CNStream Docker Images

Build docker images for CNStream.

Directory tree

```
.
├── build-cnstream-image.sh
├── Dockerfile.16.04
├── load-image-cnstream.sh
├── rm-all-docker-container.sh
└── run-container-cnstream.sh
```

Clone

```
git clone https://github.com/CambriconKnight/cnstream-docker-image.git
```

```
cam@cam-3630:/data/github$ git clone https://github.com/CambriconKnight/cnstream-docker-
Cloning into 'cnstream-docker-image'...
remote: Enumerating objects: 14, done.
remote: Counting objects: 100% (14/14), done.
remote: Compressing objects: 100% (12/12), done.
remote: Total 14 (delta 3), reused 13 (delta 2), pack-reused 0
Unpacking objects: 100% (14/14), done.
Checking connectivity... done.
cam@cam-3630:/data/github$ cd cnstream-docker-image
cam@cam-3630:/data/github/cnstream-docker-image$ ls
build-cnstream-image.sh  Dockerfile.16.04  load-image-cnstream.sh  README.md  rm-all-doc
cam@cam-3630:/data/github/cnstream-docker-image$
```

Build

```
sudo ./build-cnstream-image.sh
```

```
cam@cam-3630:/data/github/cnstream-docker-image$ sudo ./build-cnstream-image.sh
Cloning into 'cnstream'...
remote: Enumerating objects: 1005, done.
remote: Counting objects: 100% (1005/1005), done.
remote: Compressing objects: 100% (684/684), done.
remote: Total 5920 (delta 422), reused 710 (delta 292), pack-reused 4915
Receiving objects: 100% (5920/5920), 192.19 MiB | 3.02 MiB/s, done.
Resolving deltas: 100% (3113/3113), done.
Checking connectivity... done.
File(neuware-mlu270-1.5.0-1_Ubuntu16.04_amd64.deb): Not exist!
Copy your neuware package(neuware-mlu270-1.5.0-1_Ubuntu16.04_amd64.deb) into the directo
eg:cp -v /data/ftp/v1.5.0/neuware/neuware-mlu270-1.5.0-1_Ubuntu16.04_amd64.deb ./cnstrea
cam@cam-3630:/data/github/cnstream-docker-image$ cp -v /data/ftp/v1.5.0/neuware/neuware-
'/data/ftp/v1.5.0/neuware/neuware-mlu270-1.5.0-1_Ubuntu16.04_amd64.deb' -> './cnstream/r
cam@cam-3630:/data/github/cnstream-docker-image$ ./build-cnstream-image.sh
Directory(cnstream): Exists!
File(neuware-mlu270-1.5.0-1_Ubuntu16.04_amd64.deb): Exists!
====================== build image ======================
Sending build context to Docker daemon  159.3MB
Step 1/11 : FROM ubuntu:16.04
 ---> c522ac0d6194
......
......
......
Step 11/11 : WORKDIR /root/CNStream/samples/demo
 ---> Running in 3d594d45f6b8
Removing intermediate container 3d594d45f6b8
 ---> 080fdb4ca3c3
Successfully built 080fdb4ca3c3
Successfully tagged ubuntu16.04_cnstream:v1.5.0
====================== save image ======================
-rw------- 1 cam cam 1351632896 12月 15 22:03 ubuntu16.04_cnstream-v1.5.0.tar.gz
cam@cam-3630:/data/github/cnstream-docker-image$
```

Load

```
#加载Docker镜像
./load-image-cnstream.sh
```

Run

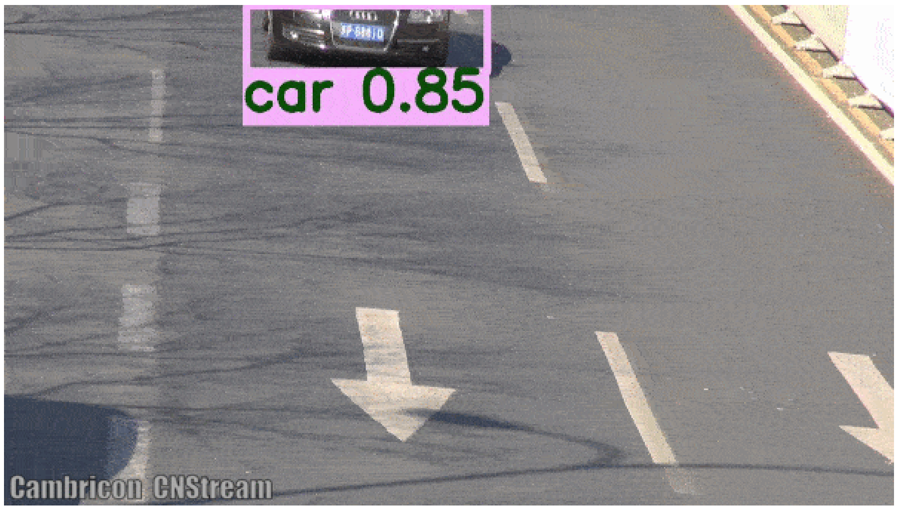
```
#启动Docker容器
./run-container-cnstream.sh
```

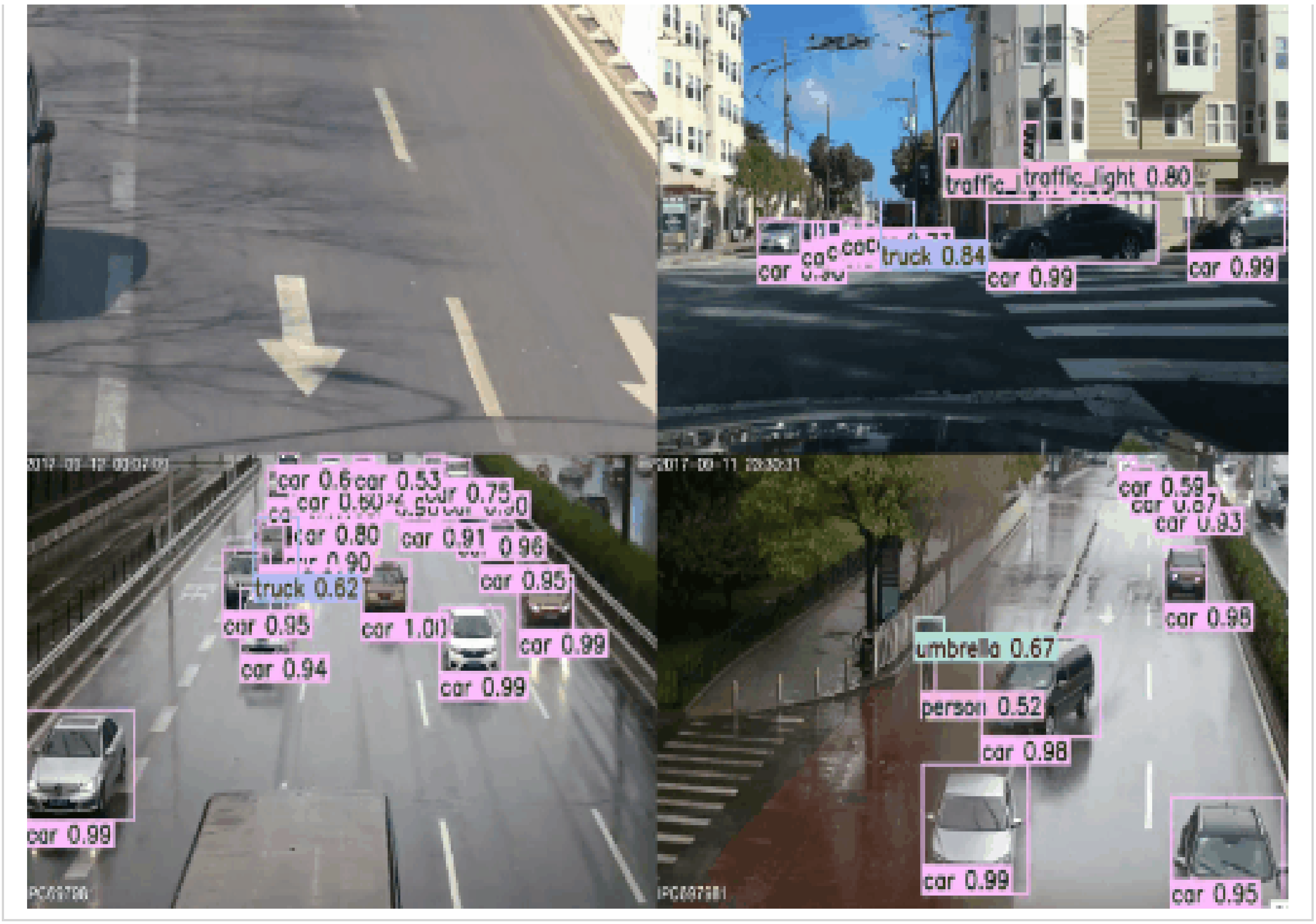
Test

YOLOv3

```
#硬件平台：MLU270、MLU220-M.2
#软件环境：Docker（ubuntu16.04_cnstream-v1.5.0.tar.gz）
#运行实例：基于CNStream的YOLOv3运行实例
#业务流程：读取视频文件 --> MLU硬件解码 --> MLU硬件推理 --> 叠加OSD信息 --> RTSP推流输出
#所用插件：DataSource; Inferencer; Osd; RtspSink
#离线模型：http://video.cambricon.com/models/MLU270/yolov3/yolov3_offline_u4_v1.3.0.cambr
#视频文件：/root/CNStream/data/videos/cars.mp4
#启动脚本：/root/CNStream/samples/demo/detection/mlu270/run_yolov3_mlu270.sh
#         /root/CNStream/samples/demo/detection/mlu220/run_yolov3_mlu220.sh
#配置文件：/root/CNStream/samples/demo/detection/mlu270/yolov3_mlu270_config.json
#         /root/CNStream/samples/demo/detection/mlu220/yolov3_mlu220_config.json
#结果演示：执行run_yolov3_mlu270.sh后，会把RTSP推流地址写入到本地文件RTSP_url_names.txt中。
#         /root/CNStream/samples/demo/detection/mlu270/RTSP_url_names.txt
```

推理结果摘选：



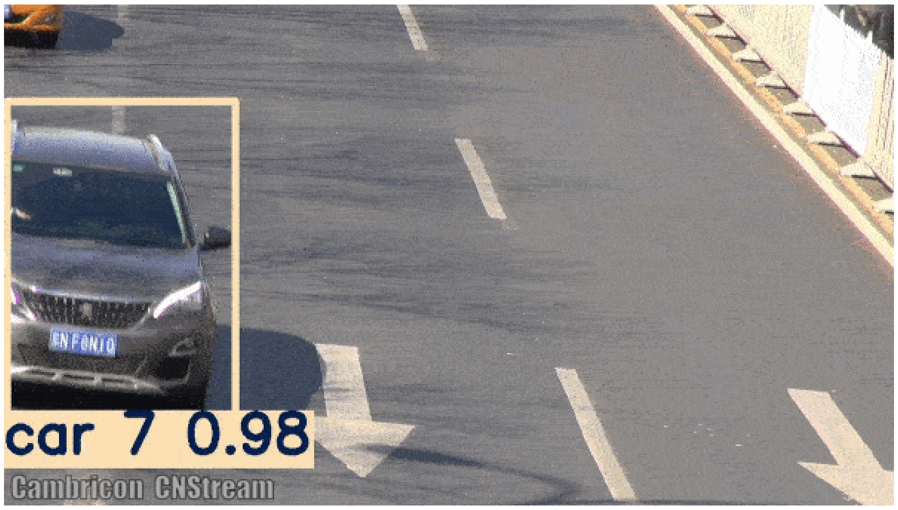

traffic_light 0.80
truck 0.84
car 0.99
car 0.99
car 0.6
car 0.53
car 0.75
car 0.80
car 0.91
car 0.90
truck 0.62
car 0.96
car 0.95
car 1.00
car 0.95
car 0.99
car 0.94
car 0.99
car 0.99
car 0.59
car 0.67
car 0.93
car 0.98
umbrella 0.67
person 0.52
car 0.98
car 0.99
car 0.95

```
root@cam-3630:~# cd /root/CNStream/samples/demo/detection/mlu270/
root@cam-3630:~/CNStream/samples/demo/detection/mlu270# ./run_yolov3_mlu270.sh
--2020-12-15 14:24:42--  http://video.cambricon.com/models/MLU270/yolov3/yolov3_offline_
Resolving video.cambricon.com (video.cambricon.com)... 182.92.212.157
Connecting to video.cambricon.com (video.cambricon.com)|182.92.212.157|:80... connected.
HTTP request sent, awaiting response... 200 OK
Length: 98652692 (94M) [text/plain]
Saving to: 'yolov3_offline_u4_v1.3.0.cambricon'
yolov3_offline_u4_v1.3.0.cambricon                100%[==================================
2020-12-15 14:25:28 (2.07 MB/s) - 'yolov3_offline_u4_v1.3.0.cambricon' saved [98652692/9
--2020-12-15 14:25:28--  http://video.cambricon.com/models/MLU270/yolov3/label_map_coco.

......
......
......

%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
===================================[ osd Performance ]===================================
[stream id] stream_0  -- [latency] avg:    4.3ms, min:    0.9ms, max:   33.6ms, [frame c
[stream id] stream_1  -- [latency] avg:    4.5ms, min:    0.7ms, max:   29.7ms, [frame c
--------------------------------------------------------
Throughput over the last 2s
Total :         -- [frame count]: 16, [processing time(s)]:   0.038891, [fps]:  411.5
--------------------------------------------------------
Average throughput over the process
Total :         -- [frame count]: 3568, [processing time(s)]:   7.968857, [fps]:  447.8
===================================[ Pipeline Performance ]==============================
End node of pipeline: rtsp_sink
[stream id] stream_0  -- [latency] avg:  271.8ms, min:   84.1ms, max:  510.7ms, [frame c
[stream id] stream_1  -- [latency] avg:  271.1ms, min:   82.1ms, max:  527.8ms, [frame c
--------------------------------------------------------
Throughput over the last 2s
[stream id] stream_0  -- [frame count]: 9, [processing time(s)]:   0.246877, [fps]:   36
[stream id] stream_1  -- [frame count]: 7, [processing time(s)]:   0.289882, [fps]:   24
(* Note: Performance info of pipeline is slightly delayed compared to that of each strea
Pipeline :      -- [frame count]: 17, [processing time(s)]:   0.289882, [fps]:   58.7
--------------------------------------------------------
Average throughput over the process
[stream id] stream_0  -- [frame count]: 1784, [processing time(s)]:  59.782535, [fps]:
[stream id] stream_1  -- [frame count]: 1784, [processing time(s)]:  59.804728, [fps]:
(* Note: Performance info of pipeline is slightly delayed compared to that of each strea
Pipeline :      -- [frame count]: 3568, [processing time(s)]:  59.813077, [fps]:   59.7

Total : 59.700000
CNSTREAM CORE I1215 14:26:30.512209 27883] [MyPipeline] Stop
WARNING: Logging before InitCNStreamLogging() is written to STDERR
CNSTREAM CORE I1215 14:26:30.512708 27887] [MyPipeline] stop updating stream message
I1215 14:26:30.513303 27883 mlu_context.cpp:82] Cambricon runtime destroy
root@cam-3630:~/CNStream/samples/demo/detection/mlu270#
```

SSD

```
#硬件平台：MLU270
#软件环境：Docker（ubuntu16.04_cnstream-v1.5.0.tar.gz）
#运行实例：基于CNStream的SSD运行实例
#业务流程：读取视频文件 --> MLU硬件解码 --> MLU硬件推理 --> 叠加OSD信息 --> 本地显示（带有GUI界面
#所用插件：DataSource; Inferencer; Osd; Displayer
#离线模型：http://video.cambricon.com/models/MLU270/Primary_Detector/ssd/resnet34_ssd.cam
#视频文件：/root/CNStream/data/videos/cars.mp4
#启动脚本：/root/CNStream/samples/demo/run.sh
#配置文件：/root/CNStream/samples/demo/detection_config.json
#结果演示：执行run.sh后，会把检测的实时画面显示到屏幕上。
#注意事项：1.需在GUI终端运行； 2.需设置-Dbuild_display=ON重新编译CNStream；
#         3.需修改detection_config.json文件中字段"show"值为"true"；
```

推理结果摘选：



```
#1.请确保在GUI终端运行
cd /root/CNStream/build
#2.设置-Dbuild_display=ON重新编译CNStream
cmake -Dbuild_display=ON ../
cd /root/CNStream/samples/demo
#3.修改detection_config.json文件中字段"show"值为"true"；
vim detection_config.json
#运行实例
./run.sh
```

```
root@cam-3630:~/CNStream/samples/demo# ./run.sh
~/CNStream/data/models/MLU270/Primary_Detector/ssd ~/CNStream/samples/demo
resnet34_ssd.cambricon offline model exists.
label_voc.txt exists.
~/CNStream/samples/demo
/root/CNStream/samples/demo
CNRT: 4.6.0 e158c88
Register object named [PreprocYolov3]
Register object named [PreprocCpu]
Register object named [ObjPreprocCpu]
Register object named [PostprocSsd]
Register object named [PostprocYolov3]
Register object named [PostprocFakeYolov3]
Register object named [PostprocClassification]
Register object named [ObjPostprocClassification]
Register object named [CarFilter]
WARNING: Logging before InitGoogleLogging() is written to STDERR
I1215 15:46:50.022884 23753 demo.cpp:328] CNSTREAM VERSION:v5.3.0
CNSTREAM CORE I1215 15:46:50.023119 23753] Add Module source to pipeline
CNSTREAM CORE I1215 15:46:50.023214 23753] Add Module detector to pipeline
CNSTREAM CORE I1215 15:46:50.023227 23753] Add Module osd to pipeline
CNSTREAM CORE I1215 15:46:50.023239 23753] Add Module displayer to pipeline
CNSTREAM CORE I1215 15:46:50.023257 23753] Link Module osd-->displayer
CNSTREAM CORE I1215 15:46:50.023265 23753] Link Module detector-->osd
CNSTREAM CORE I1215 15:46:50.023269 23753] Link Module source-->detector
CNSTREAM CORE I1215 15:46:50.023288 23753] Directory [perf_database/] exists.
before init
before create window
before create texture
I1215 15:46:50.474404 23753 mlu_context.cpp:99] Cambricon runtime init success.
I1215 15:46:50.500952 23753 model_loader.cpp:191] Load function from offline model succe
$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$
===================================[ displayer Performance ]============================
......
......
......
[stream id] stream_0  -- [frame count]: 1491, [processing time(s)]:  59.740551, [fps]:
[stream id] stream_1  -- [frame count]: 1491, [processing time(s)]:  59.740547, [fps]:

(* Note: Performance info of pipeline is slightly delayed compared to that of each strea
Pipeline :      -- [frame count]: 2982, [processing time(s)]:  59.740566, [fps]:   50.0

Total : 50.000000
CNSTREAM CORE I1215 15:46:16.409847 20398] [MyPipeline] Stop
WARNING: Logging before InitCNStreamLogging() is written to STDERR
CNSTREAM CORE I1215 15:46:16.410425 20402] [MyPipeline] stop updating stream message
I1215 15:46:16.420593 20398 mlu_context.cpp:82] Cambricon runtime destroy
root@cam-3630:~/CNStream/samples/demo#
```