. The headset is available on Amazon store: http://www.amazon.com/NeuroSky-MindWave-Mobile-BrainWave-Starter/dp/B00B8BF4EM .

If you have any questions, let us know at support@neurosky.com.

Introduction to MDT for Windows

For the purposes of this document, we will loosely use the terms “**PC**” and “**Windows**” interchangeably throughout. The **MDT for Windows** allows you to develop software applications that will run on a Windows system.

The **MDT for Windows** includes: T**hinkGear_Connector, Application Standards, Stream SDK for PC, EEG Algorithm SDK for Windows** and **EULA.**

- **ThinkGear_Connector** The ThinkGear Connector (TGC) is a software program - analogous to a socket server - that runs as a background process on your computer and is responsible for directing data from a NeuroSky ThinkGear-enabled headset from the serial port to an open network socket. It is available on both Windows and OSX. Any language or framework that contains a socket library should be able to communicate with the socket API. TGC is an ideal option for developers working in frameworks like Adobe Flash or web-based applications.

- **Application Standards** Document and Icon Images

- **EULA** End User License Agreement

- **Stream SDK for PC** is used to help connect your application to a NeuroSky headset via bluetooth, and receive data from headset. It contains the follows file:
  * Stream SDK for PC Development Guide
    – libs
      – x86/win32
        * thinkgear.dll
        * thinkgear.lib
        * thinkgear.h
        – csharp
          * thinkgear.dll
          * NativeThinkgear.cs
      – x64/win64
        * thinkgear64.dll
      * thinkgear64.lib
        * thinkgear.h
        – csharp
          * thinkgear64.dll
          * NativeThinkgear64.cs

– Sample Project
– x86/win32
* thinkgear_testapp
* thinkgear_testapp_csharp
– x64/win64
* thinkgear_testapp
* thinkgear_testapp_csharp_64
* ChangeLog.txt

- **EEG Algorithm SDK** is used to analyze and further interpret EEG data from NeuroSky's headset or TGAM module. It includes Attention, Meditation and Eye Blink Detection. These three algorithms are free to use within your application. It contains the follows file:
  * Readme
  * EEG Algorithm SDK for Windows: Development Guide
  – EEG Algorithm SDK Dynamic Linked Library (DLL):
    * AlgoSdkDll.dll (for 32-bit)
    * AlgoSdkDll64.dll (for 64-bit)
  – Algo SDK Sample project

If you want more information about other EEG algorithms, please contact us at support@neurosky.com.

For details, please check within each package.

Usage

Each SDK includes a sample project and documents which teach you how to use them.

In order to make the integration progress for SDKs more smooth, please review the documents of SDKs. For example, review "**Stream SDK for PC Development Guide.pdf**" to start with the Stream SDK. For EEG Algorithm SDK, please review "**eeg_algorithm_sdk_for_windows_development_guide.pdf**".

"**ThinkGear_Connector**" is an independent package based on NeuroSky ThinkGear-enabled headset, please review all the documents of TGC to start.

"**ApplicationStandards.pdf**" is very userful. It tells you how to use the icons to mark the status of connection in your project.

Here is a code snippet which shows how to use these SDK together (This code snippet is from the **EEG Algorithm SDK**'s sample project):

```
static DWORD ThreadReadPacket(LPVOID lpdwThreadParam) {
    int rawCount = 0;
    wchar_t buffer[100];
    short rawData[512] = { 0 };
    int lastRawCount = 0;

    while (true) {
        /* Read a single Packet from the connection */
        packetsRead = TG_ReadPackets(connectionId, 1);

        //swprintf(buffer, 20, L"%d", packetsRead);
        //OutputLog(buffer);

        /* If TG_ReadPackets() was able to read a Packet of data... */

        if (packetsRead == 1) {
            /* If the Packet containted a new raw wave value... */
            if (TG_GetValueStatus(connectionId, TG_DATA_RAW) != 0) {
                /* Get and print out the new raw value */
                rawData[rawCount++] = (short)TG_GetValue(connectionId, TG_DATA_RAW);
                lastRawCount = rawCount;
                if (rawCount == 512) {
                    (NSK_ALGO_DataStreamAddr)(NSK_ALGO_DATA_TYPE_EEG, rawData, rawCount);
                    rawCount = 0;
                }
            }
            if (TG_GetValueStatus(connectionId, TG_DATA_POOR_SIGNAL) != 0) {
```

```
                short pq = (short)TG_GetValue(connectionId, TG_DATA_POOR_SIGNAL);
                SYSTEMTIME st;
                GetSystemTime(&st);
                swprintf(buffer, 100, L"%6d, PQ[%3d], [%d]", st.wSecond*1000 + st.wMilliseconds, pq,
lastRawCount);
                rawCount = 0;
                OutputLog(buffer);
                (NSK_ALGO_DataStreamAddr)(NSK_ALGO_DATA_TYPE_PQ, &pq, 1);
            }
            if (TG_GetValueStatus(connectionId, TG_DATA_ATTENTION) != 0) {
                short att = (short)TG_GetValue(connectionId, TG_DATA_ATTENTION);
                (NSK_ALGO_DataStreamAddr)(NSK_ALGO_DATA_TYPE_ATT, &att, 1);
            }
            if (TG_GetValueStatus(connectionId, TG_DATA_MEDITATION) != 0) {
                short med = (short)TG_GetValue(connectionId, TG_DATA_MEDITATION);
                (NSK_ALGO_DataStreamAddr)(NSK_ALGO_DATA_TYPE_MED, &med, 1);
            }
        }
        //Sleep(1);
    }
}
```

References and Bug reports

You can get the latest developer information from here:
http://developer.neurosky.com/

Learn about NeuroSky's EEG Data Types here:
http://developer.neurosky.com/docs/doku.php?id=thinkgear_communications_protocol

You may find some additional useful information in the Knowledge Base:
http://support.neurosky.com/kb

If you find any bugs, please contact us at:
support@neurosky.com