Jetson Nano AI Fundamentals - DLI Getting Started with AI

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Outline

- Jetson Nano AI Fundamentals
- Docker
- Hello Camera
- Thumbs Project

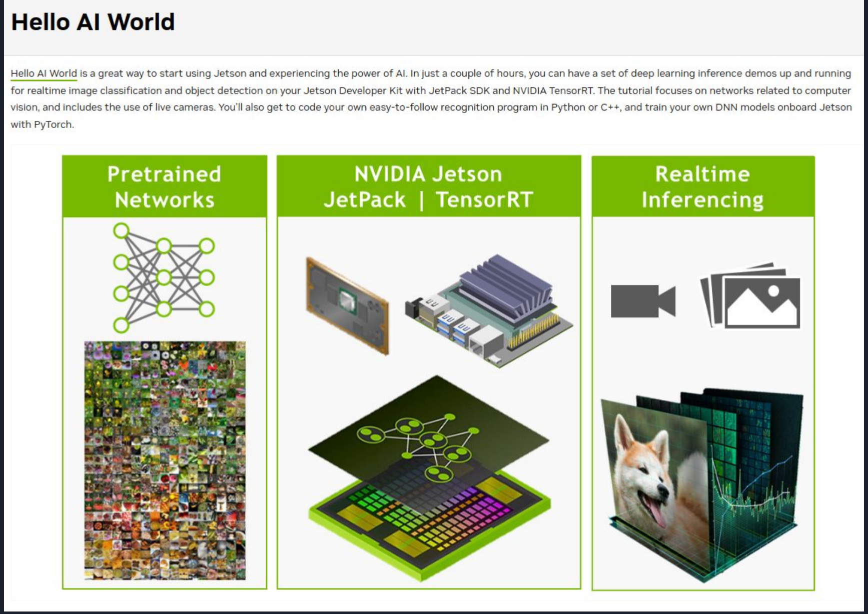
Getting Started

https://developer.nvidia.com/embedded/learn/jetson-ai-certification-programs

- Watch episodes 1-4

Two Days to a Demo

https://developer.nvidia.com/embedded/twodaystoademo#hello_ai_world



Hello AI World

Hello AI World is a great way to start using Jetson and experiencing the power of AI. In just a couple of hours, you can have a set of deep learning inference demos up and running for realtime image classification and object detection on your Jetson Developer Kit with JetPack SDK and NVIDIA TensorRT. The tutorial focuses on networks related to computer vision, and includes the use of live cameras. You'll also get to code your own easy-to-follow recognition program in Python or C++, and train your own DNN models onboard Jetson with PyTorch.

DLI Getting Started with AI on Jetson Nano

https://catalog.ngc.nvidia.com/orgs/nvidia/teams/dli/containers/dli-nano-ai

- The following are required to run this container.
    - NVIDIA Jetson Nano Developer Kit or NVIDIA Jetson Nano 2GB Developer Kit
    - microSD memory card (64GB UHS-I minimum recommended) flashed with the current Jetson Nano Developer Kit SD Card image
    - USB Camera such as Logitech C270 Webcam (or a CSI camera)
    - USB cable (Micro-B to Type-A)
    - Internet connection for Jetson Nano do download this Docker image
    - Compatible Power Supply (must be 5V 4A with 2.1mm DC barrel connector if using the original 4GB Jetson Nano Developer Kit)
    - 2-pin jumper (original 4GB version only)
    - Optional: monitor, keyboard, and mouse

Docker

- Provides some virtualized environment
- Containers
  - create
  - build
  - run
- In order to get rid of sudo prepended to docker commands
  - sudo usermod -aG docker $USER

Running docker container

- Create a directory on Nano

```
mkdir ~/nvdli-data
```

- Download and run the container

```
sudo docker run --runtime nvidia -it --rm --network host \
  --volume ~/nvdli-data:/nvdli-nano/data \
  --device /dev/video0 \
  nvcr.io/nvidia/dli/dli-nano-ai:<tag>
```

Nano 2GB and USB webcam

- Learn your tag

```
cat /etc/nv_tegra_release
```

```
sudo docker run --runtime=nvidia -it --rm --network host --volume ~/nvdli-data:/nvdli-nano/data --device /dev/video0 nvcr.io/nvidia/dli/dli-nano-ai:v2.0.2-r32.7.1
```

Script

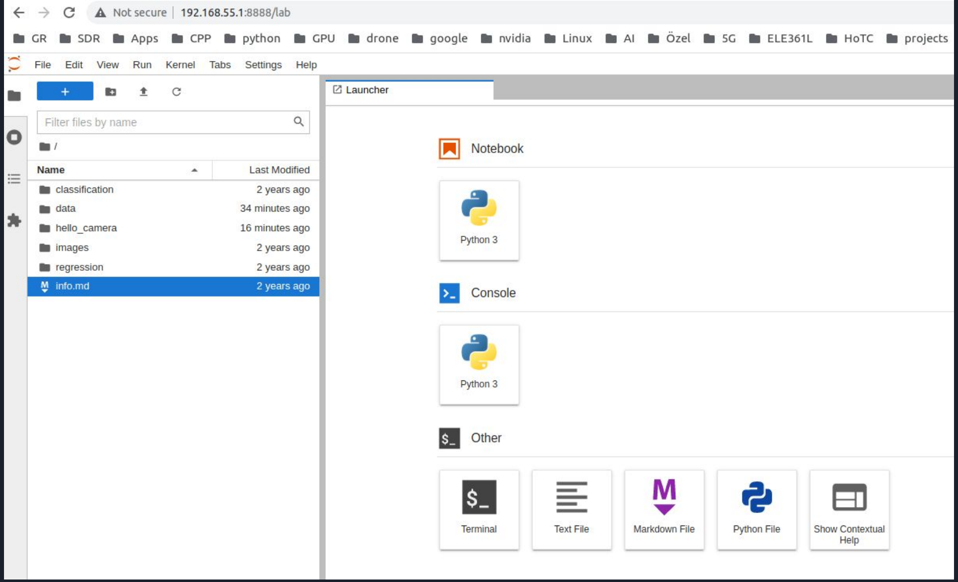
```
# create a reusable script
echo "sudo docker run --runtime nvidia -it --rm --network host \
   --volume ~/nvdli-data:/nvdli-nano/data \
   --device /dev/video0 \
   nvcr.io/nvidia/dli/dli-nano-ai:v2.0.2-r32.7.1" > docker_dli_run.sh
# make the script executable
chmod +x docker_dli_run.sh
# run the script
./docker_dli_run.sh
```

Errors

- If you encounter errors, try …
  - sudo apt install nvidia-docker2
  - sudo apt install nvidia-container

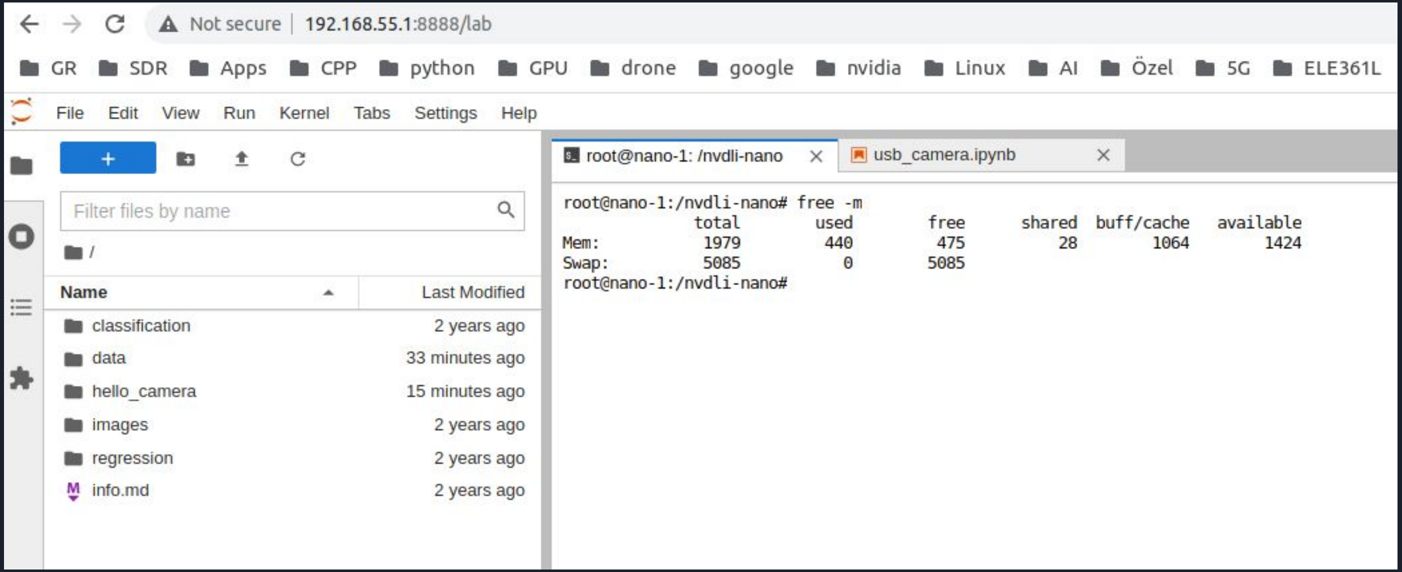
Logging Into The JupyterLab Server

- Open the following link address : 192.168.55.1:8888
- Enter the password: dlinano



Name	Last Modified
classification	2 years ago
data	34 minutes ago
hello_camera	16 minutes ago
images	2 years ago
regression	2 years ago
info.md	2 years ago

Terminal at Jupyter



Name	Last Modified
classification	2 years ago
data	33 minutes ago
hello_camera	15 minutes ago
images	2 years ago
regression	2 years ago
info.md	2 years ago

```
root@nano-1:/nvdli-nano# free -m
              total        used        free      shared  buff/cache   available
Mem:           1979         440         475          28        1064        1424
Swap:          5085           0        5085
root@nano-1:/nvdli-nano#
```

Hello Camera

- Check the camera is working
- Open The Hello Camera Notebook

Classification

- Binary classification
- Thumbs Up/Down Project
  - Collect your own data
  - Train the model
  - Test and update your model