BUILDING THE MICRO SD

The hackster tutorial below has been followed in order to get the HW and the Linux distribution:

https://www.h.ackster.io/AlbertaBeef/ultra96-v2-building-the-foundational-designs-e4315f

As the WIC wifi driwer was not working, the following advice has been followed:

Known build issues

I often get an error during the petalinux build phase, caused by a failure to access packages from various github repositories. If this occurs, re-check your internet connection, and re-start the build as follows:

```
$ cd ~/Avnet_2022_2/petalinux/u96v2_sbc_base_2022_2
$ petalinux-build
```

I usually keep doing this until the build succeeds.

For the Ultra96-V2, I often am not able to build the following openamp-fw-* packages:

- openamp-fw-echo-testd
- openamp-fw-mat-muld
- openamp-fw-rpc-demo

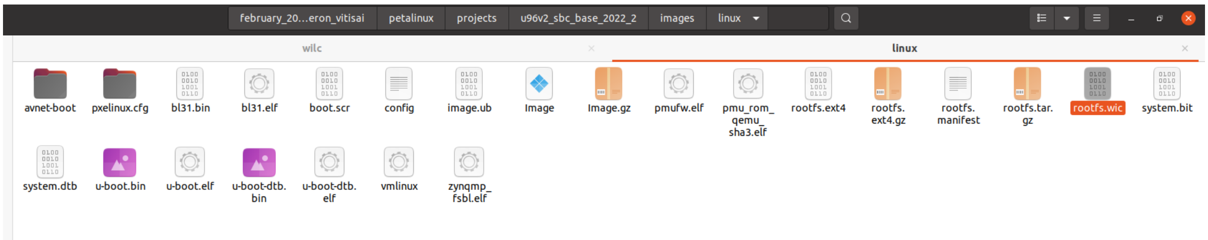
In order to workaround this issue, I simply remove them from the petalinux-image definition. To do this, edit the following file: `~/Avnet_2022_2/petalinux/u96v2_sbc_base_2022_2/roject-spec/meta-avnet/recipes-core/images/petalinux-image-minimal.bbappend`

Remove the "openamp-fw-*" packages from the "IMAGE_INSTALL:append:u96v2-sbc" entry:

```
IMAGE_INSTALL:append:u96v2-sbc = "\
        ...
"
```

And the process has gone smoothly.

In the end, the “WIC” file is in the folder below:



It gets flashed on a micro SD with the following commands:

Give “sudo fdisk –l" to find out what is the micro SD:

```
Disk /dev/sdc: 59.7 GiB, 64088965120 bytes, 125173760 sectors
Disk model: STORAGE DEVICE
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disklabel type: dos
Disk identifier: 0x4e0663ea

Device     Boot   Start     End Sectors  Size Id Type
/dev/sdc1  *       2048 2000895 1998848  976M 83 Linux
/dev/sdc2       2000896 7340031 5339136  2.6G 83 Linux
caccolillo@caccolillo-OMEN-25L-Desktop-GT12-1xxx:~/Documents/february_2025_test_bergeron_vitisai/petalinux/projects/u96v2_sbc_base_2022_2/images$ sudo fdisk -l
```

CREATING A BOOTABLE IMAGE ON A MICRO-SD

Go in the petalinux image folder and create the BOOT.BIN boot file as per instructions below:

10. Change directory into **images/linux** within the lab1 project.

`cd images/linux`

11. Once in the project enter:

`$ petalinux-package --boot --fsbl zynqmp_fsbl.elf --u-boot u-boot.elf --pmufw pmufw.elf --fpga system.bit`

```
training@training-VirtualBox:~/AvnetTTC-u96/MPSoC_PetaLInux/2021.2/Lab1/images/linux$ petalinux-package --boot --fsbl zynqmp_fsbl.elf --u-boot u-boot.elf -
-pmufw pmufw.elf --fpga system.bit
[INFO] Sourcing buildtools
INFO: Getting system flash information...
INFO: File in BOOT BIN: "/home/training/AvnetTTC-u96/MPSoC_PetaLInux/2021.2/Lab1/images/linux/zynqmp_fsbl.elf"
INFO: File in BOOT BIN: "/home/training/AvnetTTC-u96/MPSoC_PetaLInux/2021.2/Lab1/images/linux/pmufw.elf"
INFO: File in BOOT BIN: "/home/training/AvnetTTC-u96/MPSoC_PetaLInux/2021.2/Lab1/images/linux/system.bit"
INFO: File in BOOT BIN: "/home/training/AvnetTTC-u96/MPSoC_PetaLInux/2021.2/Lab1/images/linux/bl31.elf"
INFO: File in BOOT BIN: "/home/training/AvnetTTC-u96/MPSoC_PetaLInux/2021.2/Lab1/images/linux/system.dtb"
INFO: File in BOOT BIN: "/home/training/AvnetTTC-u96/MPSoC_PetaLInux/2021.2/Lab1/images/linux/u-boot.elf"
INFO: Generating zynqmp binary package BOOT.BIN...


****** Xilinx Bootgen v2021.2
  **** Build date : Sep 30 2021-06:08:18
    ** Copyright 1986-2021 Xilinx, Inc. All Rights Reserved.


[INFO]   : Bootimage generated successfully

INFO: Binary is ready.
WARNING: Unable to access the TFTPBOOT folder /tftpboot!!!
WARNING: Skip file copy to TFTPBOOT folder!!!
training@training-VirtualBox:~/AvnetTTC-u96/MPSoC_PetaLInux/2021.2/Lab1/images/linux$
```

Figure 6 Generate BOOT.BIN

Create a bootable micro-SD card as per instructions in the following:

14. Now that the SD card is in the Virtual machine, we can use fdisk and disks to create and format our partitions. Open disks:

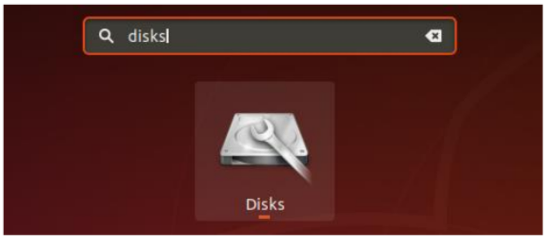


Figure 8 Open Disk Application

15. In disks we can see our SD card:

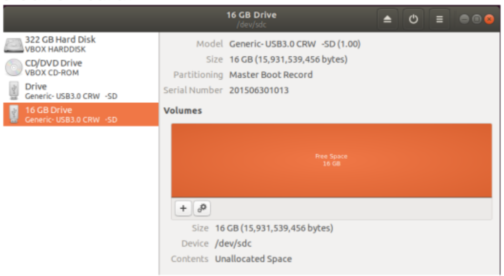


Figure 9 SD card in Disk Application

Note if you already have a partition on the drive, we recommend you delete the partitions before continuing. Simply press the “minus” button (only shows if you have partitions) on the selected partition to delete them. Continue if you have “Free Space”

16. We are going to create the first Partition as FAT32. Simply press the plus button. We recommend that you have at least 1 GB for the boot files and leave the reset for the Linux OS.

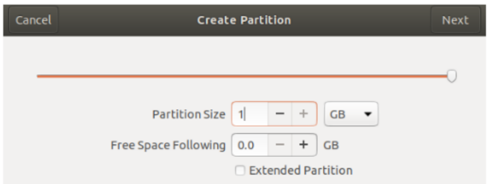


Figure 10 Create new partition 1GB

17. Next add a name for the boot partition. Leave the settings as default and press Create when done.

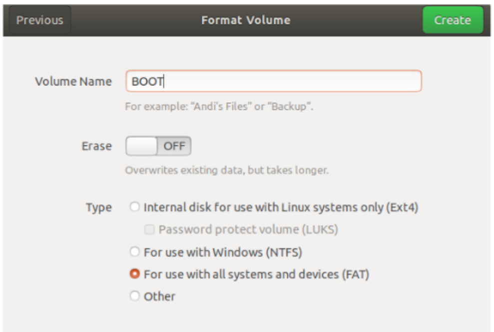


Figure 11 Name the new partition and FAT32 type

18. Now we create the second partition in the same way. Click on the free space and then the plus button.

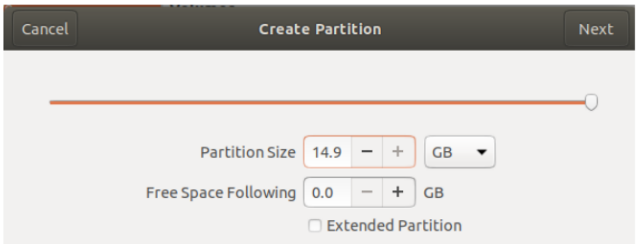


Figure 12 Create second partition with remaining free space

We are going to use the rest of the free space on the SD card for the Linux OS. Click next.

19. Name the Linux File System for the partition and **select the file system type as Ext4** click create once done.

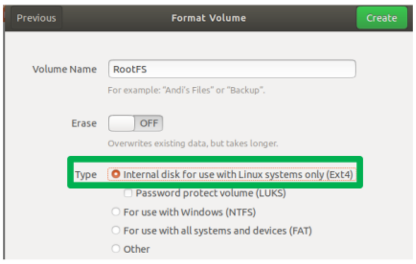


Figure 13 Name the Linux File System and EXT4

20. Open a terminal and enter:

```
sudo fdisk -l
```

This command will show all the drives on the virtual machine. Look for the SD card as we need the device name.

```
Device     Boot   Start      End  Sectors  Size Id Type
/dev/sdc1          2048  1955839  1953792  954M  c W95 FAT32 (LBA)
/dev/sdc2       1955840 31115263 29159424 13.9G 83 Linux
```

Figure 14 Check in fdisk

21. Navigate into the images/Linux folder of our PetaLinux project. In our case

```
cd ~/AvnetTTC/home/training/AvnetTTC-u96/MPSoC_PetaLInux/2021.2/Lab1
```

21. Navigate into the images/Linux folder of our PetaLinux project. In our case

    `cd ~/AvnetTTC/home/training/AvnetTTC-u96/MPSoC_PetaLInux/2021.2/Lab1`

22. Next is to enter the command below. Make sure the correct partition is selected. Our ext4 partition is mounted to /dev/sdc2. This took just under an hour to complete

sudo dd if=images/linux/rootfs.ext4 of=/dev/sdc2 status=progress

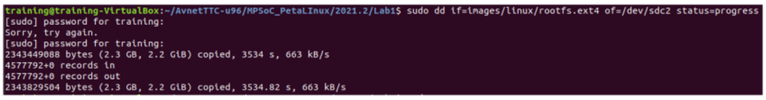


Figure 15 Flash Completed

While we wait for the flashing process to complete, we are going to copy the boot files into the boot partition that we created earlier. The boot files that we need to copy over is the boot.scr, BOOT.BIN and image.ub.

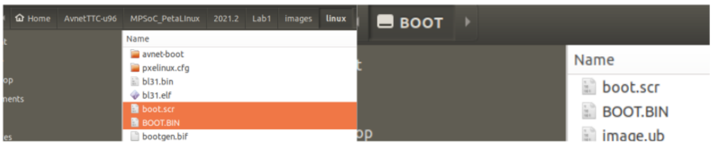


Figure 16 Copy the boot files in the BOOT partition

Insert the micro-SD card and boot as follows:

1. Power down the Ultra96 board by pressing and holding the power down, then change the Boot Mode switch on Ultra96 to 01 for SD Card as shown below.

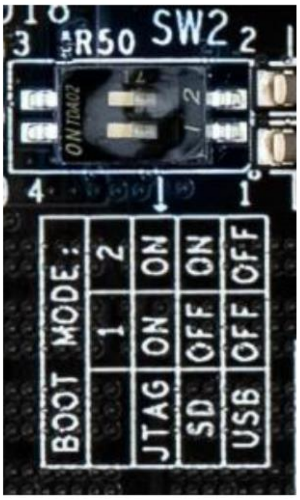


Figure 17 Set switch to SD

2. Plug-in the USB Cable to the USB to JTAG/UART pod

3. Open Terra Term and connect to the serial port at 115200, No Parity and 1 Stop

4. Power on the Ultra96 by pressing the power on button. You should see the u-boot and PetaLinux boot messages scroll in the terminal window.

The port to use for the serial terminal is /dev/ttyUSB1.

COMBINING DESIGNS INTO A SINGLE FILE

In this article is shown how to combine several platforms together by using overlays:

https://www.hackster.io/AlbertaBeef/ultra96-v2-combining-designs-into-a-single-platform-9d2572

It is a solution to reprogram the FPGA with Linux still running:

https://xilinx-wiki.atlassian.net/wiki/spaces/A/pages/18841645/Solution+Zynq+PL+Programming+With+FPGA+Manager

ADDING VITIS AI SUPPORT

In this article is shown how to add support to Vitis AI and to get a DPU working:

https://www.hackster.io/AlbertaBeef/ultra96-v2-adding-support-for-vitis-ai-3-0-704799

And in:

https://www.hackster.io/AlbertaBeef/ultra96-v2-adding-support-for-ros2-8ba68d?auth_token=6d7e7ae101ef33c3b16e9a5aa25a23b4&

Pre-Built SD image

The following link provided a pre-built image for the Ultra96-V2

- http://avnet.me/avnet-u96v2-2022.2-sdimage
  (2023/05/10, md5sum = de17c497334da903790d702a5fae8f51)

A link to a prebuilt image is provided:

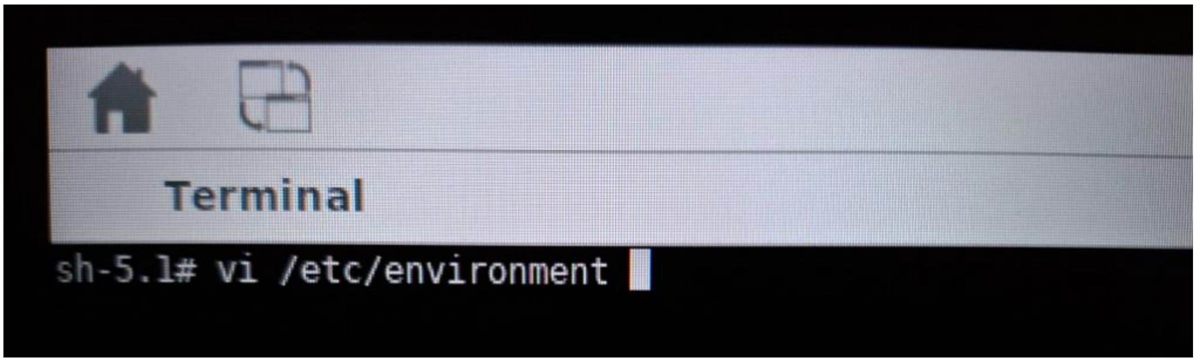
https://avtinc.sharepoint.com/teams/ET-Downloads/Shared%20Documents/Forms/AllItems.aspx?id=%2Fteams%2FET%2DDo

[wnloads%2FShared%20Documents%2Fxtm%5Fteam%2Fbergeron%2FVITIS%2Fvitis%5Fai%5F3%5F0%5Favnet%2Favnet%2Du96v2%5Fsbc%2Dv2022%2E2%2D2023%2D05%2D10%2Ezip&parent=%2Fteams%2FET%2DDownloads%2FShared%20Documents%2Fxtm%5Fteam%2Fbergeron%2FVITIS%2Fvitis%5Fai%5F3%5F0%5Favnet&p=true&ga=1]

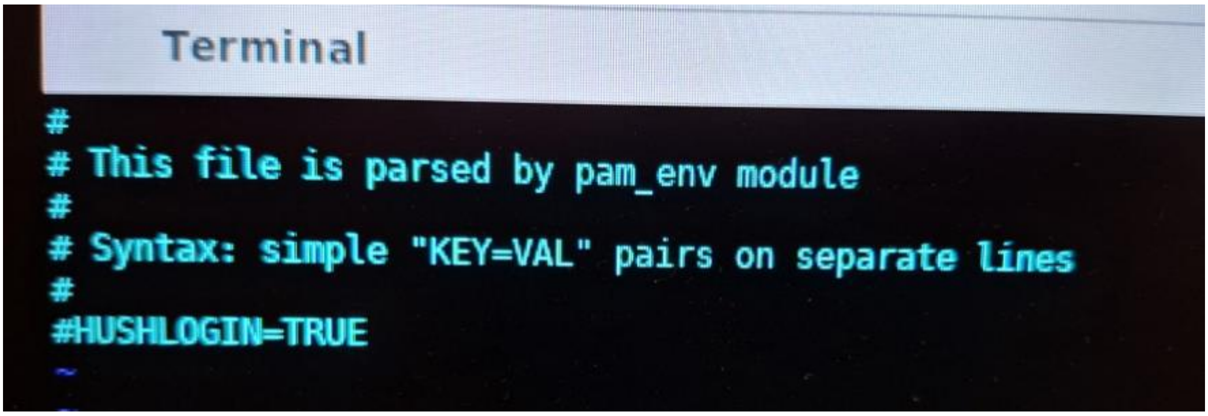
Once downloaded and extracted, it gets written to a MicroSD with Balena Etcher.

When the board boots up with a screen connected and a USB camera, a mouse and a keyboard, xserver (the graphic server) does not start.

To get it working give to the command line:



And use vi to edit the file adding:



The line with hushlogin.

Reboot the board and it will fix the graphics.

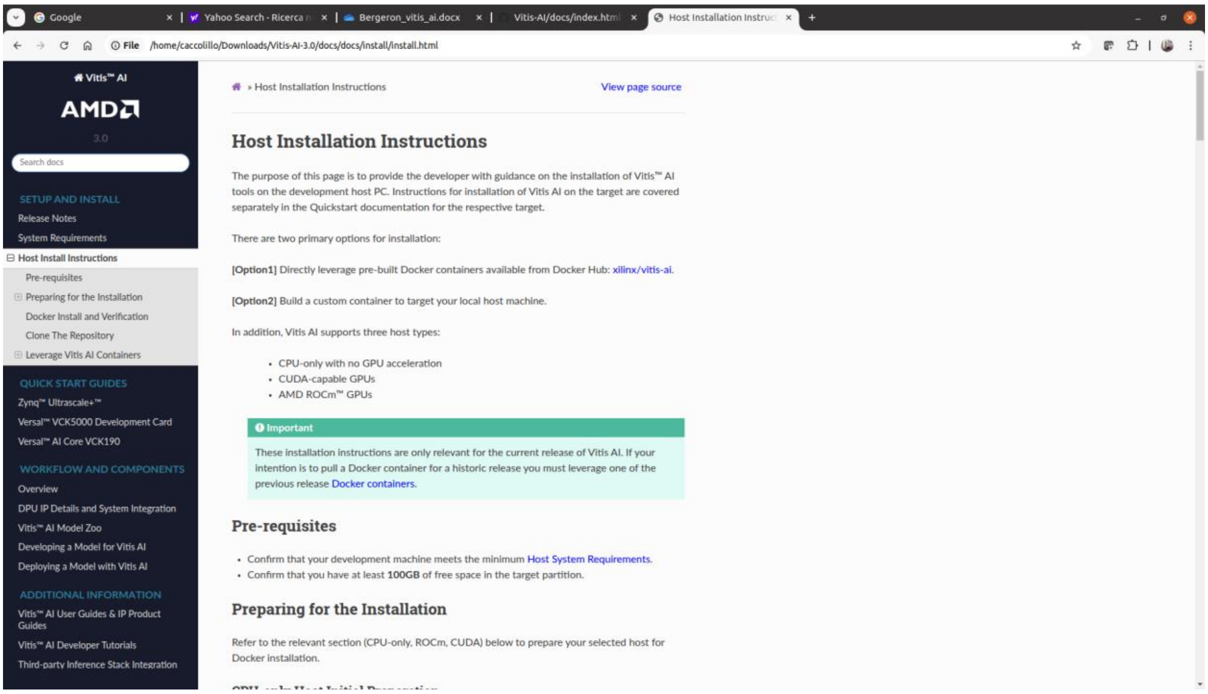
INSTALLING VITIS AI ON THE HOST

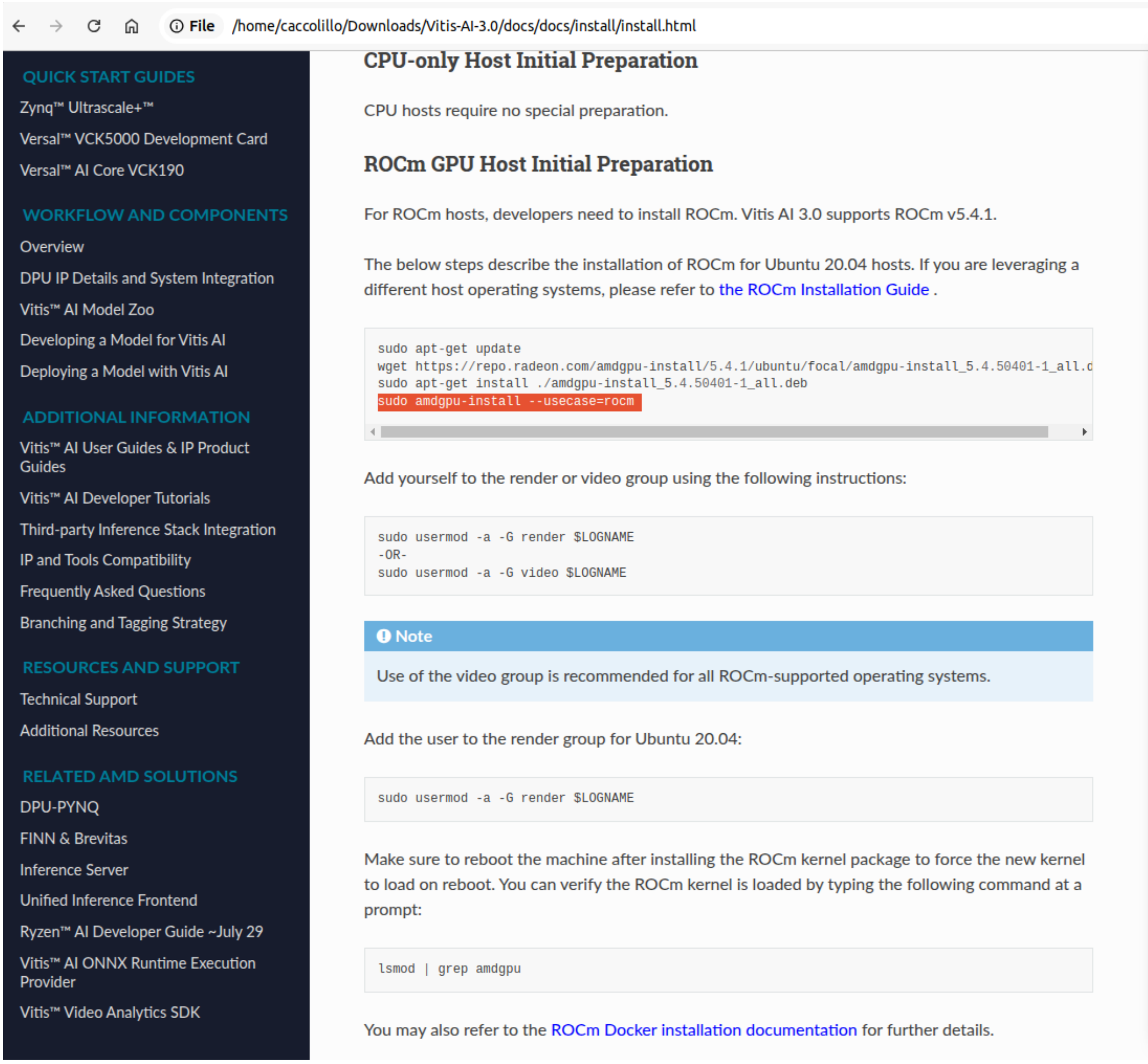
Starting with this tutorial:

https://beetlebox.org/vitis-ai-using-tensorflow-and-keras-tutorial-part-2/

Instructions about how to install the required SW must be followed:

https://github.com/Xilinx/Vitis-AI/tree/3.0/docs





/home/caccolillo/Downloads/Vitis-AI-3.0/docs/docs/install/install.html

QUICK START GUIDES
- Zynq™ Ultrascale+™
- Versal™ VCK5000 Development Card
- Versal™ AI Core VCK190

WORKFLOW AND COMPONENTS
- Overview
- DPU IP Details and System Integration
- Vitis™ AI Model Zoo
- Developing a Model for Vitis AI
- Deploying a Model with Vitis AI

ADDITIONAL INFORMATION
- Vitis™ AI User Guides & IP Product Guides
- Vitis™ AI Developer Tutorials
- Third-party Inference Stack Integration
- IP and Tools Compatibility
- Frequently Asked Questions
- Branching and Tagging Strategy

RESOURCES AND SUPPORT
- Technical Support
- Additional Resources

RELATED AMD SOLUTIONS
- DPU-PYNQ
- FINN & Brevitas
- Inference Server
- Unified Inference Frontend
- Ryzen™ AI Developer Guide ~July 29
- Vitis™ AI ONNX Runtime Execution Provider
- Vitis™ Video Analytics SDK

CPU-only Host Initial Preparation

CPU hosts require no special preparation.

ROCm GPU Host Initial Preparation

For ROCm hosts, developers need to install ROCm. Vitis AI 3.0 supports ROCm v5.4.1.

The below steps describe the installation of ROCm for Ubuntu 20.04 hosts. If you are leveraging a different host operating systems, please refer to the ROCm Installation Guide .

```
sudo apt-get update
wget https://repo.radeon.com/amdgpu-install/5.4.1/ubuntu/focal/amdgpu-install_5.4.50401-1_all.d
sudo apt-get install ./amdgpu-install_5.4.50401-1_all.deb
sudo amdgpu-install --usecase=rocm
```

Add yourself to the render or video group using the following instructions:

```
sudo usermod -a -G render $LOGNAME
-OR-
sudo usermod -a -G video $LOGNAME
```

Note

Use of the video group is recommended for all ROCm-supported operating systems.

Add the user to the render group for Ubuntu 20.04:

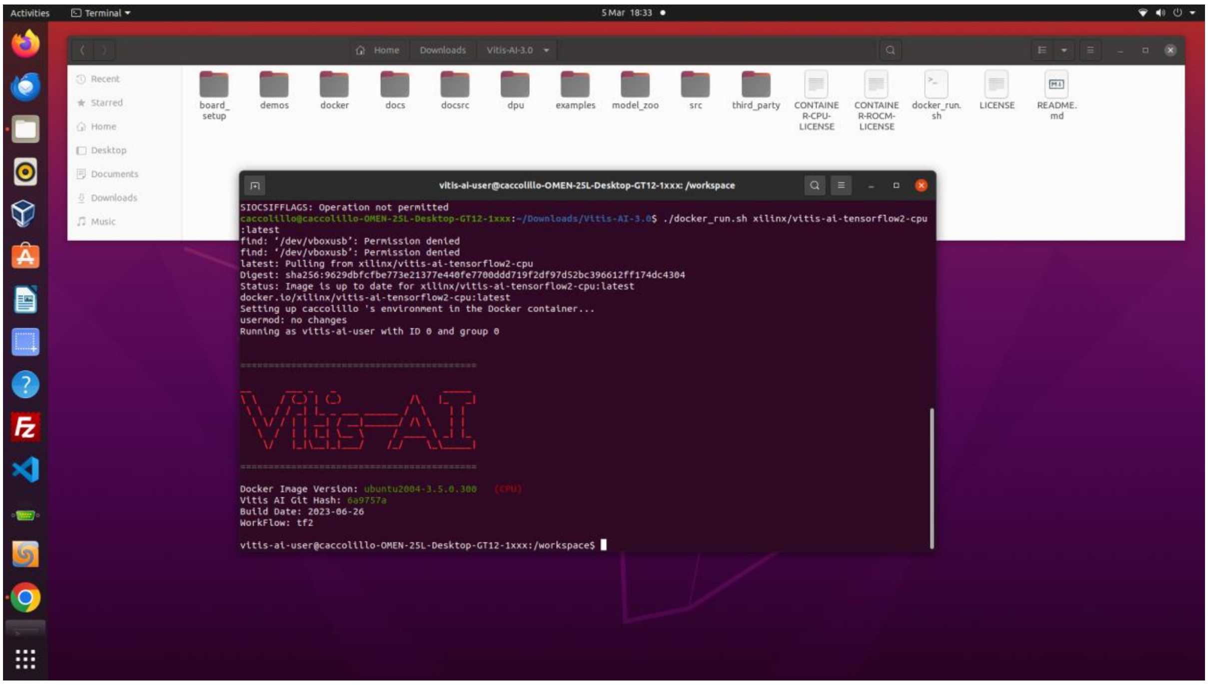
```
sudo usermod -a -G render $LOGNAME
```

Make sure to reboot the machine after installing the ROCm kernel package to force the new kernel to load on reboot. You can verify the ROCm kernel is loaded by typing the following command at a prompt:

```
lsmod | grep amdgpu
```

You may also refer to the ROCm Docker installation documentation for further details.

Once done, the docker image can be started:



VITIS AI TUTORIAL

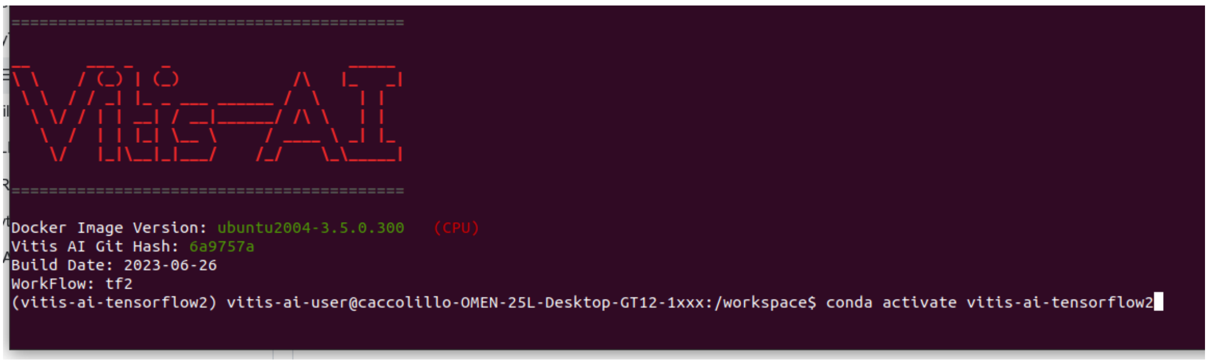
This tutorial shows how to start from an h5 model:

https://github.com/Xilinx/Vitis-AI-Tutorials/tree/3.0/Tutorials/RESNET18/

https://www.xilinx.com/developer/articles/medical-ai-application-acceleration-with-xilinx-vitis-ai.html

https://community.element14.com/products/roadtest/b/blog/posts/amd-xilinx-kria-kv260-vision-ai-starter-kit-software

Activate tensorflow 2 (conda activate ...):



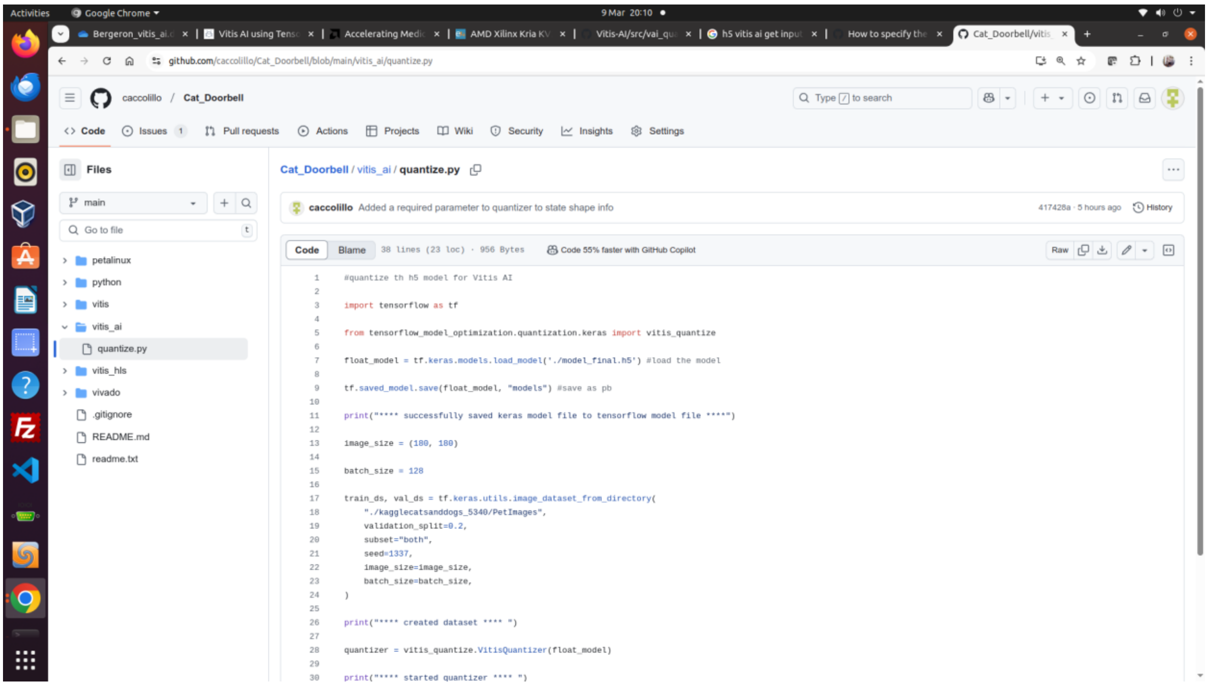
VITIS AI QUANTIZER

The h5 model has to be quantized first:

https://docs.amd.com/r/en-US/ug1414-vitis-ai/Quantize

https://github.com/Xilinx/Vitis-AI/tree/3.0/src/vai_quantizer/vai_q_tensorflow2.x

A script has been created to quantize the h5 model:

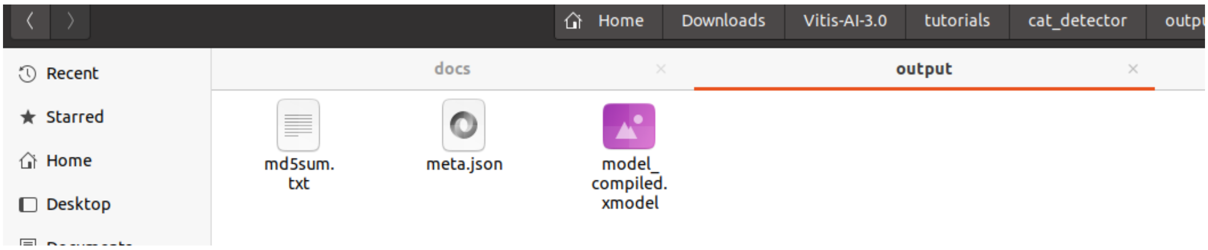


Once started, it creates the quantized model.

Then in the docker, launch the following command to compile the model:

vai_c_tensorflow2 -m ./quantized_model.h5 -a /opt/vitis_ai/compiler/arch/DPUCZDX8G/KV260/arch.json -o output/ -n model_compiled --options "{'mode':'normal','save_kernel':'', 'input_shape':'128,180,180,3'}"

And a folder gets created with the desired output:



RUNNING THE VITIS AI MODEL

To run an xmodel the vart library is needed, and it can be used either in C++ or Python.

https://xilinx.github.io/inference-server/0.1.0/xmodel_example_python.html

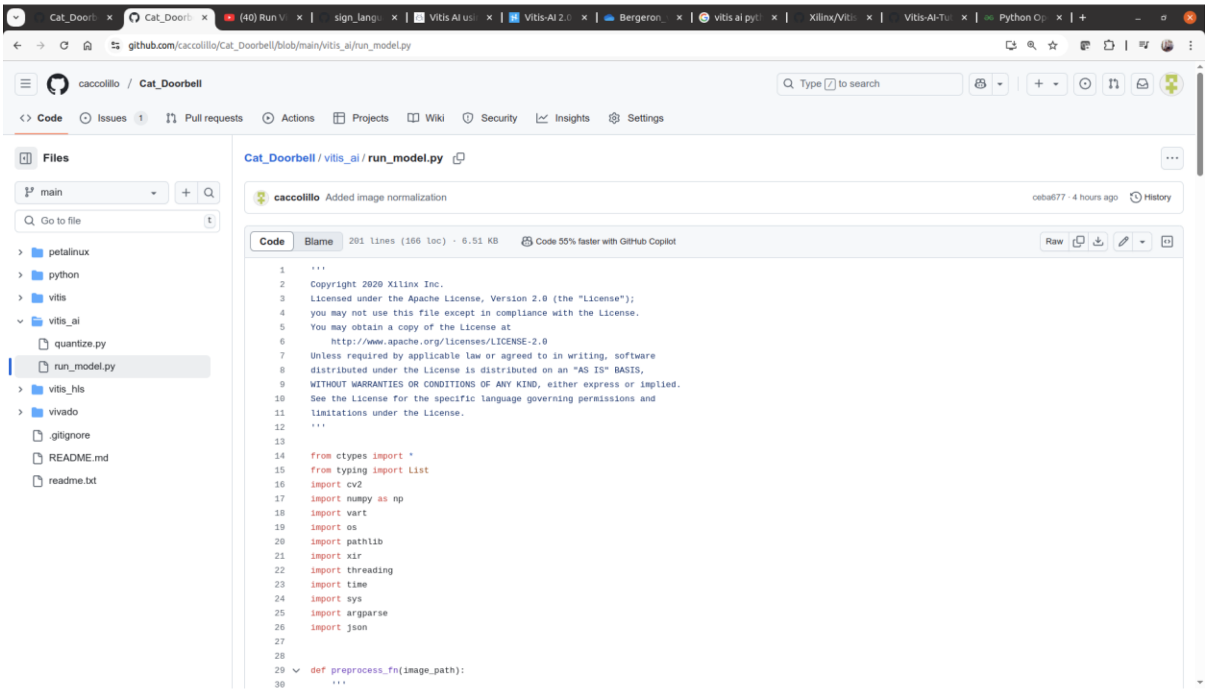
https://beetlebox.org/vitis-ai-using-tensorflow-and-keras-tutorial-part-9/

https://github.com/beetleboxorg/sign_language_mnist

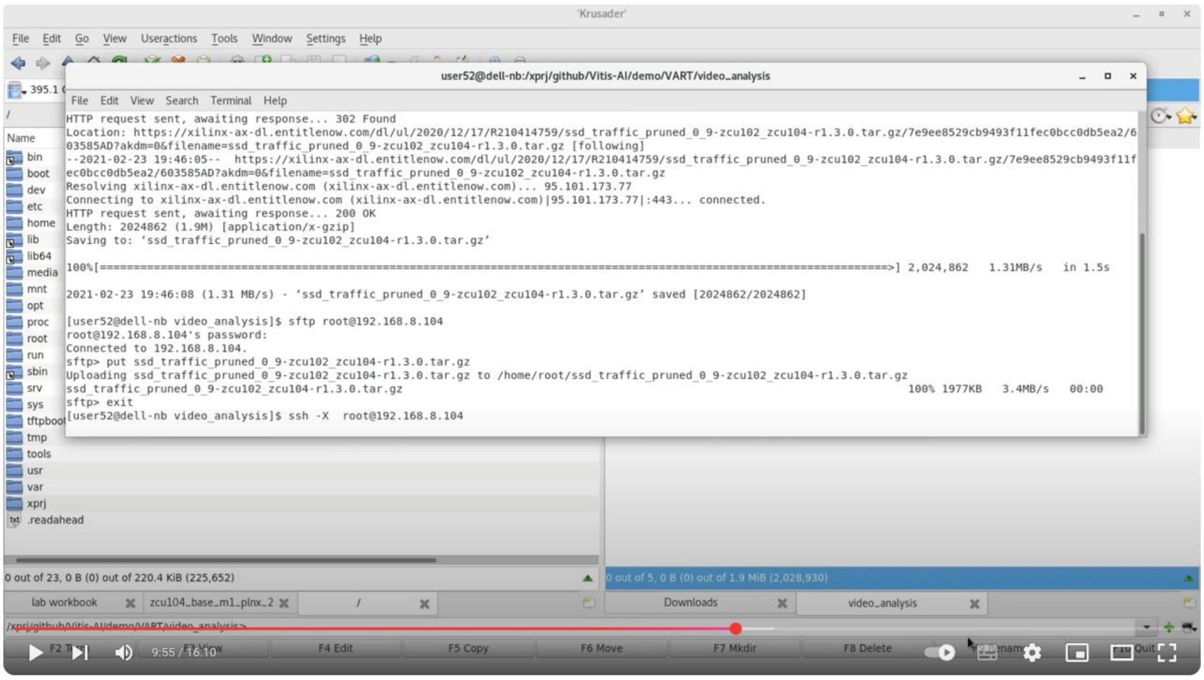
https://github.com/beetleboxorg/sign_language_mnist/blob/master/target/sign_language_app.py

A script has been prepared, inspired by the one at:

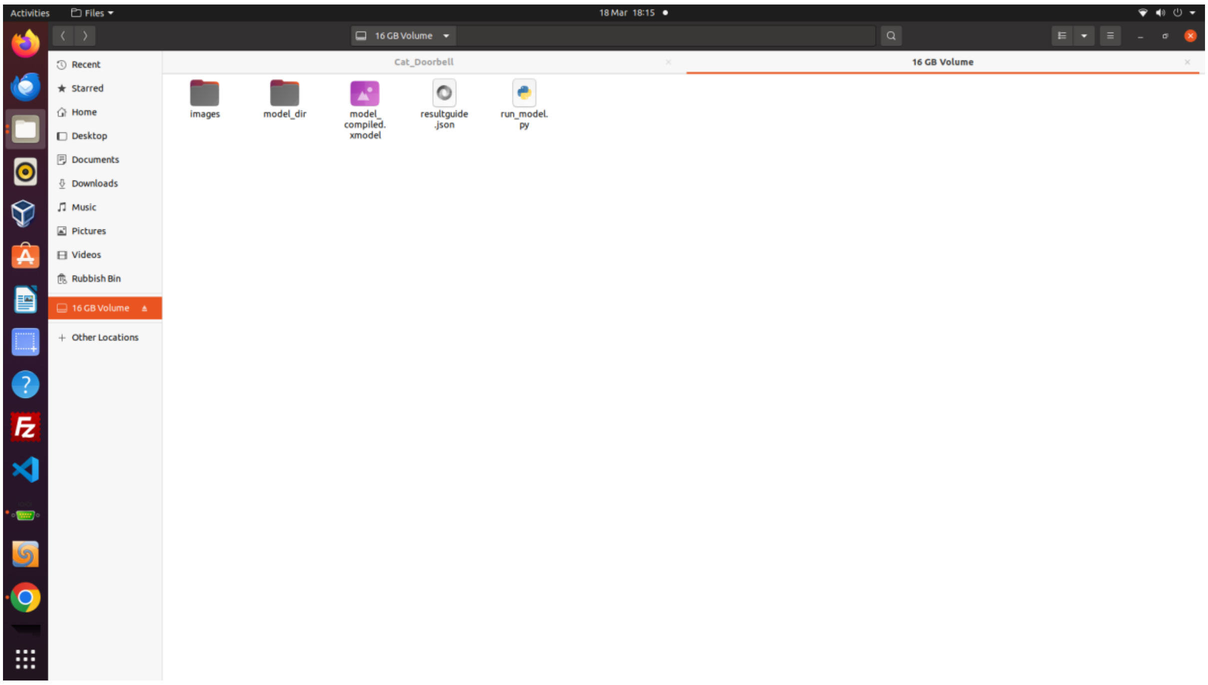
https://github.com/beetleboxorg/sign_language_mnist/blob/master/target/sign_language_app.py

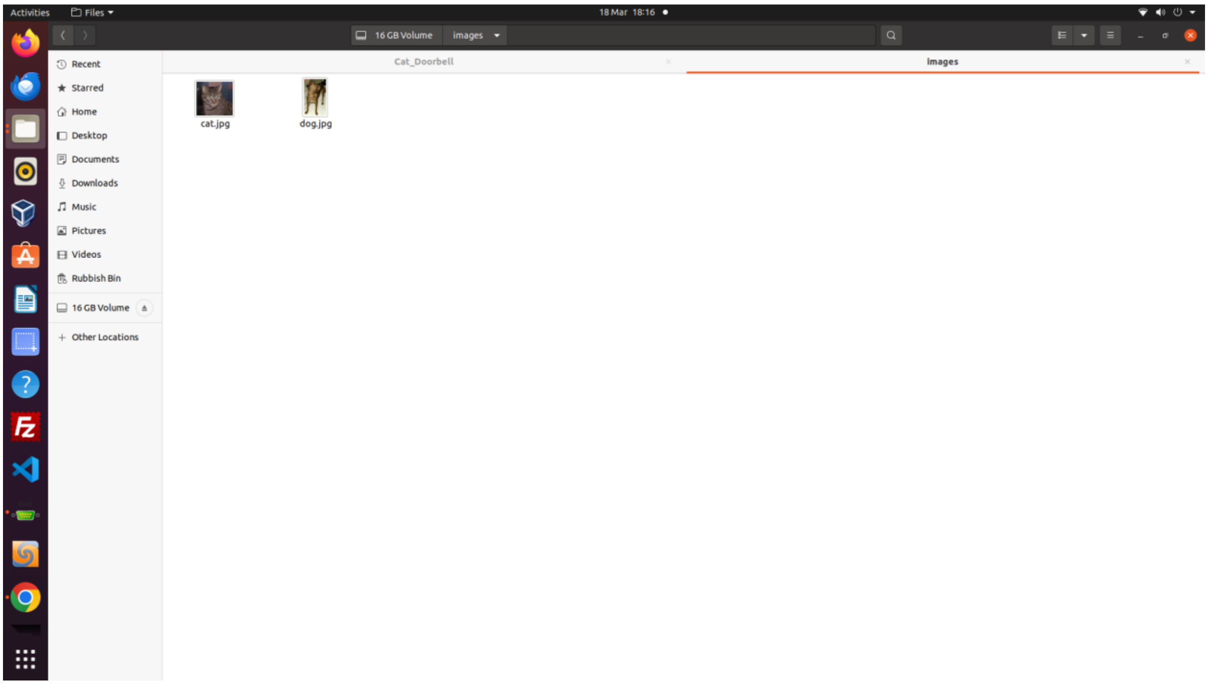


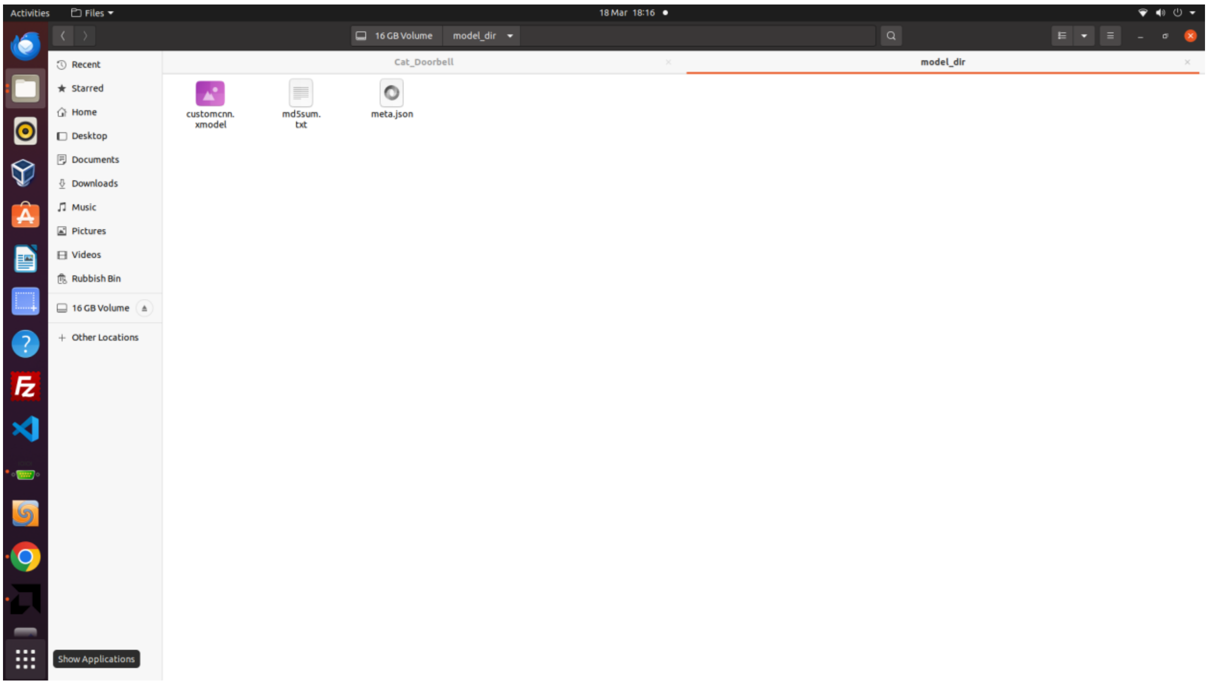
Copy the model and the script on the board either with ssh or sftp:



By creating an USB pen organized as follows:


Activities
Files
18 Mar 18:15
16 GB Volume
Cat_Doorbell
16 GB Volume
Recent
Starred
Home
Desktop
Documents
Downloads
Music
Pictures
Videos
Rubbish Bin
16 GB Volume
Other Locations
images
model_dir
model_compiled.xmodel
resultguide.json
run_model.py


Activities
Files
18 Mar 18:16
16 GB Volume
images
Cat_Doorbell
images
Recent
Starred
Home
Desktop
Documents
Downloads
Music
Pictures
Videos
Rubbish Bin
16 GB Volume
Other Locations
cat.jpg
dog.jpg



And mounting it, giving the following commands:

cd /run/media/sda1

python3 ./run_model.py

The script fails as the model has been compiled for the wrong DPU:

By searching online for the error code, it seems as if an error in the Vitis AI docker has been made, when compiling the quantized model:

https://adaptivesupport.amd.com/s/article/DPU-fingerprint-ERROR?language=en_US

https://adaptivesupport.amd.com/s/question/0D54U00006wDmkzSAC/info-post-about-dpu-fingerprint?language=en_US

https://xilinx.github.io/kria-apps-docs/kv260/2022.1/build/html/docs/aibox/docs/customize_ai_models-aib.html

As adviced in the first link, by giving the “xdputil query” command on the U96 board:

```
u96v2-sbc-2022-2 login: root
root@u96v2-sbc-2022-2:~# xdputil query
{
    "DPU IP Spec":{
        "DPU Core Count":1,
        "IP version":"v4.1.0",
        "generation timestamp":"2023-02-21 21-30-00",
        "git commit id":"7d32c41",
        "git commit time":2023022121,
        "regmap":"1to1 version"
    },
    "VAI Version":{
        "libvart-runner.so":"Xilinx vart-runner Version: 3.0.0-c5d2bd43d951c174185d728b8e5bcda3869e0b39  2023-04-10-20:06:16 ",
        "libvitis_ai_library-dpu_task.so":"Xilinx vitis_ai_library dpu_task Version: 3.0.0-c5d2bd43d951c174185d728b8e5bcda3869e0b39  2023-01-13 06:58:30 [UTC] ",
        "libxir.so":"Xilinx xir Version: xir-c5d2bd43d951c174185d728b8e5bcda3869e0b39 2023-04-03-14:21:20",
        "target_factory":"target-factory.3.0.0 c5d2bd43d951c174185d728b8e5bcda3869e0b39"
    },
    "kernels":[
        {
            "DPU Arch":"DPUCZDX8G_ISA1_B2304_0101000016010405",
            "DPU Frequency (MHz)":200,
            "IP Type":"DPU",
            "Load Parallel":2,
            "Load augmentation":"enable",
            "Load minus mean":"disable",
            "Save Parallel":2,
            "XRT Frequency (MHz)":200,
            "cu_addr":"0xb0000000",
            "cu_handle":"0xaaaaf170e7a0",
            "cu_idx":0,
            "cu_mask":1,
            "cu_name":"DPUCZDX8G:DPUCZDX8G_1",
            "device_id":0,
            "fingerprint":"0x101000016010405",
            "name":"DPU Core 0"
        }
    ]
}
root@u96v2-sbc-2022-2:~#
```

We get the fingerprint:

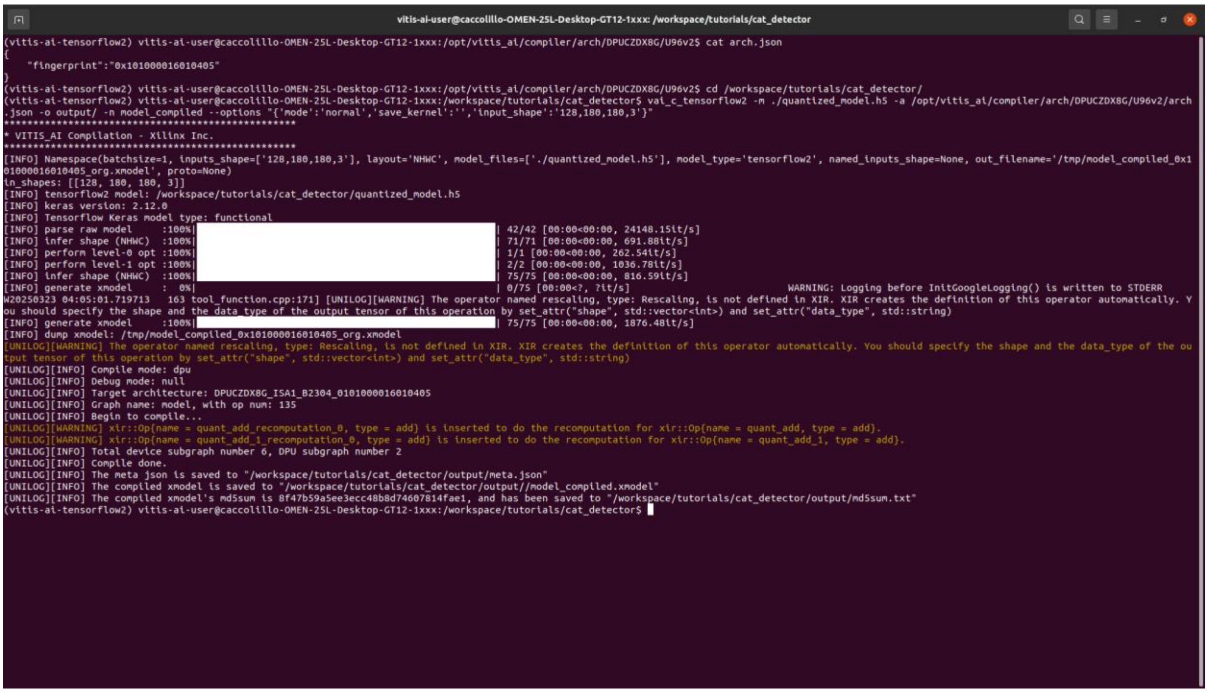
"DPU Arch":"DPUCZDX8G_ISA1_B2304_0101000016010405",
"fingerprint":"0x101000016010405",

A new folder U96v2 is created on the docker and the json file is created:

```
vitis-ai-user@caccolillo-OMEN-25L-Desktop-GT12-1xxx: /opt/vitis_ai/compiler/arch/DPUCZDX8G/U96v2
(vitis-ai-tensorflow2) vitis-ai-user@caccolillo-OMEN-25L-Desktop-GT12-1xxx:/opt/vitis_ai/compiler/arch/DPUCZDX8G/U96v2$ cat arch.json
{
    "fingerprint":"0x101000016010405"
}
(vitis-ai-tensorflow2) vitis-ai-user@caccolillo-OMEN-25L-Desktop-GT12-1xxx:/opt/vitis_ai/compiler/arch/DPUCZDX8G/U96v2$
```

The model is compiled again:

vai_c_tensorflow2 -m ./quantized_model.h5 -a /opt/vitis_ai/compiler/arch/DPUCZDX8G/U96v2/arch.json -o output/ -n model_compiled --options "{'mode':'normal','save_kernel':'','input_shape':'128,180,180,3'}"



And placed in the USB memory stick, overwriting the wrong one.

And mounting it, giving the following commands:

cd /run/media/sda1

python3 ./run_model.py

The script starts this time and runs the DPU:

But it then crashes at around row 200.

Some debugging is needed.

At least now, the DPU is working.

It looks like there is an error over the way in which the output of the model run on the DPU is taken.

To get a better understanding of how to run it, it has been decided to follow the tutorial below:

https://www.pixela.co.jp/products/pickup/dev/ai/vitisai_ai_4_custom_model_en.html

MNIST VITIS AI MODEL TUTORIAL

To get a better understanding of how to run a trained model, it has been decided to follow the tutorial below:

https://www.pixela.co.jp/products/pickup/dev/ai/vitisai_ai_4_custom_model_en.html

The trainig script wasn’t working, so this one has been used instead:

https://adaptivesupport.amd.com/s/question/0D52E00006rCKYqSAO/any-idea-why-this-is-producing-a-shape-error-in-quantization?language=en_US

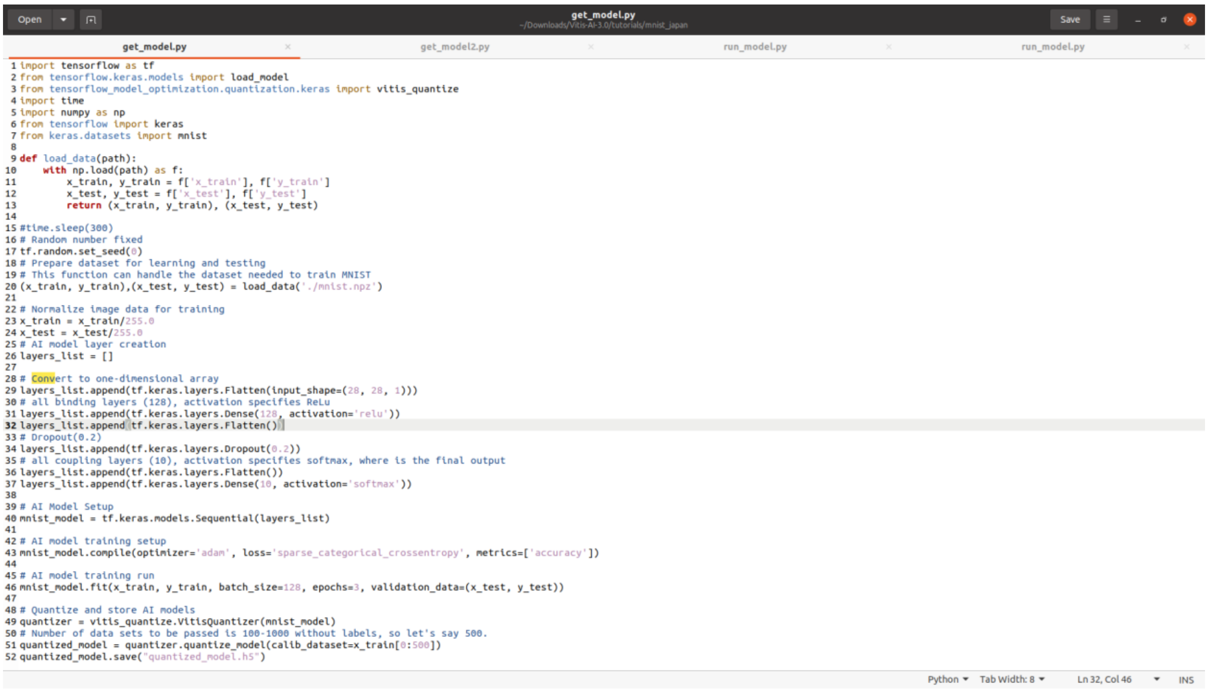
The mnist dataset could not be downloaded, so the mnist dataset jas been downloaded manually:

https://www.kaggle.com/datasets/vikramtiwari/mnist-numpy

And to load it, the function below has been used:

```
def load_data(path):
    with np.load(path) as f:
        x_train, y_train = f['x_train'], f['y_train']
        x_test, y_test = f['x_test'], f['y_test']
        return (x_train, y_train), (x_test, y_test)



#time.sleep(300)
# Random number fixed
tf.random.set_seed(0)

# Prepare dataset for learning and testing
# This function can handle the dataset needed to train MNIST



(x_train, y_train),(x_test, y_test) = load_data('./mnist.npz')

```

The script below has worked, generating a quantized model:



```python
import tensorflow as tf
from tensorflow.keras.models import load_model
from tensorflow_model_optimization.quantization.keras import vitis_quantize
import time
import numpy as np
from tensorflow import keras
from keras.datasets import mnist

def load_data(path):
    with np.load(path) as f:
        x_train, y_train = f['x_train'], f['y_train']
        x_test, y_test = f['x_test'], f['y_test']
        return (x_train, y_train), (x_test, y_test)

#time.sleep(300)
# Random number fixed
tf.random.set_seed(0)
# Prepare dataset for learning and testing
# This function can handle the dataset needed to train MNIST
(x_train, y_train),(x_test, y_test) = load_data('./mnist.npz')

# Normalize image data for training
x_train = x_train/255.0
x_test = x_test/255.0
# AI model layer creation
layers_list = []

# Convert to one-dimensional array
layers_list.append(tf.keras.layers.Flatten(input_shape=(28, 28, 1)))
# all binding layers (128), activation specifies ReLu
layers_list.append(tf.keras.layers.Dense(128, activation='relu'))
layers_list.append(tf.keras.layers.Flatten())
# Dropout(0.2)
layers_list.append(tf.keras.layers.Dropout(0.2))
# all coupling layers (10), activation specifies softmax, where is the final output
layers_list.append(tf.keras.layers.Flatten())
layers_list.append(tf.keras.layers.Dense(10, activation='softmax'))

# AI Model Setup
mnist_model = tf.keras.models.Sequential(layers_list)

# AI model training setup
mnist_model.compile(optimizer='adam', loss='sparse_categorical_crossentropy', metrics=['accuracy'])

# AI model training run
mnist_model.fit(x_train, y_train, batch_size=128, epochs=3, validation_data=(x_test, y_test))

# Quantize and store AI models
quantizer = vitis_quantize.VitisQuantizer(mnist_model)
# Number of data sets to be passed is 100-1000 without labels, so let's say 500.
quantized_model = quantizer.quantize_model(calib_dataset=x_train[0:500])
quantized_model.save("quantized_model.h5")
```

The flatten() function has been used to get it working.

KERAS MINIRESNET FINALLY WORKING

As a starting point, the following tutorial has been used:

https://github.com/Xilinx/Vitis-AI-Tutorials/tree/3.0/Tutorials/Keras_GoogleNet_ResNet/

The files of interest have been:

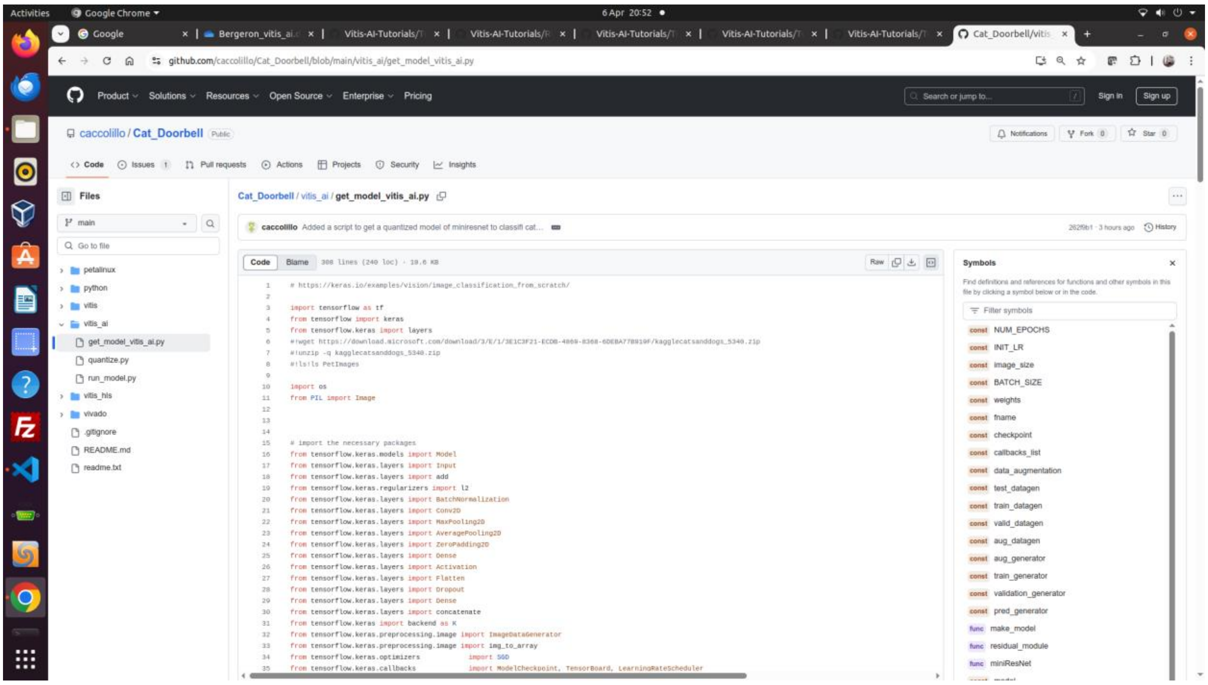
https://github.com/Xilinx/Vitis-AI-Tutorials/blob/3.0/Tutorials/Keras_GoogleNet_ResNet/files/code/custom_cnn.py

And:

https://github.com/Xilinx/Vitis-AI-Tutorials/blob/3.0/Tutorials/Keras_GoogleNet_ResNet/files/code/train_fmnist.py

Where the dataset has been created starting from images of cats and dogs borrowed by kaggle, and reworking the script.

The script has been saved in:



At the end of the training, by using the following datasets available om kaggle:

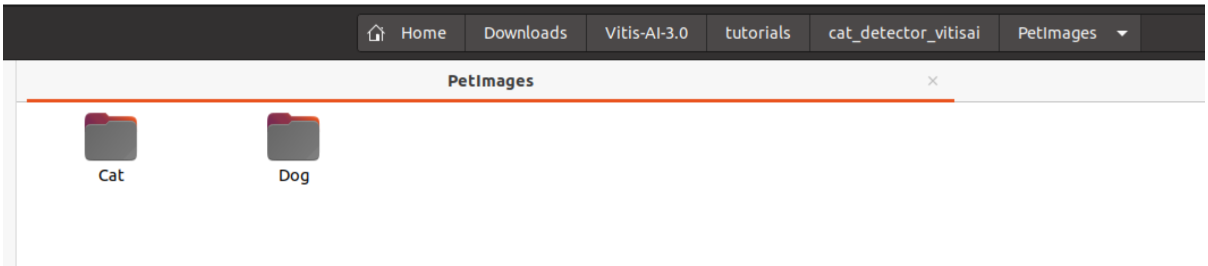
https://www.kaggle.com/c/dogs-vs-cats

https://www.kaggle.com/datasets/tongpython/cat-and-dog

https://www.kaggle.com/datasets/karakaggle/kaggle-cat-vs-dog-dataset

https://www.kaggle.com/datasets/bhavikjikadara/dog-and-cat-classification-dataset

By saving the cat and dog pictures in the folders shown below:



By launching the training script, we get the following performances:

```
==================================================================================================
Total params: 888,910
Trainable params: 876,552
Non-trainable params: 12,358
__________________________________________________________________________________________________
WARNING:absl:`lr` is deprecated in Keras optimizer, please use `learning_rate` or use the legacy optimizer, e.g.,tf.keras.optimizers.legacy
Epoch 1/10
803/803 [==============================] - 5871s 7s/step - loss: 1.1657 - accuracy: 0.6167 - val_loss: 1.0453 - val_accuracy: 0.6985
Epoch 2/10
803/803 [==============================] - 6715s 8s/step - loss: 0.9894 - accuracy: 0.7398 - val_loss: 0.9376 - val_accuracy: 0.7768
Epoch 3/10
803/803 [==============================] - 7215s 9s/step - loss: 0.8737 - accuracy: 0.8090 - val_loss: 0.8971 - val_accuracy: 0.7961
Epoch 4/10
803/803 [==============================] - 7571s 9s/step - loss: 0.7959 - accuracy: 0.8444 - val_loss: 0.7628 - val_accuracy: 0.8572
Epoch 5/10
803/803 [==============================] - 7769s 10s/step - loss: 0.7228 - accuracy: 0.8748 - val_loss: 0.7391 - val_accuracy: 0.8668
Epoch 6/10
803/803 [==============================] - 8336s 10s/step - loss: 0.6695 - accuracy: 0.8948 - val_loss: 0.6930 - val_accuracy: 0.8824
Epoch 7/10
803/803 [==============================] - 8005s 10s/step - loss: 0.6184 - accuracy: 0.9117 - val_loss: 0.6770 - val_accuracy: 0.8943
Epoch 8/10
803/803 [==============================] - 8483s 11s/step - loss: 0.5830 - accuracy: 0.9274 - val_loss: 0.6554 - val_accuracy: 0.8988
Epoch 9/10
803/803 [==============================] - 8204s 10s/step - loss: 0.5418 - accuracy: 0.9408 - val_loss: 0.6062 - val_accuracy: 0.9133
Epoch 10/10
803/803 [==============================] - 8343s 10s/step - loss: 0.5105 - accuracy: 0.9495 - val_loss: 0.6328 - val_accuracy: 0.9142
Training completed. Press Enter to continue...
```

At the end, an hdf5file is created, as per the description in the tutorial:

https://github.com/Xilinx/Vitis-AI-Tutorials/blob/3.0/Tutorials/Keras_GoogleNet_ResNet/README.md

And it gets compiled:

```
vitis-ai-user@caccolillo-OMEN-25L-Desktop-GT12-1xxx:/workspace/tutorials/cat_detector_vitisai$ vai_c_tensorflow2 -m ./quantized.h5 -a /opt/vitis_ai/compiler/arch/DPUCZDX8G/U96V2/a
rch.json -o output/ -n model_compiled
**************************************************
* VITIS_AI Compilation - Xilinx Inc.
**************************************************
[INFO] Namespace(batchsize=1, inputs_shape=None, layout='NHWC', model_files=['./quantized.h5'], model_type='tensorflow2', named_inputs_shape=None, out_filename='/tmp/model_compile
d_0x101000016010405_org.xmodel', proto=None)
[INFO] tensorflow2 model: /workspace/tutorials/cat_detector_vitisai/quantized.h5
[INFO] keras version: 2.12.0
[INFO] Tensorflow Keras model type: functional
[INFO] parse raw model     :100%|██████████| 232/232 [00:00<00:00, 17264.19it/s]
[INFO] infer shape (NHWC)  :100%|██████████| 378/378 [00:00<00:00, 1600.17it/s]
[INFO] perform level-0 opt :100%|██████████| 1/1 [00:00<00:00, 52.46it/s]
[INFO] perform level-1 opt :100%|██████████| 2/2 [00:00<00:00, 210.15it/s]
[INFO] infer shape (NHWC)  :100%|██████████| 380/380 [00:00<00:00, 1745.68it/s]
[INFO] generate xmodel     :100%|██████████| 380/380 [00:00<00:00, 4614.96it/s]
[INFO] dump xmodel: /tmp/model_compiled_0x101000016010405_org.xmodel
[UNILOG][INFO] Compile mode: dpu
[UNILOG][INFO] Debug mode: null
[UNILOG][INFO] Target architecture: DPUCZDX8G_ISA1_B2304_0101000016010405
[UNILOG][INFO] Graph name: resnet, with op num: 778
[UNILOG][INFO] Begin to compile...
[UNILOG][INFO] Total device subgraph number 3, DPU subgraph number 1
[UNILOG][INFO] Compile done.
[UNILOG][INFO] The meta json is saved to "/workspace/tutorials/cat_detector_vitisai/output/meta.json"
[UNILOG][INFO] The compiled xmodel is saved to "/workspace/tutorials/cat_detector_vitisai/output//model_compiled.xmodel"
[UNILOG][INFO] The compiled xmodel's md5sum is c4595a3cecf3b11f62b2912ebefff230, and has been saved to "/workspace/tutorials/cat_detector_vitisai/output/md5sum.txt"
vitis-ai-user@caccolillo-OMEN-25L-Desktop-GT12-1xxx:/workspace/tutorials/cat_detector_vitisai$
```