

# Library Release Notes

Integration of StrokeSENS 1.4 to  
GEHC FastStroke

NVI Library version 1.4 (Build  
19)

September 2022

## Intended Use

StrokeSENS is a decision-aid software package to be used by clinicians to perform image processing, analysis, viewing and communication of computed tomography (CT) scans of the brain in patients with suspected acute stroke. Data and images are acquired through DICOM-compliant imaging devices prior to processing and analysis in StrokeSENS.

The StrokeSENS software provides analysis capabilities for imaging datasets acquired with standard CT imaging and contrast enhanced CT Angiography (CTA) modalities. Analysis of non-contrast CT images includes assessment of regions with suspected acute ischemic tissue. Analysis of contrast-enhanced CT images includes automated detection of anterior circulation Large Vessel Occlusion (LVO).

In the case of a suspected anterior circulation LVO, the system will send a notification to a pre-configured destination(s) (members of the acute stroke team), notifying them of the existence of a suspected LVO that requires review. The notification system is intended to be used in parallel to the standard of care workflow to notify clinicians of the existence of the case earlier than they may have been notified as part of the standard of care workflow. Images are available for viewing on a mobile device and on a standard radiology workstation. Images that are previewed on a mobile device are for informational purposes only and are not intended for diagnostic use beyond notification.

## Device Description

Components of the finished integrated medical device include:

- The StrokeSENS LVO Processing Engine
- The StrokeSENS ASPECTS Processing Engine
- A Compatible Radiological Software Platform (ie. GEHC FastStroke)

The **StrokeSENS LVO** Processing Engine is a software-only device designed for operation with a compatible radiological software platform. The platform will:

1. Provide the CTA images used as input to the Processing Engine
2. Receive as output the indication whether an LVO was detected by the Processing Engine
3. Provide the necessary technological components for presenting the LVO notification to the clinician user (ie. email and user interface update)

The **StrokeSENS ASPECTS** Processing Engine is a software-only device designed for operation with a compatible radiological software platform. The platform will:

1. Provide the NCCT images used as input to the Processing Engine
2. Receive as output the results of the ASPECTS Processing Engine
  1. Regional ASPECTS score
  2. Affected Hemisphere
  3. Anatomical Mask
3. Provide the necessary technological components for presenting the ASPECTS results to the end-user

The Compatible Radiological Software Platform (GE FastStroke) is responsible for providing the CT image inputs. Based on the type of incoming DICOM data, the Processing Engine(s) is responsible to determine if the data is valid and suitable for processing and analysis.

**Resolved Issues**

Issue key	Summary
NV-1537	Failed Content Test in LVO 1.2
NV-2348	Remove unused dependencies from OpenCV used in the ASPECTS lib

**Known Issues**

Issue key	Summary
NV-1589	Windows and Linux versions of 1.2.GE ASPECTS registration library produce different ASPECTS region masks

**In the Build Package**

- NviLib
  - Library interface C++ headers
  - libASPECTS.so.1.2.3
  - LibLVO.so.1.4.0
  - Libmlc.so.1.13.5
  - LibNVIRegistration.so.1.0.0
  - libnvi\_utils\_lib.so.1.1.0
  - Test application
- NviLibTest
  - Source code of library test application
- Dockerfile
- Readme

**External Libraries – Copyright and Licensing Requirements**

Library name	version	Licensing agreement	Download link
Tensorflow	1.13.2	Apache License 2.0	<a href="https://www.tensorflow.org/">https://www.tensorflow.org/</a>
Advanced Normalization Tools (ANTs)	2.3.4	<a href="https://github.com/ANTsX/ANTs/blob/master/COPYING.txt">https://github.com/ANTsX/ANTs/blob/master/COPYING.txt</a>	<a href="https://github.com/ANTsX/ANTs/tree/v2.3.4">https://github.com/ANTsX/ANTs/tree/v2.3.4</a>
Insight Toolkit (ITK)	5.1.0	<a href="https://github.com/InsightSoftwareConsortium/ITK/blob/master/LICENSE">https://github.com/InsightSoftwareConsortium/ITK/blob/master/LICENSE</a>	<a href="https://github.com/InsightSoftwareConsortium/ITK">https://github.com/InsightSoftwareConsortium/ITK</a>
Open Source Computer Vision (OpenCV)	4.5.5	<a href="https://github.com/opencv/opencv/blob/4.x/LICENSE">https://github.com/opencv/opencv/blob/4.x/LICENSE</a>	<a href="https://github.com/opencv/opencv">https://github.com/opencv/opencv</a>
Dcm2niix	1.0.20171215	<a href="https://github.com/rordenlab/dcm2niix/blob/master/license.txt">https://github.com/rordenlab/dcm2niix/blob/master/license.txt</a>	<a href="https://github.com/rordenlab/dcm2niix">https://github.com/rordenlab/dcm2niix</a>
Simple ITK	2.0.2	<a href="https://github.com/SimpleITK/SimpleITK/blob/master/LICENSE">https://github.com/SimpleITK/SimpleITK/blob/master/LICENSE</a>	<a href="https://github.com/SimpleITK/SimpleITK">https://github.com/SimpleITK/SimpleITK</a>

## **Support**

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