Installing DL Streamer on Windows through Docker and running the Face Detection and Classification model

This installation guide provides instructions on how to begin working with the open source version of GStreamer Video Analytics (GVA) plugin or DL Streamer, which is a part of the Intel® Distribution of OpenVINO™ Toolkit.

One can build pipelines using various and more than one GStreamer elements. There are options to run the inference operations such as detection, classification, tracking. Also, there are options for the displaying the results using various output inference such as either storing the results in a file or publishing the results through message brokers such as MQTT or Kafka.

Note: DL Streamer is not directly supported on Windows. DL Streamer can be run using Docker for Windows.

Following are the steps to run DL Streamer on Windows:

Step 1: Install Docker

Download and Install Docker for Windows using the instructions provided at https://docs.docker.com/docker-for-windows/install/

Step 2: Install Moba XTerm

This is required to display the output of the DL Streamer. Install the MobaXterm Home Edition (Installer Edition) from https://mobaxterm.mobatek.net/download-home-edition.html

Start the XServer:
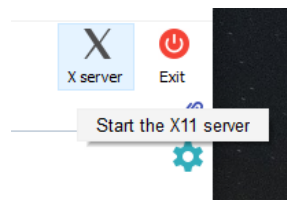
Step 3: Start docker in the Windows PowerShell and pull the openvino image from dockerhub using the following command:

Cmd 1: docker pull openvino/ubuntu18_data_dev

Step 4: Run the openvino image in docker using following command:

Cmd 2: docker run -it --rm -e https_proxy -e http_proxy --network=host --entrypoint /bin/bash --name dlstreamer_test --privileged --user root openvino/ubuntu18_data_dev

Step 5: Then set the display settings. We export the settings. We do this using the following commands:

Cmd 3: export DISPLAY=192.168.0.49:0.0

Cmd 4: export no_proxy=192.168.0.49

Step 6: We next test the pipeline using the following command:

Cmd 5: gst-launch-1.0 videotestsrc ! ximagesink
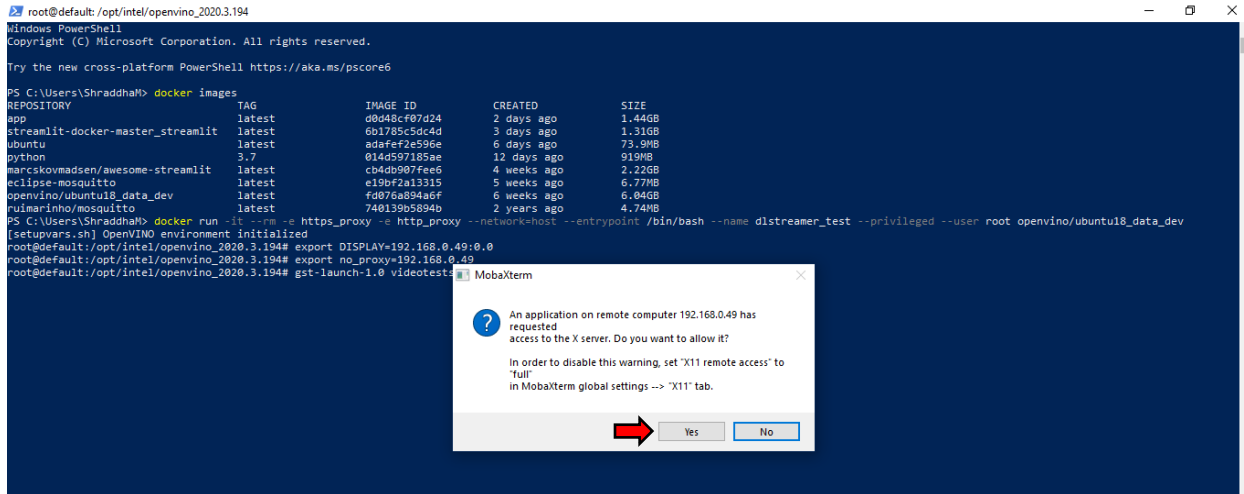
The above command gives us the following output:
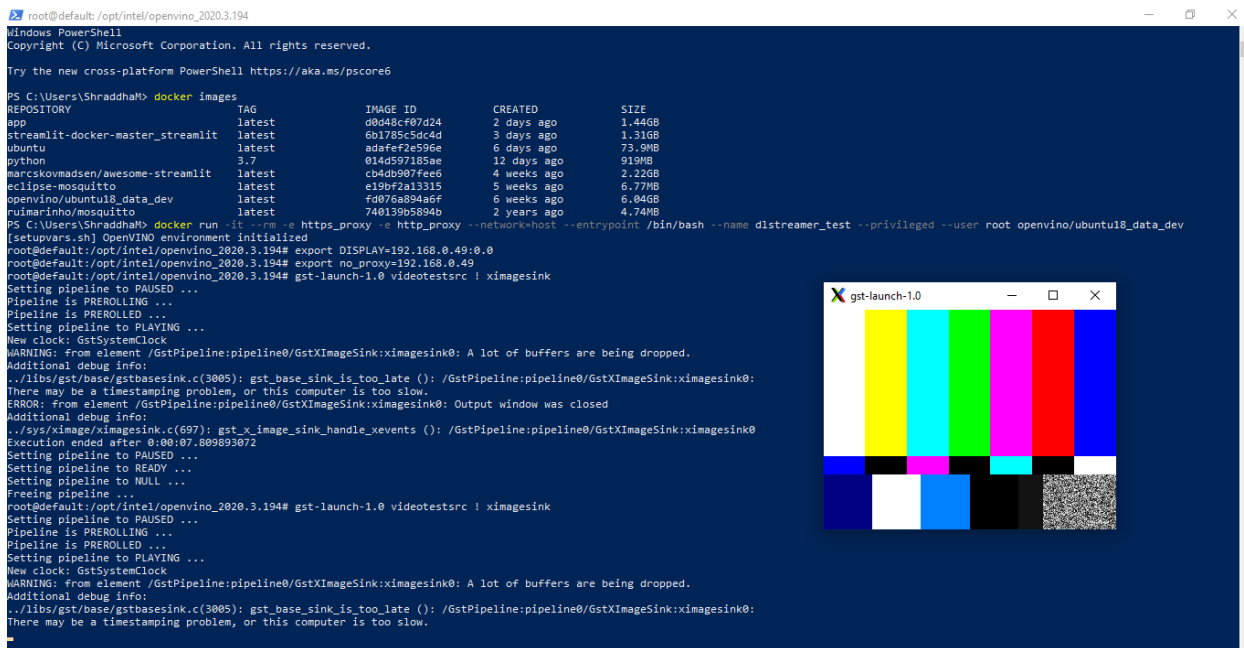
The above output verifies that we have connected to the display properly. To get the desired output, we need to edit the face detection sample to use *ximagesink* instead of *xvimagesink*. To do this we will first install our favorite editor.

Step 7: Installing the editor using the following commands:

Cmd 6: apt-get update

```
root@default: /opt/intel/openvino_2020.3.194
root@default:/opt/intel/openvino_2020.3.194# apt-get update
Get:1 http://security.ubuntu.com/ubuntu bionic-security InRelease [88.7 kB]
Get:2 http://archive.canonical.com/ubuntu bionic InRelease [10.2 kB]
Get:3 http://archive.ubuntu.com/ubuntu bionic InRelease [242 kB]
Get:4 http://archive.ubuntu.com/ubuntu bionic-updates InRelease [88.7 kB]
Get:5 http://security.ubuntu.com/ubuntu bionic-security/multiverse Sources [3234 B]
Get:6 http://security.ubuntu.com/ubuntu bionic-security/main Sources [203 kB]
Get:7 http://archive.ubuntu.com/ubuntu bionic-backports InRelease [74.6 kB]
Get:8 http://security.ubuntu.com/ubuntu bionic-security/universe Sources [219 kB]
Get:9 http://security.ubuntu.com/ubuntu bionic-security/restricted Sources [6943 B]
Get:10 http://security.ubuntu.com/ubuntu bionic-security/restricted amd64 Packages [89.0 kB]
Get:11 http://security.ubuntu.com/ubuntu bionic-security/multiverse amd64 Packages [9282 B]
Get:12 http://security.ubuntu.com/ubuntu bionic-security/main amd64 Packages [1003 kB]
Get:13 http://archive.canonical.com/ubuntu bionic/partner Sources [1903 B]
Get:14 http://security.ubuntu.com/ubuntu bionic-security/universe amd64 Packages [869 kB]
Get:15 http://archive.ubuntu.com/ubuntu bionic/universe Sources [11.5 MB]
Get:16 http://archive.ubuntu.com/ubuntu bionic/main Sources [1063 kB]
Get:17 http://archive.ubuntu.com/ubuntu bionic/multiverse Sources [216 kB]
Get:18 http://archive.ubuntu.com/ubuntu bionic/restricted Sources [5823 B]
Get:19 http://archive.ubuntu.com/ubuntu bionic/main amd64 Packages [1344 kB]
Get:20 http://archive.ubuntu.com/ubuntu bionic/multiverse amd64 Packages [186 kB]
Get:21 http://archive.ubuntu.com/ubuntu bionic/universe amd64 Packages [11.3 MB]
Get:22 http://archive.ubuntu.com/ubuntu bionic/restricted amd64 Packages [13.5 kB]
Get:23 http://archive.ubuntu.com/ubuntu bionic-updates/universe Sources [373 kB]
Get:24 http://archive.ubuntu.com/ubuntu bionic-updates/restricted Sources [10.5 kB]
Get:25 http://archive.ubuntu.com/ubuntu bionic-updates/multiverse Sources [6201 B]
Get:26 http://archive.ubuntu.com/ubuntu bionic-updates/main Sources [418 kB]
Get:27 http://archive.ubuntu.com/ubuntu bionic-updates/universe amd64 Packages [1405 kB]
Get:28 http://archive.ubuntu.com/ubuntu bionic-updates/restricted amd64 Packages [103 kB]
Get:29 http://archive.ubuntu.com/ubuntu bionic-updates/multiverse amd64 Packages [13.6 kB]
Get:30 http://archive.ubuntu.com/ubuntu bionic-updates/main amd64 Packages [1303 kB]
Get:31 http://archive.ubuntu.com/ubuntu bionic-backports/universe Sources [3566 B]
Get:32 http://archive.ubuntu.com/ubuntu bionic-backports/main Sources [4301 B]
Get:33 http://archive.ubuntu.com/ubuntu bionic-backports/main amd64 Packages [8286 B]
Get:34 http://archive.ubuntu.com/ubuntu bionic-backports/universe amd64 Packages [8158 B]
Fetched 32.3 MB in 45s (720 kB/s)
Reading package lists... Done
root@default:/opt/intel/openvino_2020.3.194#
```

Cmd 7: apt-get install nano


```
root@default: /opt/intel/openvino_2020.3.194
root@default:/opt/intel/openvino_2020.3.194# apt-get install nano
Reading package lists... Done
Building dependency tree
Reading state information... Done
Suggested packages:
  spell
The following NEW packages will be installed:
  nano
0 upgraded, 1 newly installed, 0 to remove and 58 not upgraded.
Need to get 231 kB of archives.
After this operation, 778 kB of additional disk space will be used.
Get:1 http://archive.ubuntu.com/ubuntu bionic/main amd64 nano amd64 2.9.3-2 [231 kB]
Fetched 231 kB in 1s (311 kB/s)
debconf: delaying package configuration, since apt-utils is not installed
Selecting previously unselected package nano.
(Reading database ... 49303 files and directories currently installed.)
Preparing to unpack .../nano_2.9.3-2_amd64.deb ...
Unpacking nano (2.9.3-2) ...
Setting up nano (2.9.3-2) ...
update-alternatives: using /bin/nano to provide /usr/bin/editor (editor) in auto mode
update-alternatives: warning: skip creation of /usr/share/man/man1/editor.1.gz because associated file /usr/share/man/man1/nano.1.gz (of link group editor) doesn't exist
update-alternatives: using /bin/nano to provide /usr/bin/pico (pico) in auto mode
update-alternatives: warning: skip creation of /usr/share/man/man1/pico.1.gz because associated file /usr/share/man/man1/nano.1.gz (of link group pico) doesn't exist
root@default:/opt/intel/openvino_2020.3.194#
```

Step 8: Next, we change the directory to locate the face detection sample file to be edited.

Cmd 8: cd /opt/intel/openvino/data_processing/dl_streamer/samples/gst_launch/face_detection_and_classification/


```
root@default: /opt/intel/openvino/data_processing/dl_streamer/samples/gst_launch/face_detection_and_classification
root@default:/opt/intel/openvino_2020.3.194# cd /opt/intel/openvino/data_processing/dl_streamer/samples/gst_launch/face_detection_and_classification/
root@default:/opt/intel/openvino/data_processing/dl_streamer/samples/gst_launch/face_detection_and_classification# ls
README.md  face_detection_and_classification.sh  model_proc
root@default:/opt/intel/openvino/data_processing/dl_streamer/samples/gst_launch/face_detection_and_classification#
```

Open the file to be edited using the following command:

Cmd 9: nano face_detection_and_classification.sh


```
root@default: /opt/intel/openvino/data_processing/dl_streamer/samples/gst_launch/face_detection_and_classification
root@default:/opt/intel/openvino_2020.3.194# cd /opt/intel/openvino/data_processing/dl_streamer/samples/gst_launch/face_detection_and_classification/
root@default:/opt/intel/openvino/data_processing/dl_streamer/samples/gst_launch/face_detection_and_classification# ls
README.md  face_detection_and_classification.sh  model_proc
root@default:/opt/intel/openvino/data_processing/dl_streamer/samples/gst_launch/face_detection_and_classification# nano face_detection_and_classification.sh
root@default:/opt/intel/openvino/data_processing/dl_streamer/samples/gst_launch/face_detection_and_classification#
```

Make changes in the file as mentioned above.

```
  GNU nano 2.9.3                    face_detection_and_classification.sh                    Modified

    exit 1
}

PROC_PATH() {
    echo $(dirname "$0")/model_proc/$1.json
}

DETECT_MODEL_PATH=$(GET_MODEL_PATH $MODEL1)
CLASS_MODEL_PATH=$(GET_MODEL_PATH $MODEL2)
CLASS_MODEL_PATH1=$(GET_MODEL_PATH $MODEL3)
CLASS_MODEL_PATH2=$(GET_MODEL_PATH $MODEL4)

MODEL2_PROC=$(PROC_PATH $MODEL2)
MODEL3_PROC=$(PROC_PATH $MODEL3)
MODEL4_PROC=$(PROC_PATH $MODEL4)

PIPELINE="gst-launch-1.0 $SOURCE_ELEMENT ! \
decodebin ! videoconvert ! video/x-raw,format=BGRx ! \
gvadetect model=$DETECT_MODEL_PATH device=$DEVICE ! queue ! \
gvaclassify model=$CLASS_MODEL_PATH model-proc=$MODEL2_PROC device=$DEVICE ! queue ! \
gvaclassify model=$CLASS_MODEL_PATH1 model-proc=$MODEL3_PROC device=$DEVICE ! queue ! \
gvaclassify model=$CLASS_MODEL_PATH2 model-proc=$MODEL4_PROC device=$DEVICE ! queue ! \
gvawatermark ! videoconvert ! fpsdisplaysink video-sink=ximagesink sync=false"

echo ${PIPELINE}
${PIPELINE}
```

Step 9: We then download the models using the following commands:

Cmd 10: cd /opt/intel/openvino/data_processing/dl_streamer/samples/

Cmd 11: /opt/intel/openvino/data_processing/dl_streamer/samples/download_models.sh

<u>Step 10:</u> Now, we will run the face detection and classification pipeline, using the following command:

Cmd 12: cd /opt/intel/openvino/data_processing/dl_streamer/samples/gst_launch/face_detection_and_classification/

Cmd 13: /opt/intel/openvino/data_processing/dl_streamer/samples/gst_launch/face_detection_and_classification/face_detection_and_classification.sh

Following is the screenshot of how the output looks like:

References:

[1] https://docs.docker.com/docker-for-windows/install/

[2] https://github.com/opencv/gst-video-analytics

[3] https://github.com/opencv/gst-video-analytics/issues/75

[4] https://mobaxterm.mobatek.net/download-home-edition.html