eNBSP - NBioBSP

NITGEN&COMPANY Biometric Service Provider SDK

Programmer's Manual .NET

SDK version 4.8x

Serial Number:

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INDEX

Chapter 1. Introduction

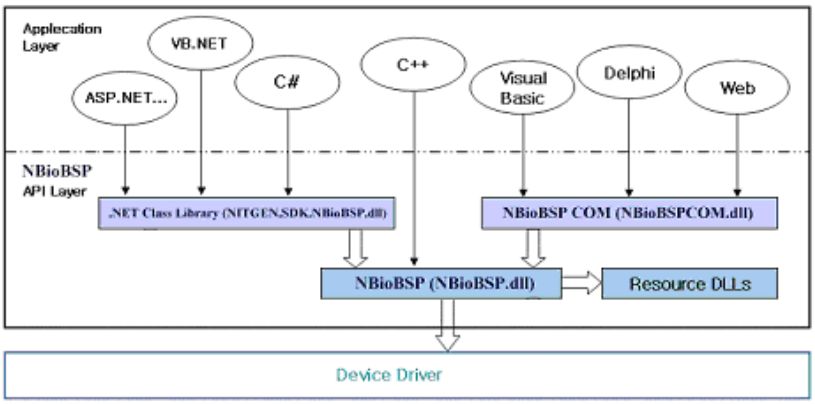
The eNBSP (NBioBSP) SDK provides feature rich, high-level functionality that can be integrated into any application requiring fingerprint authentication. NBioBSP technology is built on the NBioAPI™ specification, working seamlessly with the most durable, compact, and reliable optics-based fingerprint readers in the world.

All NBioBSP SDK components contain the APIs needed for biometric authentication of multiple users and device functions. NBioBSP is equipped with self-contained User Interfaces for enrollment and verification, enabling software application developers to quickly and easily integrate fingerprint authentication into the application of their choice.

1.1 Support Modules

- NBioBSP.dll
  This is the main module of the NBioBSP that implements all of NITGEN's biometric functions including fingerprint enrollment and verification

- NITGEN.SDK.NBioBSP.dll
  The NBioBSP Class Library (NITGEN.SDK.NBioBSP.dll) is designed to support developers using C#, VB.NET, ASP.NET, J# and the like in Microsoft .NET environment.
  The NBioBSP Class Library also uses NBioBSP.dll and provides higher level of interfaces. NBioBSP Class Library supports almost all NBioBSP functions.



[Development model using NBioBSP SDK]

1.2 Sample programs

1.2.1 Support samples (32bit SDK)

- C#

  BSPDemoCS – Basic function demo application for C#.

  UITestCS – User Interface demo application for C#.

  IndexSerchDemoCS – IndexSearch demo application for C#.

  RollDemoCS – Roll fingerprint function demo application for C#.

1.2.2 Support Samples (64bit SDK)

- C#

  BSPDemoCS – Basic function demo application for C#.

  UITestCS – User Interface demo application for C#.

  IndexSerchDemoCS – IndexSearch demo application for C#.

  BSPRollDemoCS – Roll fingerprint function demo application for C#.

  ExportDemoCS – Data Export / Import function demo application for C#.

- VB.NET

  BSPDemoVBNET – Basic function demo application for VB.NET.

  IndexSerchDemoVBNET – IndexSearch demo application for VB.NET.

Chapter 2. .NET Programming

This chapter describes how to make a .NET programming with the NBioBSP Class Library that is, named “NITGEN.SDK.NBioBSP.dll”, designed and developed to support Microsoft .NET environment on C#, VB.NET, ASP.NET, J# and the like. The NBioBSP Class Library also uses NBioBSP.dll and provides higher level of interfaces. NBioBSP Class Library supports almost all NBioBSP functions.

While a number of languages support the .NET programming, this section will introduce the usage of C# programming that is the most popular of .NET languages. It is also applicable to other .NET languages because most parts have not much difference besides initialization.

2.1 Module initialization and closure

2.1.1 Module initialization

Use the following code to initialize the NBioBSP Class Library module.

```
using NITGEN.SDK.NBioBSP;
...
m_NBioAPI = new NBioAPI();
...
```

2.1.2 Module closure

No specific code is needed to close or free any memory on .NET language.(During a collection, the garbage collector will free.)
In scenarios where resources must be released at a specific time, developer can call dispose method.

```
...
m_NBioAPI.Dispose();
...
```

Use this method to release unmanaged resources such as handles and memorys held by an instance of the NBioBSP object.

2.2 Device related programming

The device must be opened before it can be used.
Use the **Enumerate** method to determine which device is linked to the system.

2.2.1 Listing devices

Before opening the device, use the **EnumerateDevice** method to determine the number and type of devices linked to the PC. Once this is activated, the number of devices linked to the PC and the ID for each device will be returned.
DeviceID is composed of the device names and their instance numbers.

```
DeviceID = Instance Number + Device Name
```

If there is only one device for each type in the system, the instance number will be '0.' In this way, the device name has the same value as the device ID.

The following is an example of how to use the **EnumerateDevice** method. All devices found by this method will be added into the combo box, comboDevice.

```
m_NBioAPI = new NBioAPI();
...
int i;
uint nNumDevice;
short[] nDeviceID;
NBioAPI.Type.DEVICE_INFO_EX[] deviceInfoEx;

uint ret = m_NBioAPI.EnumerateDevice(out nNumDevice, out nDeviceID, out deviceInfoEx);

if (ret == m_NBioAPI.Error.NONE)
{
     comboDevice.Items.Add("Auto_Detect");
        for (i = 0; i < nNumDevice; i++)
        {
           comboDevice.Items.Add(deviceInfoEx[i].Name);
        }
}
```

The device ID will be returned if the number of devices is entered in the DeviceNumber property of the nDeviceID (DeviceNumber). For example, nDeviceID(0) will show the DeviceID of the first device.

2.2.2 Initializing the device

The **OpenDevice** method is used to initialize the device for the NBioBSP Class Library. Device initialization must be done using the **OpenDevice** method before device related functions such as enrolling, verifying, and capturing will work properly.

In the event that you are unsure which devices have been installed, use the **EnumerateDevice** method to determine what devices have previously been installed.

```
m_NBioAPI = new NBioAPI();
...
ret = m_NBioAPI.OpenDevice(DeviceID);

if (ret == NBioAPI.Error.NONE)
  // Open device success ...
else
   // Open device failed ...
```

The device can be set automatically using **NBioAPI.Type.DEVICE_ID.AUTO**.
This setting will search the latest active device if there are multiple devices connected.

```
m_NBioAPI.OpenDevice(NBioAPI.Type.DEVICE_ID.AUTO);
```

NBioBSP_DEVICE_ID_AUTO_DETECT use the latest opened device.

2.2.3 Closing the device

The **CloseDevice** method should be used to close the device. The same **DeviceID** used to call the **Open** method must be used again to call the **CloseDevice** method.

```
m_NBioAPI = new NBioAPI();
...
ret = m_NBioAPI.CloseDevice(DeviceID);

if (ret == NBioAPI.Error.NONE)
    // Close device success ...
else
   // Close device failed ...
```

The current device must be closed before opening another device.

2.3 Fingerprint enrollment

The **Enroll** method is used to enroll fingerprints. All fingerprint data is used as the type of handle, binary or encoded text found in the **NBioBSP Class Library** module.

Fingerprint data will be entered into the handle of **FIR** property upon successful enrollment, and it can be returned as the type of binary or encoded text.

The NBioBSP Class Library provides various overloading **Enroll** method that can be used for the specific purpose. One of example is as below.

```
m_NBioAPI = new NBioAPI();
...
NBioAPI.Type.HFIR hNewFIR;

ret = m_NBioAPI.Enroll(out hNewFIR, null);

if (ret == NBioAPI.Error.NONE)
{
    // Enroll success ...

    // Get binary encoded FIR data
    NBioAPI.Type.FIR biFIR;
    m_NBioAPI.GetFIRFromHandle(hNewFIR, out biFIR);

    // Get text encoded FIR data
    NBioAPI.Type.FIR_TEXTENCODE textFIR;
    m_NBioAPI.GetTextFIRFromHandle(hNewFIR, out textFIR, true);

    // Write FIR data to file or DB
}
else
    // Enroll failed ...
```

Fingerprint data will be stored as saving **biFIR** or **textFIR** to a file or DB.

2.4 Fingerprint verification

The **Verify** method performs fingerprint verification using the existing fingerprint data as a comparison with newly input fingerprints, and returns the verification result. After successful verification, the method returns the payload if it is available.

```
m_NBioAPI = new NBioAPI();
...
//Read FIRText Data from File or DB.
...

uint ret;
bool result;
NBioAPI.Type.FIR_PAYLOAD myPayload = new NBioAPI.Type.FIR_PAYLOAD();

// Verify with binary FIR
ret = m_NBioAPI.Verify(biFIR, out result, myPayload);

if (ret != NBioAPI.Error.NONE)
{
    // Verify Success

    // Check payload
    if (myPayload.Data != null)
    {
        textPayload.Text = myPayload.Data;
    }
}
else
   // Verify failed
```

2.5 Client / Server environment programming

Unlike standalone environments, the fingerprint enrollment and matching occur in separate places within the Client/Server environment. Fingerprints are generally enrolled in the client and later matched in the Server.

The **Enroll** method registers fingerprints while the **Capture** method verifies fingerprints.

The **VerifyMatch** method matches fingerprints in the Server through the use of previously registered fingerprints from the client.

2.5.1 Fingerprint enrollment

Use the **Enroll** method for fingerprint enrollment in the client.

```
m_NBioAPI = new NBioAPI();
...
NBioAPI.Type.HFIR hNewFIR;

ret = m_NBioAPI.Enroll(out hNewFIR, null);

if (ret == NBioAPI.Error.NONE)
{
    // Enroll success ...

    // Get binary encoded FIR data
    NBioAPI.Type.FIR biFIR;
    m_NBioAPI.GetFIRFromHandle(hNewFIR, out biFIR);

    // Get text encoded FIR data
    NBioAPI.Type.FIR_TEXTENCODE textFIR;
    m_NBioAPI.GetTextFIRFromHandle(hNewFIR, out textFIR, true);

    // Write FIR data to file or DB
}
else
    // Enroll failed ...
```

2.5.2 Fingerprint verification

Use the **Capture** method for registering only one fingerprint in the client. While the **EnrolI** method allows several fingerprints to be enrolled and transferred in the FIR, the **Capture** method registers only one fingerprint.
The **Capture** method takes the purpose of fingerprint capture and allows NBioAPI.Type.FIR_PURPOSE.VERIFY only as a parameter.

```
m_NBioAPI = new NBioAPI();
...

ret = m_NBioAPI.Capture(NBioAPI.Type.FIR_PURPOSE.VERIFY, out hCapturedFIR,
                        NBioAPI.Type.TIMEOUT.DEFAULT, null, null);

if (ret == NBioAPI.Error.NONE)
    // Capture success ...
else
    //Capture failed ...
```

The **VerifyMatch** method matches fingerprints stored on the Server.
The **VerifyMatch** method takes two parameters, FIR received from client and FIR stored in server. After successful verification, the method returns the payload.
The payload comes from the second parameter, **StoredFIR**, and does not affect to the payload of the first parameter, **CapturedFIR**.

```
m_NBioAPI = new NBioAPI();
...
//  Get Captured FIR Data from Client and Read stored FIR Data from File or DB.
...

uint ret;
bool result;
NBioAPI.Type.FIR_PAYLOAD myPayload = new NBioAPI.Type.FIR_PAYLOAD();

ret = m_NBioAPI.VerifyMatch(hCapturedFIR, hStoredFIR, out result, myPayload);

if (ret != NBioAPI.Error.NONE)
{
   // Verify Success

   // Check payload
   if (myPayload.Data != null)
   {
      textPayload.Text = myPayload.Data;
   }
}
else
   // Verify failed
```

2.6 Using Payload

Including other data within the fingerprint data is called a **Payload**.

2.6.1 Inserting payload in fingerprint data

At the time of fingerprint enrollment, use the **Enroll** method to include payload with the FIR.
The **CreateTemplate** method can be used to insert payload into an existing FIR.

The **Enroll** method will use the fingerprint data and payload to provide a parameter for later comparison.

```
m_NBioAPI = new NBioAPI();
...
NBioAPI.Type.HFIR hNewFIR;
NBioAPI.Type.FIR_PAYLOAD myPayload = new NBioAPI.Type.FIR_PAYLOAD();
myPayload.Data = "Your Payload Data";

ret = m_NBioAPI.Enroll(out hNewFIR, myPayload);

if (ret == NBioAPI.Error.NONE)
    // Enroll success ...
else
    // Enroll failed ...
```

Use the **CreateTemplate** method to insert a **payload** into existing fingerprint data.
The **CreateTemplate** method can also add new fingerprint data onto existing fingerprint data.

```
m_NBioAPI = new NBioAPI();
...
NBioAPI.Type.HFIR hNewFIR;
NBioAPI.Type.FIR_PAYLOAD myPayload = new NBioAPI.Type.FIR_PAYLOAD();
myPayload.Data = "Your Payload Data";

ret = m_NBioAPI.CreateTemplate(null, hStoredFIR, out hNewFIR, myPayload);

if (ret == NBioAPI.Error.NONE)
    // CreateTemplate success ...
else
    // CreateTemplate failed ...
```

2.6.2 Extracting payload from fingerprint Template

Payload in fingerprint templates (registered data) will only be extracted if matched using the **Verify** method or if the **VerifyMatch** method is true.

```
m_NBioAPI = new NBioAPI();
...
//Read FIRText Data from File or DB.
...

uint ret;
bool result;
NBioAPI.Type.FIR_PAYLOAD myPayload = new NBioAPI.Type.FIR_PAYLOAD();

// Verify with binary FIR
ret = m_NBioAPI.Verify(biFIR, out result, myPayload);

if (ret != NBioAPI.Error.NONE)
{
   // Verify Success

   // Check payload
   if (myPayload.Data != null)
   {
      textPayload.Text = myPayload.Data;
   }
}
else
   // Verify failed
```

Extracting payloads using the **VerifyMatch** method is the same as using the **Verify** Method.

2.7 Changing the NBioBSP User Interface

The **NBioBSP Class Library** module offers resource files for customization of the basic UI in English.

Use the **SetSkinResource** method to load UI resources in languages other than English.

```
m_NBioAPI = new NBioAPI();
...
string szSkinFileName;
openFileDialog.Filter = "DLL files (*.dll)|*.dll|All files (*.*)|*.*";

if (openFileDialog.ShowDialog(this) == DialogResult.OK)
{
   szSkinFileName = openFileDialog.FileName;

    if (szSkinFileName.Length != 0)
    {
         // Set skin resource
         bool bRet = m_NBioAPI.SetSkinResource(szSkinFileName);

         if (bRet)
            labStatus.Text = "Set skin resource Success!";
         else
            labStatus.Text = "Set skin resource failed!";
     }
}
```

Resource files must have an absolute path. Extra documents are offered for making customized UI's.

Appendix A. Class Library for .NET Reference

A.1 NBioAPI Class

As a main class of the NBioBSP Class Library, this class includes many functions and some other classes. This object must be declared.

A.1.1 Basic Method

GetVersion

public System.UInt32 GetVersion (out NITGEN.SDK.NBioBSP.NBioAPI.Type.VERSION Version);

Description
This function is to retrieve the current version of the BSP module.

Parameters
Version:
Version information.

Return Value
NBioAPI.Error.NONE : No error

GetInitInfo

public System.UInt32 GetInitInfo (out NITGEN.SDK.NBioBSP.NBioAPI.Type.INIT_INFO_0 InitInfo);

Description
This function is to retrieve the initialization settings.

Parameters
InitInfo:
A object to a class that receives the initialization settings.

Return Value
NBioAPI.Error.NONE : No error.

SetInitInfo

public System.UInt32 SetInitInfo (NITGEN.SDK.NBioBSP.NBioAPI.Type.INIT_INFO_0 InitInfo);

Description
This function is to configure the initialization settings. The NBioAPI supports the type 0 structure. The structure, InitInfo, must be initialized before use.

Parameters
InitInfo:
A object to a class containing the initialization settings.

Return Value
NBioAPI.Error.NONE : No error.
NBioAPI.Error.INIT_MAXFINGER : Invalid value for the MaxFingersForEnroll.
NBioAPI.Error.INIT_SAMPLESPERFINGER : Invalid SampleNumber.
NBioAPI.Error.INIT_ENROLLQUALITY : Invalid EnrollQuality.
NBioAPI.Error.INIT_VERIFYQUALITY : Invalid VerifyQuality.
NBioAPI.Error.INIT_IDENTIFYQUALITY : Invalid Identify Quality.
NBioAPI.Error.INIT_SECURITYLEVEL : Invalid security level.

EnumerateDevice

public System.UInt32 EnumerateDevice (out System.UInt32 NumDevice , out short[] DeviceID);

Description
This function is to retrieve the number of devices and device IDs attached to the system.

Parameters
NumDevice:
The number of devices attached.

DeviceID:
An array including the device IDs.

Return Value
NBioAPI.Error.NONE : No error.

GetDeviceInfo

public System.UInt32 GetDeviceInfo (System.Int16 DeviceID ,
out NITGEN.SDK.NBioBSP.NBioAPI.Type.DEVICE_INFO_0 DeviceInfo);

Description
This function retrieves information about the specified device.

Parameters
DeviceID:
The device ID to be queried.

DeviceInfo:
A object to a class that receives the device information.

Return Value
NBioAPI.Error.NONE: No error.
NBioAPI.Error.DEVICE_NOT_OPENED: Device not opened.
NBioAPI.Error.WRONG_DEVICE_ID: Invalid device ID.

SetDeviceInfo

public System.UInt32 SetDeviceInfo (System.Int16 DeviceID ,
NITGEN.SDK.NBioBSP.NBioAPI.Type.DEVICE_INFO_0 DeviceInfo);

Description
This function is to configure the specific options of the device attached to the system.
The image width and height in the structure are read-only.

Parameters
DeviceID:
The device ID to be configured.

DeviceInfo:
A object to a class specifying the device information.

Return Value
NBioAPI.Error.NONE: No error.
NBioAPI.Error.DEVICE_NOT_OPENED: Device not opened.
NBioAPI.Error.WRONG_DEVICE_ID: Invalid device ID.
NBioAPI.Error.DEVICE_BRIGHTNESS: Invalid device brightness.
NBioAPI.Error.DEVICE_CONTRAST: Invalid device contrast.
NBioAPI.Error.DEVICE_GAIN: Invalid device gain.

OpenDevice

public System.UInt32 OpenDevice (System.Int16 DeviceID)

Description
This function is to initialize the device. Entering a value of 0 for the DeviceID means that a default device will be used. It must be called to use the device related functions such as Capture or Enroll.

Parameters
nDeviceID:
The device ID to open. A 0 value means the default device will be used.

Return Value
NBioAPI.Error.NONE: No error.
NBioAPI.Error.DEVICE_ALREADY_OPENED: Device already opened.
NBioAPI.Error.DEVICE_OPEN_FAIL: Failed to open device.

CloseDevice

public System.UInt32 CloseDevice (System.Int16 DeviceID);

Description
This function is to close the device opened by the OpenDevice function. The value of the parameter, DeviceID, must be identical to the one used for the OpenDevice function.

Parameters
DeviceID:
The device ID to be closed.

Return Value
NBioAPI.Error.NONE: No error.
NBioAPI.Error.DEVICE_NOT_OPENED: Device not opened.
NBioAPI.Error.WRONG_DEVICE_ID: Invalid device ID.

AdjustDevice

public System.UInt32 AdjustDevice (NITGEN.SDK.NBioBSP.NBioAPI.Type.WINDOW_OPTION WindowOption);

Description
This function is used to configure the brightness of the device. It prompts a dialog on which users can change the brightness and contrast of the device.

Parameters
WindowOption:
A object to a class containing the window options of the NBioBSP module.

Return Value
NBioAPI.Error.NONE: No error.
NBioAPI.Error.DEVICE_NOT_OPENED: Device not opened.
NBioAPI.Error.WRONG_DEVICE_ID: Invalid device ID.
NBioAPI.Error.USER_CANCEL: Cancelled by user during adjustment.

GetOpenedDeviceID

public System.Int16 GetOpenedDeviceID ( );

Description
This function returns the device ID currently opened.

Parameters
N/A

Return Value
Returns the device ID currently opened.

CheckFinger

public System.UInt32 CheckFinger (System.Boolean bExistFinger);

Description
This function is to check if a finger is placed on the fingerprint sensor. Only valid for USB fingerprint devices.
HFDU 01/04/06(device driver version 4.1.0.1 or higher), HFDU 11/14(all version), HFDU 05/07 not support.

Parameters
bExistFinger:
A object to Boolean indicating whether a finger is placed on the fingerprint sensor or not. If yes, it returns NBioAPI_TRUE, otherwise NBioAPI_FALSE.

Return Value
NBioAPI.Error.NONE: No error.
NBioAPI.Error.DEVICE_NOT_OPENED: Device not opened.
NBioAPI.Error.LOWVERSION_DRIVER: Not supported for your device driver.

A.1.2 Memory Method

GetFIRFromHandle

public System.UInt32 GetFIRFromHandle (NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR hFIR ,
out NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR FIR);

public System.UInt32 GetFIRFromHandle (NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR hFIR ,
out NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR FIR ,
NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_FORMAT Format);

Description
This function is to receive a FIR from the FIR handle. An application must allocate the buffer for the NBioAPI_FIR structure. Note that this function has two different types.

Parameters
hFIR:
The handle of the FIR.

FIR:
FIR class that receives fingerprint information.

Format:
FIR data format. This version supports NBioAPI_FIR_FORMAT_STANDARD only.

Return Value
NBioAPI.Error.NONE: No error.
NBioAPI.Error.INVALID_HANDLE: Invalid handle.

GetHeaderFromHandle

public System.UInt32 GetHeaderFromHandle (NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR hFIR ,
out NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_HEADER Header);

public System.UInt32 GetHeaderFromHandle (NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR hFIR ,
out NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_HEADER Header ,
NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_FORMAT Format);

Description
This function is to retrieve the FIR header information from the FIR handle. Note that this function has two different types.

Parameters
hFIR:
The handle of the FIR.

Header:
FIR header

Format:
FIR data format. This version supports NBioAPI_FIR_FORMAT_STANDARD only.

Return Value
NBioAPI.Error.NONE: No error.
NBioAPI.Error.INVALID_HANDLE: Invalid handle.

GetTextFIRFromHandle

```
public System.UInt32 GetTextFIRFromHandle ( NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR hFIR ,
                                            out NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_TEXTENCODE TextFIR ,
                                            System.Boolean bIsWide );

public System.UInt32 GetTextFIRFromHandle ( NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR hFIR ,
                                            out NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_TEXTENCODE TextFIR ,
                                            System.Boolean bIsWide ,
                                            NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_FORMAT Format );
```

Description

This function is to retrieve the text-encoded FIR from the FIR handle. Note that this function has two different types.

Parameters

hFIR:

The handle of the FIR.

TextFIR:

The class that receives the text encoed FIR.

bIsWide:

Flag whether an application uses Unicode characters or not.

Format:

FIR data format. This version supports NBioAPI_FIR_FORMAT_STANDARD only.

Return Value

NBioAPI.Error.NONE: No error.

NBioAPI.Error.INVALID_HANDLE: Invalid handle.

A.1.3 BSP Method

Capture

```
public System.UInt32 Capture ( out NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR CapturedFIR );

public System.UInt32 Capture ( out NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR CapturedFIR ,
                               System.Int32 Timeout ,
                               NITGEN.SDK.NBioBSP.NBioAPI.Type.WINDOW_OPTION WindowOption );

public System.UInt32 Capture ( NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_PURPOSE Purpose ,
                               out NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR CapturedFIR ,
                               System.Int32 Timeout ,
                               NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR AuditData ,
                               NITGEN.SDK.NBioBSP.NBioAPI.Type.WINDOW_OPTION WindowOption );
```

Descriptions

This method captures samples for the purpose specified, and returns the handle of FIR data. The purpose is recorded in the header of the CapturedFIR. If AuditData is non-NULL, a FIR of type “raw” may be returned. Note that this method has three different types.

Parameters

CapturedFIR:

A handle to a FIR containing captured data. This data is either an “intermediate” type FIR (which can only be used by either the Process or CreateTemplate functions, depending on the purpose), or a “processed” FIR, (which can be used directly by VerifyMatch, depending on the purpose).

Purpose:

A value indicating the purpose of the fingerprint data capture.

Timeout:

An integer specifying the timeout value (in milliseconds) for the operation. If this timeout reached, the function returns an error, and no results. This value can be any positive number. Use a value of NBioAPI.Type.TIMEOUT.DEFAULT for default timeout, and use NBioAPI.Type.TIMEOUT.INFINITE for no timeout.

AuditData:

A handle to a FIR containing raw fingerprint data. This data may be used to provide human-identifiable data of the person at the device. If the object is NULL on input, no audit data is collected.

WindowOption:

A object to a class containing the window options of the NBioBSP module.

Return Value

NBioAPI.Error.NONE: No error.

NBioAPI.Error.DEVICE_NOT_OPENED: Device not opened.

NBioAPI.Error.USER_CANCEL: Cancelled by user during verification.

Process

public System.UInt32 Process (NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR CapturedFIR ,
out NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR ProcessedFIR);

public System.UInt32 Process (NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR CapturedFIR ,
out NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR ProcessedFIR);

public System.UInt32 Process (NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_TEXTENCODE CapturedFIR ,
out NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR ProcessedFIR);

public System.UInt32 Process (NITGEN.SDK.NBioBSP.NBioAPI.Type.INPUT_FIR CapturedFIR ,
out NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR ProcessedFIR);

Descriptions
This method processes the intermediate data captured via a call to Capture for the purpose of either verification or identification. If the processing capability is in this module, it builds a “processed” FIR, otherwise, ProcessedFIR is set to NULL. A call to this method is not necessary because the Capture and Enroll methods perform processing operation. It can be used when processing the “raw” data included from audit data.

Parameters
CapturedFIR:
The captured FIR of its handle.

ProcessedFIR:
A handle for the newly constructed “processed” FIR.

Return Value
NBioAPI.Error.NONE: No error.
NBioAPI.Error.INVALID_HANDLE: Invalid handle.
NBioAPI.Error.ALREADY_PROCESSED: FIR already processed.
NBioAPI.Error.DATA_PROCESS_FAIL: Processing failed.
NBioAPI.Error.ENCRYPTED_DATA_ERROR: Cannot be decrypted.
NBioAPI.Error.INTERNAL_CHECKSUM_FAIL: Data forged.

CreateTemplate

```
public System.UInt32 CreateTemplate ( NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR CapturedFIR ,
                                      NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR StoredTemplate ,
                                      out NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR NewTemplate ,
                                      NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_PAYLOAD Payload );

public System.UInt32 CreateTemplate ( NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR CapturedFIR ,
                                      NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR StoredTemplate ,
                                      out NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR NewTemplate ,
                                      NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_PAYLOAD Payload );

public System.UInt32 CreateTemplate ( NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR CapturedFIR ,
                                      NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_TEXTENCODE StoredTemplate ,
                                      out NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR NewTemplate ,
                                      NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_PAYLOAD Payload );

public System.UInt32 CreateTemplate ( NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR CapturedFIR ,
                                      NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR StoredTemplate ,
                                      out NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR NewTemplate ,
                                      NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_PAYLOAD Payload );

public System.UInt32 CreateTemplate ( NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR CapturedFIR ,
                                      NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR StoredTemplate ,
                                      out NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR NewTemplate ,
                                      NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_PAYLOAD Payload );

public System.UInt32 CreateTemplate ( NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR CapturedFIR ,
                                      NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_TEXTENCODE StoredTemplate ,
                                      out NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR NewTemplate ,
                                      NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_PAYLOAD Payload );

public System.UInt32 CreateTemplate ( NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_TEXTENCODE CapturedFIR ,
                                      NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR StoredTemplate ,
                                      out NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR NewTemplate ,
                                      NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_PAYLOAD Payload );

public System.UInt32 CreateTemplate ( NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_TEXTENCODE CapturedFIR ,
                                      NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR StoredTemplate ,
                                      out NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR NewTemplate ,
                                      NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_PAYLOAD Payload );

public System.UInt32 CreateTemplate ( NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_TEXTENCODE CapturedFIR ,
                                      NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_TEXTENCODE StoredTemplate ,
                                      out NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR NewTemplate ,
                                      NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_PAYLOAD Payload );

public System.UInt32 CreateTemplate ( NITGEN.SDK.NBioBSP.NBioAPI.Type.INPUT_FIR CapturedFIR ,
                                      NITGEN.SDK.NBioBSP.NBioAPI.Type.INPUT_FIR StoredTemplate ,
                                      out NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR NewTemplate ,
                                      NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_PAYLOAD Payload );
```

Descriptions

This method takes a FIR containing raw fingerprint data for the purpose of creating a new enrollment template. A new FIR is constructed from the CapturedFIR, and (optionally) it may perform an adaptation based on an existing StoredTemplate. The old StoredTemplate remains unchanged. If the StoredTemplate contains a payload, the payload is not copied into the NewTemplate. If the NewTemplate needs a payload, then that Payload must be presented as an argument to the function.

Parameters

CapturedFIR:

Object to the captured FIR. The CapturedFIR acquired for the purpose of “verification” can be used for this parameter.

StoredTemplate:

Optionally, the template to be adapted.

NewTemplate:

A handle to a newly created template that is derived from the CapturedFIR and (optionally) the StoredTemplate.

Payload:

A object to data that will be wrapped inside the newly created template. If NULL, this parameter is ignored.

Return Value

NBioAPI.Error.NONE: No error.

NBioAPI.Error.INVALID_HANDLE: Invalid handle.

NBioAPI.Error.ENCRYPTED_DATA_ERROR: Cannot be decrypted.

NBioAPI.Error.INTERNAL_CHECKSUM_FAIL: Data forged.

NBioAPI.Error.MUST_BE_PROCESSED_DATA: Not processed data.

VerifyMatch

```
public System.UInt32 VerifyMatch ( NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR CapturedFIR ,
                                   NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR StoredTemplate ,
                                   out System.Boolean Result ,
                                   NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_PAYLOAD Payload );

public System.UInt32 VerifyMatch ( NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR CapturedFIR ,
                                   NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR StoredTemplate ,
                                   out System.Boolean Result ,
                                   NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_PAYLOAD Payload );

public System.UInt32 VerifyMatch ( NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR CapturedFIR ,
                                   NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_TEXTENCODE StoredTemplate ,
                                   out System.Boolean Result ,
                                   NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_PAYLOAD Payload );

public System.UInt32 VerifyMatch ( NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR CapturedFIR ,
                                   NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR StoredTemplate ,
                                   out System.Boolean Result,
                                   NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_PAYLOAD Payload );

public System.UInt32 VerifyMatch ( NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR CapturedFIR ,
                                   NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR StoredTemplate ,
                                   out System.Boolean Result ,
                                   NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_PAYLOAD Payload );

public System.UInt32 VerifyMatch ( NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR CapturedFIR ,
                                   NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_TEXTENCODE StoredTemplate ,
                                   out System.Boolean Result ,
                                   NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_PAYLOAD Payload );

public System.UInt32 VerifyMatch ( NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_TEXTENCODE CapturedFIR ,
                                   NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR StoredTemplate ,
                                   out System.Boolean Result ,
                                   NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_PAYLOAD Payload );

public System.UInt32 VerifyMatch ( NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_TEXTENCODE CapturedFIR ,
                                   NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR StoredTemplate ,
                                   out System.Boolean Result ,
                                   NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_PAYLOAD Payload );

public System.UInt32 VerifyMatch ( NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_TEXTENCODE CapturedFIR ,
                                   NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_TEXTENCODE StoredTemplate ,
                                   out System.Boolean Result ,
                                   NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_PAYLOAD Payload );

public System.UInt32 VerifyMatch ( NITGEN.SDK.NBioBSP.NBioAPI.Type.INPUT_FIR CapturedFIR ,
                                   NITGEN.SDK.NBioBSP.NBioAPI.Type.INPUT_FIR StoredTemplate ,
                                   out System.Boolean Result ,
                                   NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_PAYLOAD Payload );
```

Descriptions

This function performs a verification (1-to-1) match between FIRs; the ProcessedFIR and the StoredTemplate. The ProcessedFIR is the “processed” FIR constructed specifically for the verification. The StoredTemplate was created at enrollment. If the StoredTemplate contains a Payload, the Payload may be returned upon successful verification.

Parameters

CapturedFIR:

The FIR to be verified, or its handle.

StoredTemplate:

The FIR to be verified against.

Result:

A object to a Boolean value indicating (NBioAPI.TRUE/ NBioAPI.FALSE) whether the FIRs matched or not.

Payload:

If the StoredTemplate contains a payload, it is returned in an allocated NBioAPI.TypeFIR_PAYLOAD structure.

Return Value

NBioAPI.Error.NONE: No error.

NBioAPI.Error.INVALID_HANDLE: Invalid handle.

NBioAPI.Error.ENCRYPTED_DATA_ERROR: Cannot be decrypted.

NBioAPI.Error.INTERNAL_CHECKSUM_FAIL: Data forged.

NBioAPI.Error.MUST_BE_PROCESSED_DATA: Not processed data.

VerifyMatchEx

```
public System.UInt32 VerifyMatch ( NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR CapturedFIR ,
                                   NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR StoredTemplate ,
                                   out System.Boolean Result ,
                                   NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_PAYLOAD Payload ,
                                   NITGEN.SDK.NBioBSP.NBioAPI.Type.MATCH_OPTION_0 MatchOption0 );

public System.UInt32 VerifyMatch ( NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR CapturedFIR ,
                                   NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR StoredTemplate ,
                                   out System.Boolean Result ,
                                   NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_PAYLOAD Payload ,
                                   NITGEN.SDK.NBioBSP.NBioAPI.Type.MATCH_OPTION_0 MatchOption0 );

public System.UInt32 VerifyMatch ( NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR CapturedFIR ,
                                   NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_TEXTENCODE StoredTemplate ,
                                   out System.Boolean Result ,
                                   NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_PAYLOAD Payload ,
                                   NITGEN.SDK.NBioBSP.NBioAPI.Type.MATCH_OPTION_0 MatchOption0 );

public System.UInt32 VerifyMatch ( NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR CapturedFIR ,
                                   NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR StoredTemplate ,
                                   out System.Boolean Result,
                                   NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_PAYLOAD Payload ,
                                   NITGEN.SDK.NBioBSP.NBioAPI.Type.MATCH_OPTION_0 MatchOption0 );

public System.UInt32 VerifyMatch ( NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR CapturedFIR ,
                                   NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR StoredTemplate ,
                                   out System.Boolean Result ,
                                   NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_PAYLOAD Payload ,
                                   NITGEN.SDK.NBioBSP.NBioAPI.Type.MATCH_OPTION_0 MatchOption0 );

public System.UInt32 VerifyMatch ( NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR CapturedFIR ,
                                   NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_TEXTENCODE StoredTemplate ,
                                   out System.Boolean Result ,
                                   NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_PAYLOAD Payload ,
                                   NITGEN.SDK.NBioBSP.NBioAPI.Type.MATCH_OPTION_0 MatchOption0 );

public System.UInt32 VerifyMatch ( NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_TEXTENCODE CapturedFIR ,
                                   NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR StoredTemplate ,
                                   out System.Boolean Result ,
                                   NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_PAYLOAD Payload ,
                                   NITGEN.SDK.NBioBSP.NBioAPI.Type.MATCH_OPTION_0 MatchOption0 );

public System.UInt32 VerifyMatch ( NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_TEXTENCODE CapturedFIR ,
                                   NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR StoredTemplate ,
                                   out System.Boolean Result ,
                                   NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_PAYLOAD Payload ,
                                   NITGEN.SDK.NBioBSP.NBioAPI.Type.MATCH_OPTION_0 MatchOption0 );
```

public System.UInt32 VerifyMatch (NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_TEXTENCODE CapturedFIR ,
NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_TEXTENCODE StoredTemplate ,
out System.Boolean Result ,
NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_PAYLOAD Payload ,
NITGEN.SDK.NBioBSP.NBioAPI.Type.MATCH_OPTION_0 MatchOption0);

public System.UInt32 VerifyMatch (NITGEN.SDK.NBioBSP.NBioAPI.Type.INPUT_FIR CapturedFIR ,
NITGEN.SDK.NBioBSP.NBioAPI.Type.INPUT_FIR StoredTemplate ,
out System.Boolean Result ,
NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_PAYLOAD Payload ,
NITGEN.SDK.NBioBSP.NBioAPI.Type.MATCH_OPTION_0 MatchOption0);

Descriptions
This method performs a verification (1-to-1) match between FIRs; the ProcessedFIR and the StoredTemplate. The ProcessedFIR is the “processed” FIR constructed specifically for the verification. The StoredTemplate was created at enrollment. If the StoredTemplate contains a Payload, the Payload may be returned upon successful verification. Only difference with the VerifyMatch method is that it takes a set of matching condition as a parameter

Parameters
CapturedFIR:
The FIR to be verified, or its handle.

StoredTemplate:
The FIR to be verified against.

Result:
A object to a Boolean value indicating (NBioAPI.TRUE/ NBioAPI.FALSE) whether the FIRs matched or not.

Payload:
If the StoredTemplate contains a payload, it is returned in an allocated NBioAPI_FIR_PAYLOAD structure.

MatchOption:
A set of condition for matching operation.

Return Value
NBioAPI.Error.NONE: No error.
NBioAPI.Error.INVALID_HANDLE: Invalid handle.
NBioAPI.Error.ENCRYPTED_DATA_ERROR: Cannot be decrypted.
NBioAPI.Error.INTERNAL_CHECKSUM_FAIL: Data forged.
NBioAPI.Error.MUST_BE_PROCESSED_DATA: Not processed data.

Enroll

```
public System.UInt32 Enroll ( out NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR NewTemplate ,
                               NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_PAYLOAD Payload );

public System.UInt32 Enroll ( ref NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR StoredTemplate ,
                               out NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR NewTemplate ,
                               NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_PAYLOAD Payload ,
                               System.Int32 Timeout ,
                               NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR AuditData ,
                               NITGEN.SDK.NBioBSP.NBioAPI.Type.WINDOW_OPTION WindowOption );

public System.UInt32 Enroll ( ref NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR StoredTemplate ,
                               out NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR NewTemplate ,
                               NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_PAYLOAD Payload ,
                               System.Int32 Timeout ,
                               NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR AuditData ,
                               NITGEN.SDK.NBioBSP.NBioAPI.Type.WINDOW_OPTION WindowOption );

public System.UInt32 Enroll ( ref NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_TEXTENCODE StoredTemplate,
                              out NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR NewTemplate ,
                              NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_PAYLOAD Payload ,
                              System.Int32 Timeout ,
                              NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR AuditData ,
                              NITGEN.SDK.NBioBSP.NBioAPI.Type.WINDOW_OPTION WindowOption );

public System.UInt32 Enroll ( ref NITGEN.SDK.NBioBSP.NBioAPI.Type.INPUT_FIR StoredTemplate ,
                              out NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR NewTemplate ,
                              NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_PAYLOAD Payload ,
                              System.Int32 Timeout ,
                              NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR AuditData ,
                              NITGEN.SDK.NBioBSP.NBioAPI.Type.WINDOW_OPTION WindowOption );
```

Descriptions

This method captures fingerprint data from the attached device to create a ProcessedFIR for the purpose of enrollment.

Parameters

StoredTemplate:

Optionally, the FIR to be adapted.

NewTemplate:

A handle to a newly created template that is derived from the new raw samples and (optionally) the StoredTemplate.

Payload:

A object to data that will be wrapped inside the newly created template. If NULL, this parameter is ignored.

Timeout:

An integer specifying the timeout value (in milliseconds) for the operation. If this timeout is reached, the function returns an error, and no results. This value can be any positive number. –1 value means the FIR's default timeout value will be used.

AuditData:

A handle to a FIR containing fingerprint audit data. This data may be used to provide a human-identifiable data of the person at the device. If the object is NULL on input, no audit data is collected.

WindowOption:
A object to a class containing the window options of the NBioBSP module.

Return Value
NBioAPI.Error.NONE: No error.
NBioAPI.Error.INVALID_HANDLE: Invalid handle.
NBioAPI.Error.DEVICE_NOT_OPENED: Device not opened.
NBioAPI.Error.USER_CANCEL: Cancelled by user during verification.
NBioAPI.Error.ENCRYPTED_DATA_ERROR: Cannot be decrypted.
NBioAPI.Error.INTERNAL_CHECKSUM_FAIL: Data forged.
NBioAPI.Error.FUNCTION_FAIL: Data conversion failed.

Verify

```
public System.UInt32 Verify ( NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR StoredTemplate ,
                              out System.Boolean Result ,
                              NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_PAYLOAD Payload );

public System.UInt32 Verify ( NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR StoredTemplate ,
                               out System.Boolean Result ,
                               NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_PAYLOAD Payload );

public System.UInt32 Verify ( NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_TEXTENCODE StoredTemplate ,
                              out System.Boolean Result ,
                              NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_PAYLOAD Payload );

public System.UInt32 Verify ( NITGEN.SDK.NBioBSP.NBioAPI.Type.INPUT_FIR StoredTemplate ,
                              out System.Boolean Result ,
                              NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_PAYLOAD Payload );

public System.UInt32 Verify ( NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR StoredTemplate ,
                              out System.Boolean Result ,
                              NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_PAYLOAD Payload ,
                              System.Int32 Timeout ,
                              NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR AuditData ,
                              NITGEN.SDK.NBioBSP.NBioAPI.Type.WINDOW_OPTION WindowOption );

public System.UInt32 Verify ( NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR StoredTemplate ,
                              out System.Boolean Result ,
                              NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_PAYLOAD Payload ,
                              System.Int32 Timeout ,
                              NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR AuditData ,
                              NITGEN.SDK.NBioBSP.NBioAPI.Type.WINDOW_OPTION WindowOption );

public System.UInt32 Verify ( NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_TEXTENCODE StoredTemplate ,
                              out System.Boolean Result ,
                              NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_PAYLOAD Payload ,
                              System.Int32 Timeout ,
                              NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR AuditData ,
                              NITGEN.SDK.NBioBSP.NBioAPI.Type.WINDOW_OPTION WindowOption );

public System.UInt32 Verify ( NITGEN.SDK.NBioBSP.NBioAPI.Type.INPUT_FIR StoredTemplate ,
                              out System.Boolean Result ,
                              NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_PAYLOAD Payload ,
                              System.Int32 Timeout ,
                              NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR AuditData ,
                              NITGEN.SDK.NBioBSP.NBioAPI.Type.WINDOW_OPTION WindowOption );
```

Descriptions

This function captures fingerprint data from the attached device, and compares it against the StoredTemplate.

Parameters

StoredTemplate:

The FIR to be verified against.

Result :
A obejct to a Boolean value indicating (NBioAPI.TRUE/ NBioAPI.FALSE) whether the FIRs matched or not.

Payload:
If the StoredTemplate contains a payload, it is returned in an allocated NBioAPI_FIR_PAYLOAD structure.

Timeout:
An integer specifying the timeout value (in milliseconds) for the operation. If the timeout is reached, the function returns an error, and no results. This value can be any positive number. –1 value means the FIR's default timeout value will be used.

AuditData:
A handle to a FIR containing raw fingerprint data. This data may be used to provide human-identifiable data of the person at the device. If the object is NULL on input, no audit data is collected.

WindowOption:
A object to a class containing the window options of the NBioBSP module.

Return Value
NBioAPI.Error.NONE: No error.
NBioAPI.Error.INVALID_HANDLE: Invalid handle.
NBioAPI.Error.USER_CANCEL: Cancelled by user during verification.
NBioAPI.Error.ENCRYPTED_DATA_ERROR: Cannot be decrypted.
NBioAPI.Error.INTERNAL_CHECKSUM_FAIL: Data forged.

A.1.4 User Interface Method

SetSkinResource

public System.Boolean SetSkinResource (System.String szResPath);

Descriptions

This function is used to apply a new skin resource to the NBioBSP module. The skin resource can be made for OEM users.

Parameters

szResPath:

A fullpath of the skin resource file. If NULL, the default resource is used.

Return Value

NBioAPI.Type.TRUE: Success.

NBioAPI.Type.FALSE: Failed to find the resource DLLs. Default resource will be used.

A.2 NBioAPI.Export Class

This class includes some data conversion functions.

Export

public Export (NITGEN.SDK.NBioBSP.NBioAPI NBioBSP);

Descriptions
This function takes an NBioAPI class to be constructed.

Parameters
NBioBSP:
An NBioAPI class.

Example
m_NBioAPI = new NBioAPI();
m_Export = new NBioAPI.Export(m_NBioAPI);

FDxToNBioBSP

public System.UInt32 FDxToNBioBSP (byte[] FDxData ,
NBioAPI.Type.MINCONV_DATA_TYPE FDxDataType ,
NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_PURPOSE Purpose ,
out NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR ProcessedFIR)

Descriptions
This function is to convert the FDx data (400-byte minutiae array) to the FIR format in a handle of FIR. This function does not accept raw data.

Parameters
FDxData:
The FDxData to be converted.

FDxDataType :
The type of the FDxData.

Purpose:
A value indicating the desired purpose of the ProcessedFIR.

ProcessedFIR:
The ProcessedFIR handle.

Return Value
NBioAPI.Error.NONE: No error.
NBioAPI.Error.INVALID_MINSIZE: Invalid size of minutiae data.
NBioAPI.Error.FUNCTION_FAIL: Conversion failed.

FDxToNBioBSPEx

public System.UInt32 FDxToNBioBSPEx (byte[] FDxData ,
Uint32 FDxTemplateSize,
NBioAPI.Type.MINCONV_DATA_TYPE FDxDataType ,
NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_PURPOSE Purpose ,
out NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR ProcessedFIR)

Descriptions
This function is to convert the FDx data to the FIR format in a handle of FIR. This function does not accept raw data.

Parameters
FDxData:
The FDxData to be converted.

FDxTemplateSize:
The size of a single minutiae data

FDxDataType :
The type of the FDxData.

Purpose:
ProcessedFIR 의 용도

ProcessedFIR:
A value indicating the desired purpose of the ProcessedFIR.

Return Value
NBioAPI.Error.NONE: No error.
NBioAPI.Error.INVALID_MINSIZE: Invalid size of minutiae data.
NBioAPI.Error.FUNCTION_FAIL: Conversion failed.

NBioBSPToFDx

public System.UInt32 NBioBSPToFDx (NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR CapturedFIR ,
out NITGEN.SDK.NBioBSP.NBioAPI.Export.EXPORT_DATA ExportData ,
NITGEN.SDK.NBioBSP.NBioAPI.Type.MINCONV_DATA_TYPE ExportType);

public System.UInt32 NBioBSPToFDx (NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR CapturedFIR ,
out NITGEN.SDK.NBioBSP.NBioAPI.Export.EXPORT_DATA ExportData ,
NITGEN.SDK.NBioBSP.NBioAPI.Type.MINCONV_DATA_TYPE ExportType);

public System.UInt32 NBioBSPToFDx (NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_TEXTENCODE CapturedFIR ,
out NITGEN.SDK.NBioBSP.NBioAPI.Export.EXPORT_DATA ExportData ,
NITGEN.SDK.NBioBSP.NBioAPI.Type.MINCONV_DATA_TYPE ExportType);

public System.UInt32 NBioBSPToFDx (NITGEN.SDK.NBioBSP.NBioAPI.Type.INPUT_FIR CapturedFIR ,
out NITGEN.SDK.NBioBSP.NBioAPI.Export.EXPORT_DATA ExportData ,
NITGEN.SDK.NBioBSP.NBioAPI.Type.MINCONV_DATA_TYPE ExportType);

Descriptions
This function is to convert the FIR data to FDx data format.

Parameters
CapturedFIR:
The FIR data to be converted. It can take a FIR handle, binary FIR or text encoded FIR.

ExportData:
A object to a NBioAPI.Export.EXPORT_DATA class that receives the data converted from the FIR input.

FDxDataType :
A value indicating the type of exportation.

Return Value
NBioAPI.Error.NONE: No error.
NBioAPI.Error.MUST_BE_PROCESSED_DATA: Not processed data.
NBioAPI.Error.UNKNOWN_FORMAT: Unknown format.

NBioBSPToImage

public System.UInt32 NBioBSPToImage (NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR AuditFIR ,
out NITGEN.SDK.NBioBSP.NBioAPI.Export.EXPORT_AUDIT_DATA ExportAuditData);

public System.UInt32 NBioBSPToImage (NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR AuditFIR ,
out NITGEN.SDK.NBioBSP.NBioAPI.Export.EXPORT_AUDIT_DATA ExportAuditData);

public System.UInt32 NBioBSPToImage (NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_TEXTENCODE AuditFIR ,
out NITGEN.SDK.NBioBSP.NBioAPI.Export.EXPORT_AUDIT_DATA ExportAuditData);

public System.UInt32 NBioBSPToImage (NITGEN.SDK.NBioBSP.NBioAPI.Type.INPUT_FIR AuditFIR ,
out NITGEN.SDK.NBioBSP.NBioAPI.Export.EXPORT_AUDIT_DATA ExportAuditData);

Descriptions
This function is to convert the FIR data to an image data.

Parameters
AuditFIR:
A object to a class specifying the FIR to be converted to image data. It can take a FIR handle, binary FIR or text encoded FIR.

ExportAuditData:
A object to a NBioAPI.Export.EXORT_DATA class that receives the image data converted from the FIR. This structure contains information about the FIR and the raw image data.

Return Value
NBioAPI.Error.NONE: No error.
NBioAPI.Error.ALREADY_PROCESSED: FIR already processed.

ImageToNBioBSP

public System.UInt32 ImageToNBioBSP (NITGEN.SDK.NBioBSP.NBioAPI.Export.EXPORT_AUDIT_DATA ExportAuditData
out NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR FIR);

Descriptions
This function is to convert raw image data into a FIR format.

Parameters
ExportAuditData:
A obejct to a NBioAPI.Export.EXORT_DATA class that receives the image data converted from the FIR. This structure contains information about the FIR and the raw image data.

FIR:
A object to a HFIR that receives the FIR handle.

Return Value
NBioAPI.Error.NONE: No error.
NBioAPI.Error.INVALID_MINSIZE: Invalid size of minutiae data.

ImportDataToNBioBSP

public System.UInt32 ImportDataToNBioBSP (NITGEN.SDK.NBioBSP.NBioAPI.Export.EXPORT_DATA ExportData ,
NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_PURPOSE Purpose ,
out NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR ProcessedFIR);

Descriptions
This function is to convert minutiae data into a FIR format.

Parameters
ExportData:
A obejct to a NBioAPI.Export.EXPORT_DATA class to be converted.

Purpose:
A value indicating the purpose of conversion.

ProcessedFIR:
A object to a HFIR that receives the FIR handle.

Return Value
NBioAPI.Error.NONE: No error.
NBioAPI.Error.INVALID_MINSIZE: Invalid size of minutiae data.

ImportDataToNBioBSPEx

public System.UInt32 ImportDataToNBioBSPEx (NITGEN.SDK.NBioBSP.NBioAPI.Export.EXPORT_DATA ExportData ,
NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_PURPOSE Purpose ,
NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_DATA_TYPE DataType ,
out NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR ProcessedFIR);

Descriptions
This function is to convert minutiae data into a FIR format.

Parameters
ExportData:
A object to a NBioAPI.Export.EXPORT_DATA class to be converted.

Purpose:
A value indicating the purpose of conversion.

DataType:
A type of minutiae data. (RAW, PROCESSED, …)

ProcessedFIR:
A object to a HFIR that receives the FIR handle.

Return Value
NBioAPI.Error.NONE: No error.
NBioAPI.Error.INVALID_MINSIZE: Invalid size of minutiae data.

A.3 NBioAPI.IndexSearch Class

This class includes the IndexSearch functions.

A.3.1 Initialization Method

IndexSearch

public System.Uint32 IndexSearch (NITGEN.SDK.NBioBSP.NBioAPI NBioBSP);

Descriptions
This function is a constructor of the IndexSearch class. It takes the NBioAPI class.

Parameters
NBioBSP:
The NBioAPI class.

Example
m_NBioAPI = new NBioAPI();
m_IndexSearch = new NBioAPI.IndexSearch(m_NBioAPI);

InitEngine

public System.UInt32 InitEngine ( );

Descriptions
This function is to initialize the IndexSearch engine. It allocates the memory for fingerprint DB and initializes global variables.

Parameters
N/A

Return Values
NBioAPI.Error.NONE: No error.
NBioAPI.Error.INDEXSEARCH_INIT_FAIL: Engine not initialized.

TerminateEngine

public System.UInt32 TerminateEngine ( );

Descriptions
This function is to close the IndexSearch engine. It must be called before an application is closed to free all memory allocated for the IndexSearch engine.

Parameters
N/A.

Return Values
NBioAPI.Error.NONE: No error.
NBioAPI.Error.INDEXSEARCH_INIT_FAIL: Engine not initialized.

GetInitInfo

public System.UInt32 GetInitInfo (out NITGEN.SDK.NBioBSP.NBioAPI.IndexSearch.INIT_INFO_0 InitInfo0);

Descriptions
This function is to receive the current parameter values of the IndexSearch engine.

Parameters
InitInfo0
A object to NBioAPI.IndexSearch.INIT_INFO_0 that receives the initialization setting for the IndexSearch engine.

Return Values
NBioAPI.Error.NONE: No error.
NBioAPI.Error.INDEXSEARCH_INIT_FAIL: Engine not initialized.

SetInitInfo

public System.UInt32 SetInitInfo (out NITGEN.SDK.NBioBSP.NBioAPI.IndexSearch.INIT_INFO_0 InitInfo0);

Descriptions
This function is to configure the parameter values of the IndexSearch engine.

Parameters
InitInfo0
A object to NBioAPI.IndexSearch.INIT_INFO_0 containing the initialization setting for the IndexSearch engine.

Return Values
NBioAPI.Error.NONE: No error.
NBioAPI.Error.INDEXSEARCH_INIT_FAIL: Engine not initialized.
NBioAPI.Error.INIT_PRESEARCHRATE: Invalid value for PreSearchRate.

A.3.2 Enroll / Remove / Search Method

AddFIR

```
public System.UInt32 AddFIR ( NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR CapturedFIR,
                              System.UInt32 UserID,
                              NITGEN.SDK.NBioBSP.NBioAPI.IndexSearch.FP_INFO[] SampleInfo );

public System.UInt32 AddFIR ( NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR CapturedFIR,
                              System.UInt32 UserID,
                              NITGEN.SDK.NBioBSP.NBioAPI.IndexSearch.FP_INFO[] SampleInfo );

public System.UInt32 AddFIR ( NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_TEXTENCODE CapturedFIR,
                              System.UInt32 UserID,
                              NITGEN.SDK.NBioBSP.NBioAPI.IndexSearch.FP_INFO[] SampleInfo );

public System.UInt32 AddFIR ( NITGEN.SDK.NBioBSP.NBioAPI.Type.INPUT_FIR CapturedFIR,
                              System.UInt32 UserID,
                              NITGEN.SDK.NBioBSP.NBioAPI.IndexSearch.FP_INFO[] SampleInfo );
```

Descriptions

This function is to register a fingerprint template data, along with a user ID, into the fingerprint DB on memory. After successful registration, it returns the template information.

Parameters

CapturedFIR

A FIR data to be registered.

UserID

A user ID number to be registered.

SampleInfo

A object to a NBioAPI.IndexSearch.FP_INFO that receives some information of a registered template, including finger IDs and sample counts.

Return Values

NBioAPI.Error.NONE: No error.

NBioAPI.Error.INDEXSEARCH_INIT_FAIL: Engine not initialized.

RemoveData

public System.UInt32 RemoveData (NITGEN.SDK.NBioBSP.NBioAPI.IndexSearch.FP_INFO FpInfo);

public System.UInt32 RemoveData (System.UInt32 UserID,
System.Byte FingerID,
System.Byte SampleNumber);

Descriptions
This function is to remove a template data from the fingerprint DB on memory. The parameter, pFpInfo, is used to search the corresponding template data.

Parameters
FpInfo
A object to a NBioAPI.IndexSearch.FP_INFO containing template information including a user ID, finger IDs and sample numbers.

UserID
A user ID number to be deleted.

FingerID
A finger ID to be deleted.

SampleNumber
A sample number to be deleted.

Return Values
NBioAPI.Error.NONE: No error.
NBioAPI.Error.INDEXSEARCH_INIT_FAIL: Engine not initialized.

RemoveUser

public System.UInt32 RemoveUser (System.UInt32 nUserID);

Descriptions
This function is to remove all template data of a user from the fingerprint DB on memory.

Parameters
UserID
A user ID number to be deleted.

Return Values
NBioAPI.Error.NONE: No error.
NBioAPI.Error.INDEXSEARCH_INIT_FAIL: Engine not initialized.

IdentifyData

public System.UInt32 IdentifyData (NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR CapturedFIR,
System.UInt32 SecuLevel,
out NITGEN.SDK.NBioBSP.NBioAPI.IndexSearch.FP_INFO FpInfo,
NITGEN.SDK.NBioBSP.NBioAPI.IndexSearch.CALLBACK_INFO_0 CallbackInfo);

public System.UInt32 IdentifyData (NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR CapturedFIR,
System.UInt32 SecuLevel,
out NITGEN.SDK.NBioBSP.NBioAPI.IndexSearch.FP_INFO FpInfo,
NITGEN.SDK.NBioBSP.NBioAPI.IndexSearch.CALLBACK_INFO_0 CallbackInfo);

public System.UInt32 IdentifyData (NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_TEXTENCODE CapturedFIR,
System.UInt32 SecuLevel,
out NITGEN.SDK.NBioBSP.NBioAPI.IndexSearch.FP_INFO FpInfo,
NITGEN.SDK.NBioBSP.NBioAPI.IndexSearch.CALLBACK_INFO_0 CallbackInfo);

public System.UInt32 IdentifyData (NITGEN.SDK.NBioBSP.NBioAPI.Type.INPUT_FIR CapturedFIR,
System.UInt32 SecuLevel,
out NITGEN.SDK.NBioBSP.NBioAPI.IndexSearch.FP_INFO FpInfo,
NITGEN.SDK.NBioBSP.NBioAPI.IndexSearch.CALLBACK_INFO_0 CallbackInfo);

Descriptions
This function is to perform identification and determine if the same fingerprint exists within the fingerprint DB. After identification, it returns the template information if successful. The callback functions entered through the last parameter, pCallbackInfo0, can be used to determine to skip or stop verification. For more information, please refer to NBioAPI_INDEXSEARCH_CALLBACK_INFO_0 structure.

Parameters
CapturedFIR
A FIR data.

SecuLevel
Indicates the security level set for fingerprint recognition. Values range from 1 (lowest) to 9 (highest). The default is 5 (normal).

FpInfo
A object to a NBioAPI.IndexSearch.FP_INFO that receives template information.

CallbackInfo
A object to a NBioAPI.IndexSearch.CALLBACK_INFO_0 containing a set of pointers of callback functions that is to invoked during IndexSearch operation. If NULL, no callback function will be used.

Return Values
NBioAPI.Error.NONE: No error.
NBioAPI.Error.INDEXSEARCH_INIT_FAIL: Engine not initialized.
NBioAPI.Error.INDEXSEARCH_IDENTIFY_STOP: Identification stopped by a callback function.

A.3.2 DB Method

SaveDBToFile

public System.UInt32 SaveDBToFile (System.String szFilepath);

Descriptions
This function is to backup the fingerprint DB, in memory, into a file. It takes a full path and creates a file containing fingerprint DB.

Parameters
szFilepath
Location and file name to make a DB file.

Return Values
NBioAPI.Error.NONE: No error.
NBioAPI.Error.INDEXSEARCH_INIT_FAIL: Engine not initialized.
NBioAPI.Error.INDEXSEARCH_SAVE_DB: DB file not saved.

LoadDBFromFile

public System.UInt32 LoadDBFromFile (System.String szFilepath);

Descriptions
This function is to load the fingerprint DB file into memory.

Parameters
szFilepath
Location and file name to load a DB file.

Return Values
NBioAPI.Error.NONE: No error.
NBioAPI.Error.INDEXSEARCH_INIT_FAIL: Engine not initialized.
NBioAPI.Error.INDEXSEARCH_LOAD_DB: DB file not loaded.

ClearDB

public System.UInt32 ClearDB ( );

Descriptions
This function is to delete all template data from the fingerprint DB in memory.

Parameters
N/A.

Return Values
NBioAPI.Error.NONE: No error.
NBioAPI.Error.INDEXSEARCH_INIT_FAIL: Engine not initialized.

GetDataCount

public System.UInt32 GetDataCount (out System.UInt32 DataCount);

Descriptions
This function is to retrieve the count of template data in the fingerprint DB.

Parameters
DataCount
The count of template data stored in the fingerprint DB.

Return Values
NBioAPI.Error.NONE: No error.
NBioAPI.Error.INDEXSEARCH_INIT_FAIL: Engine not initialized.

CheckDataExist

public System.UInt32 CheckDataExist (NITGEN.SDK.NBioBSP.NBioAPI.IndexSearch.FP_INFO FpInfo,
out System.Boolean Exist);

Descriptions
This function is to check if a specific template data exists in the fingerprint DB.

Parameters
FpInfo
A object to template information.

Exist
A object to a Boolean that receives the flag of existence.

Return Values
NBioAPI.Error.NONE: No error.
NBioAPI.Error.INDEXSEARCH_INIT_FAIL: Engine not initialized.

A.4 NBioAPI.NSearch Class

This class includes the NSearchSearch functions.

A.4.1 Initialization Method

NSearch

public System.Uint32 NSearch (NITGEN.SDK.NBioBSP.NBioAPI NBioBSP);

Descriptions
This function is a constructor of the IndexSearch class. It takes the NBioAPI class.

Parameters
NBioBSP:
The NBioAPI class.

Example
m_NBioAPI = new NBioAPI();
m_NSearch = new NBioAPI.NSearch(m_NBioAPI);

InitEngine

public System.UInt32 InitEngine ( );

Descriptions
This function is to initialize the NSearch engine. It allocates the memory for fingerprint DB and initializes global variables.

Parameters
N/A.

Return Values
NBioAPI.Error.NONE : No error
NBioAPI.Error.NSEARCH_OPEN_FAIL : Engine not opened.
NBioAPI.Error.NSEARCH_INIT_FAIL : Engine not initialized.

TerminateEngine

public System.UInt32 TerminateEngine ( );

Descriptions
This function is to close the IndexSearch engine. It must be called before an application is closed to free all memory allocated for the NSearch engine.

Parameters
N/A.

Return Values
NBioAPI.Error.NONE : No error
NBioAPI.Error.NSEARCH_INIT_FAIL : Engine not initialized.

GetInitInfo

public System.UInt32 GetInitInfo (out NITGEN.SDK.NBioBSP.NBioAPI.NSearch.INIT_INFO_0 InitInfo0);

Descriptions
This function is to receive the current parameter values of the NSearch engine.

Parameters
InitInfo0
A object to NBioAPI.NSearch.INIT_INFO_0 that receives the initialization setting for the NSearch engine.

Return Values
NBioAPI.Error.NONE : No Error.
NBioAPI.Error.NSEARCH_INIT_FAIL : Engine not initialized.

SetInitInfo

public System.UInt32 SetInitInfo (out NITGEN.SDK.NBioBSP.NBioAPI.NSearch.INIT_INFO_0 InitInfo0);

Descriptions
This function is to configure the parameter values of the NSearch engine.

Parameters
InitInfo0
A object to NBioAPI.NSearch.INIT_INFO_0 containing the initialization setting for the IndexSearch engine.

Return Values
NBioAPI.Error.NONE : No error.
NBioAPI.Error.NSEARCH_INIT_FAIL : Engine not initialized.
NBioAPI.Error.INIT_MAXCANDIDATE : Invalid value for MaxCandidate.

A.4.2 Enroll / Remove / Search Method

AddFIR

```
public System.UInt32 AddFIR ( NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR CapturedFIR,
                              System.UInt32 UserID,
                              NITGEN.SDK.NBioBSP.NBioAPI.NSearch.FP_INFO[] SampleInfo );

public System.UInt32 AddFIR ( NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR CapturedFIR,
                              System.UInt32 UserID,
                              NITGEN.SDK.NBioBSP.NBioAPI.NSearch.FP_INFO[] SampleInfo );

public System.UInt32 AddFIR ( NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_TEXTENCODE CapturedFIR,
                              System.UInt32 UserID,
                              NITGEN.SDK.NBioBSP.NBioAPI.NSearch.FP_INFO[] SampleInfo );

public System.UInt32 AddFIR ( NITGEN.SDK.NBioBSP.NBioAPI.Type.INPUT_FIR CapturedFIR,
                              System.UInt32 UserID,
                              NITGEN.SDK.NBioBSP.NBioAPI.NSearch.FP_INFO[] SampleInfo );
```

Descriptions
This function is to register a fingerprint template data, along with a user ID, into the fingerprint DB on memory. After successful registration, it returns the template information.

Parameters
CapturedFIR
A FIR data to be registered.

UserID
A user ID number to be registered.

SampleInfo
A object to a NBioAPI.NSearch.FP_INFO that receives some information of a registered template, including finger IDs and sample counts.

Return Values
NBioAPI.Error.NONE : No error.
NBioAPI.Error.NSEARCH_INIT_FAIL : Engine not initialized.
NBioAPI.Error.NSEARCH_OVER_LIMIT : Over template count
NBioAPI.Error.NSEARCH_MEM_OVERFLOW : Out of memory.

RemoveData

public System.UInt32 RemoveData (NITGEN.SDK.NBioBSP.NBioAPI.NSearch.FP_INFO FpInfo);

public System.UInt32 RemoveData (System.UInt32 UserID,
System.Byte FingerID,
System.Byte SampleNumber);

Descriptions
This function is to remove a template data from the fingerprint DB on memory. The parameter, pFpInfo, is used to search the corresponding template data.

Parameters
FpInfo
A object to a NBioAPI.NSearch.FP_INFO containing template information including a user ID, finger IDs and sample numbers.

UserID
A user ID number to be deleted.

FingerID
A finger ID to be deleted.

SampleNumber
A sample number to be deleted.

Return Values
NBioAPI.Error.NONE : No error.
NBioAPI.Error.NSEARCH_INIT_FAIL : Engine not initialized.

RemoveUser

public System.UInt32 RemoveUser (System.UInt32 nUserID);

Descriptions
This function is to remove all template data of a user from the fingerprint DB on memory.

Parameters
UserID
A user ID number to be deleted.

Return Values
NBioAPI.Error.NONE : No error.
NBioAPI.Error.NSEARCH_INIT_FAIL : Engine not initialized.

SearchData

public System.UInt32 SearchData (NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR CapturedFIR,
out NITGEN.SDK.NBioBSP.NBioAPI.NSearch.CANDIDATE[] Candidate);

public System.UInt32 SearchData (NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR CapturedFIR,
out NITGEN.SDK.NBioBSP.NBioAPI.NSearch.CANDIDATE[] Candidate);

public System.UInt32 SearchData (NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_TEXTENCODE CapturedFIR,
out NITGEN.SDK.NBioBSP.NBioAPI.NSearch.CANDIDATE[] Candidate);

public System.UInt32 SearchData (NITGEN.SDK.NBioBSP.NBioAPI.Type.INPUT_FIR CapturedFIR,
out NITGEN.SDK.NBioBSP.NBioAPI.NSearch.CANDIDATE[] Candidate);

Descriptions
This function is to perform Search and return candidate lists.

Parameters
CapturedFIR
A FIR data.

Candidate
A object to a NBioAPI.NSearch.CANDIDATE that receives some information of a searched template.

Return Values
NBioAPI.Error.NONE : No error.
NBioAPI.Error.NSEARCH_INIT_FAIL : Engine not initialized.

IdentifyData

public System.UInt32 IdentifyData (NITGEN.SDK.NBioBSP.NBioAPI.Type.HFIR CapturedFIR,
System.UInt32 SecuLevel,
out NITGEN.SDK.NBioBSP.NBioAPI.NSearch.FP_INFO FpInfo);

public System.UInt32 IdentifyData (NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR CapturedFIR,
System.UInt32 SecuLevel,
out NITGEN.SDK.NBioBSP.NBioAPI.NSearch.FP_INFO FpInfo);;

public System.UInt32 IdentifyData (NITGEN.SDK.NBioBSP.NBioAPI.Type.FIR_TEXTENCODE CapturedFIR,
System.UInt32 SecuLevel,
out NITGEN.SDK.NBioBSP.NBioAPI.NSearch.FP_INFO FpInfo);

public System.UInt32 IdentifyData (NITGEN.SDK.NBioBSP.NBioAPI.Type.INPUT_FIR CapturedFIR,
System.UInt32 SecuLevel,
out NITGEN.SDK.NBioBSP.NBioAPI.NSearch.FP_INFO FpInfo);

Descriptions
This function is to perform identification and determine if the same fingerprint exists within the fingerprint DB. After identification, it returns the template information if successful.

Parameters
CapturedFIR
A FIR data.

SecuLevel
Indicates the security level set for fingerprint recognition. Values range from 1 (lowest) to 9 (highest). The default is 5 (normal).

FpInfo
A object to a NBioAPI.NSearch.FP_INFO that receives template information.

Return Values
NBioAPI.Error.NONE : No error.
NBioAPI.Error.NSEARCH_INIT_FAIL : Engine not initialized.
NBioAPI.Error.NSEARCH_IDENTIFY_FAIL : Identify failed.

A.4.2 DB Method

SaveDBToFile

public System.UInt32 SaveDBToFile (System.String szFilepath);

Descriptions
This function is to backup the fingerprint DB, in memory, into a file. It takes a full path and creates a file containing fingerprint DB.

Parameters
szFilepath : Location and file name to make a DB file.

Return Values
NBioAPI.Error.NONE : No error.
NBioAPI.Error.NSEARCH_INIT_FAIL : Engine not initialized.
NBioAPI.Error.NSEARCH_SAVE_DB : DB file not saved.

LoadDBFromFile

public System.UInt32 LoadDBFromFile (System.String szFilepath);

Descriptions
This function is to load the fingerprint DB file into memory.

Parameters
szFilepath : Location and file name to load a DB file.

Return Values
NBioAPI.Error.NONE : No error.
NBioAPI.Error.NSEARCH_INIT_FAIL : Engine not initialized.
NBioAPI.Error.NSEARCH_LOAD_DB : DB file not loaded.

ClearDB

public System.UInt32 ClearDB ( );

Descriptions
This function is to delete all template data from the fingerprint DB in memory.

Parameters
N/A.

Return Values
NBioAPI.Error.NONE : No error.
NBioAPI.Error.NSEARCH_INIT_FAIL : Engine not initialized.

GetDataCount

public System.UInt32 GetDataCount (out System.UInt32 DataCount);

Descriptions
This function is to retrieve the count of template data in the fingerprint DB.

Parameters
DataCount
The count of template data stored in the fingerprint DB.

Return Values
NBioAPI.Error.NONE : No error.
NBioAPI.Error.NSEARCH_INIT_FAIL : Engine not initialized.

CheckDataExist

public System.UInt32 CheckDataExist (NITGEN.SDK.NBioBSP.NBioAPI.NSearch.FP_INFO FpInfo,
out System.Boolean Exist);

Descriptions
This function is to check if a specific template data exists in the fingerprint DB.

Parameters
FpInfo
A object to template information.

Exist
A object to a Boolean that receives the flag of existence.

Return Values
NBioAPI.Error.NONE : No error.
NBioAPI.Error.NSEARCH_INIT_FAIL : Engine not initialized.

ImportIndexSearchDB

public System.UInt32 ImportIndexSearchDB (System.String szFilepath);

Descriptions
This function is to load the fingerprint DB file(IndexSearch) into memory.

Parameters
szFilepath : Location and file name to load a DB file.

Return Values
NBioAPI.Error.NONE : No error.
NBioAPI.Error.NSEARCH_INIT_FAIL : Engine not initialized.
NBioAPI.Error.NSEARCH_LOAD_DB : DB file not loaded.