

# DENSO Robot Imaging Library Quick Tour

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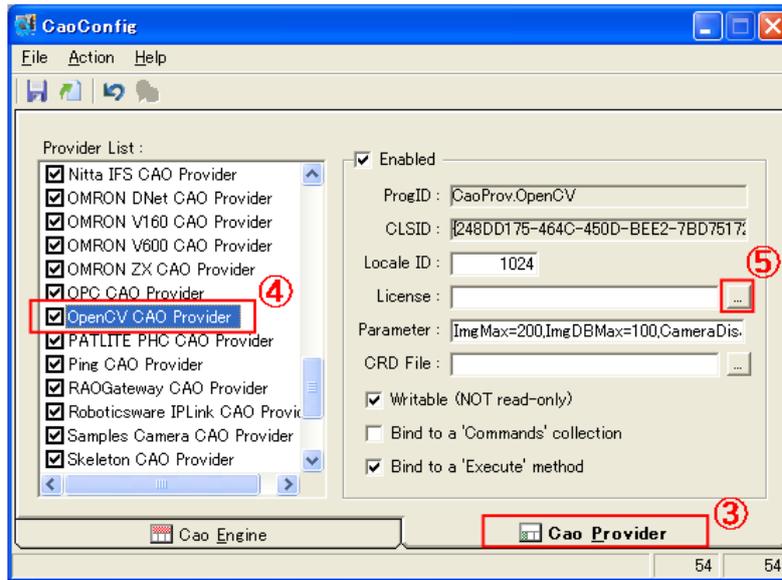
## 1 Camera installation

DENSO Robot Imaging Library supports various types of commercial PC cameras with standard interface (USB / IEEE1394 / Ethernet / etc.) As a first step, please setup camera in the following procedure.

1. Install camera to PC. For details of camera installation, please refer to the manuals for the camera.
2. Confirm the camera operation with DirectShow based sample programs (e.g. "AmCap.exe") attached with the camera. (Note) DENSO Robot Imaging Library depends on DirectShow library. If the DirectShow based sample program does not work, DENSO Robot Imaging Library also doesn't work with the camera.

## 2 DENSO Robot Imaging Library Installation

1. Install ORiN2 SDK if the software is not installed yet.
2. From start menu, locate [ORiN2]→[CAO]→[CaoConfig] and start the program.
3. Select [Cao Provider] tab.
4. Select [OpenCV CAO Provider] from Provider List.
5. Click the button next to the License text box.



- Input license key number. If you haven't purchased the software license, you may use the following evaluation license key (valid for three months.)

**CVG3-MZPB-7W2G-L43Q**

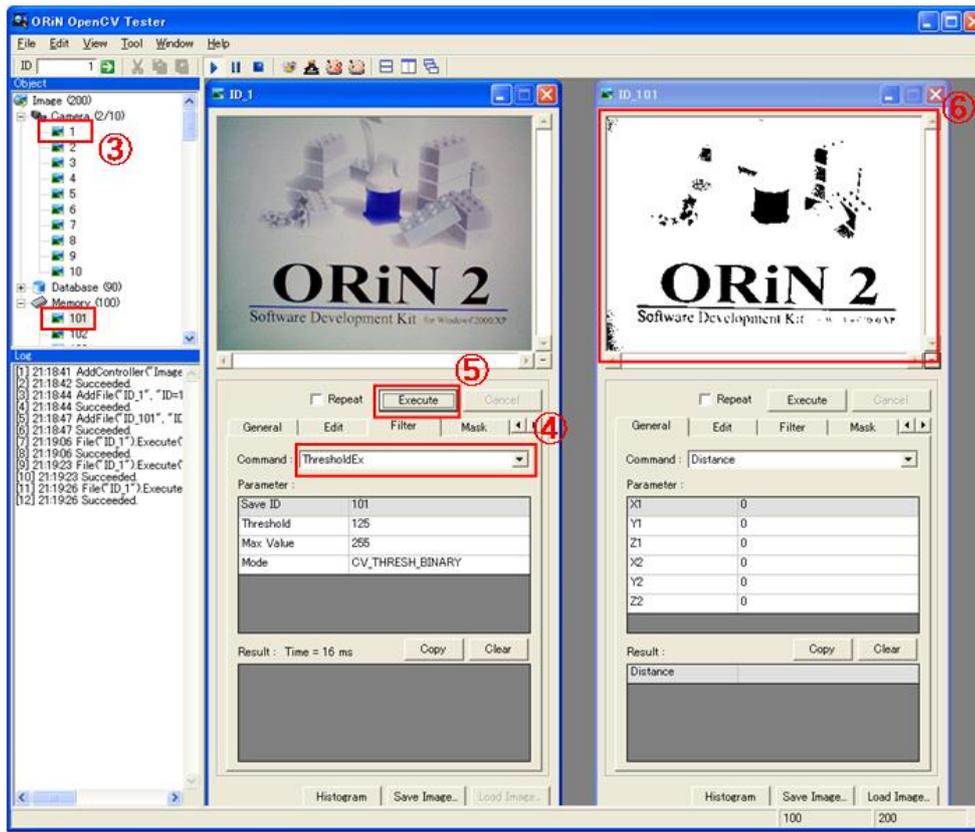
For other details, please refer to “OpenCV provider user’s guide.”

### 3 Operation test with OcvTester

Now we check the DENSO Robot Imaging Library operation with test tool “OcvTester.” Although the following procedure only explains a simple example of binarization, the tool supports all DENSO Robot Imaging Library operations. In addition, all image processing operations available in the test tool can be realized in user developed ORiN applications, because OcvTester itself is one of the DENSO Robot Imaging Library applications.

- Connect a camera to PC.
- Start `ORiN2\CAO\ProviderLib\OpenCV\Bin\OcvTester.exe`
- Locate “1” and “101” in the object tree, and double-click them.<sup>1</sup>
- Click [Filter] tab of ID\_1, and select “ThresholdEx” from combo box.
- Click [Execute] button in ID\_1 to start execution.
- Confirm that ID\_101 screen shows binarized ID\_1 image.

<sup>1</sup> Object tree has three types of memory area, i.e. camera image, nonvolatile database area, and volatile memory area. For details, please refer to “OpenCV provider user’s guide”



## 4 Program sample

DENSO Robot Imaging Library programs can be developed with various programming languages (C/C++, VB, etc.) The easiest way is to use CaoScript, a VB Script based scripting language. CaoScript is included in ORiN2 SDK. Section 4.1 explains CaoScript sample program. For other samples, refer to section 4.2.

### 4.1. CaoScript sample program

This sample program is to detect target position (target image is stored in ID101), and move DENSO robot to the detected position.

```
' Create CAO object
Set rc = Cao.AddController("rc", "CaoProv.DENSO.NetwoRC", "", "Conn=eth:192.168.0.1")
Set robo = rc.AddRobot("vp")
Set vis = Cao.AddController("cv", "CaoProv.OpenCV", "", "")
Set rawImg = vis.AddFile("cam1", "ID=1")
Set tmpImg = vis.AddFile("mem1", "ID=101")
' Search and trace target by using pattern matching
OldX = -1: OldY = -1
Do
  ' Calculate threshold level by discriminant analysis method
  iT = rawImg.AutoThreshDiscrim(rawImg.CalcHistEx(255))
  ' Binarization & B/W inversion(1)
```

```
rawImg.ThresholdEx 101, iT, 255, 1
' Shape matching
res = tmpImg.MatchShapes2(11, 2, 0.2)
' Calculate position shift length and move robot
If (OldX <> -1) Then
    v = "V(" & (OldX - res(0)) & "," & (OldY - res(1)) & ",0)"
    robo.Draw 1, v, "next"
End If
OldX = res(0): OldY = res(1)
Loop
```