Kneron Inc

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Detailed History of Changes:

Version	Date	Author	Description of Changes
0.1	5/22/2020	YC	Initial Draft
0.2	5/27/2020	YC	Add OpenCV example
0.3	6/6/2020	YC	Add introduction about all examples
0.4	6/9/2020	YC	Update executable and example code according to refactored file structure of host lib
0.5	6/16/2020	YC	Update device name, building method, and examples

Table of Contents

1. Prepare the Test Environment

This chapter describes the preparation of test environment.

1.1 Set of Files

The folder of OVF file includes 3 files. Copy the files into Windows or Mac.

File Name	Description	Size
Ubuntu 64-bit.mf	Manifest file	191 Bytes
Ubuntu 64-bit.ovf	Open virtualization format file	7.45 KB
Ubuntu_64-bit-disk1.vmdk	Virtual machine disk image file	7.92 GB

1.2 VMware Software Installation

Different VMware software are used on Windows and Mac.

Software Name	Version	Platform	Download Link
VMware Workstation Player	15.5	Windows	https://www.vmware.com/products/workstation-player/workstation-player-evaluation.html
VMware Workstation Fusion	11.5	Mac	https://www.vmware.com/products/fusion/fusion-evaluation.html

1.3 Kneron Software in Virtual Machine

Kneron software are installed in virtual machine.

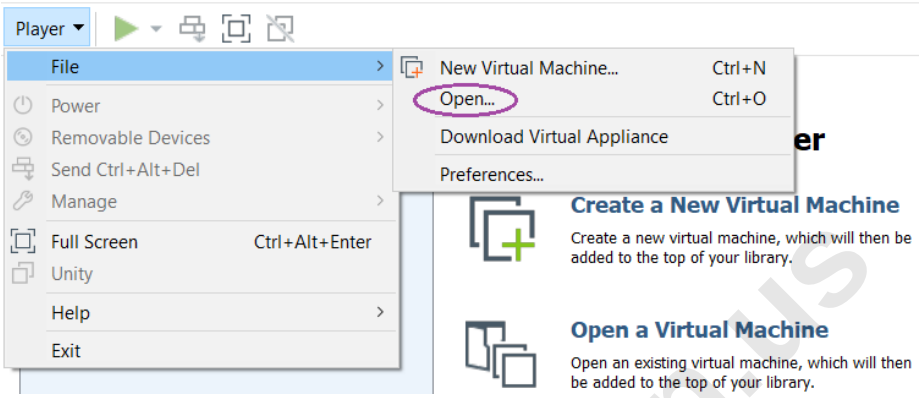
Software Name	Version	Usage
Toolchain	0.6.0	Batch compile models to fw_info.bin and all_models.bin

1.4 Import .ovf File in VMware Workstation

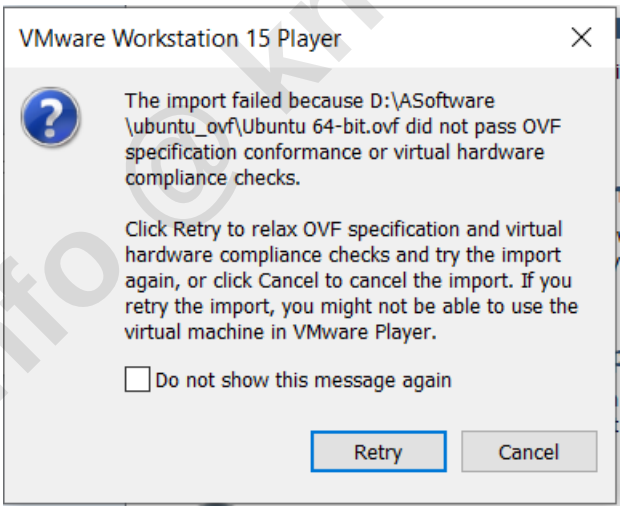
1.4.1 VMware Workstation Player in Windows

(1) Select Player -> File -> Open to open the .ovf file on hard disk.

Before importing ovf file, make sure there are more than free space of 18 GB in Windows.



(2) Click “Retry” if VM Player reports importing failure and wait for 10~20 minutes



(3) A new virtual machine is installed and accessible in player

(4) Click “Play virtual machine” for the selected virtual machine, and wait virtual machine power on

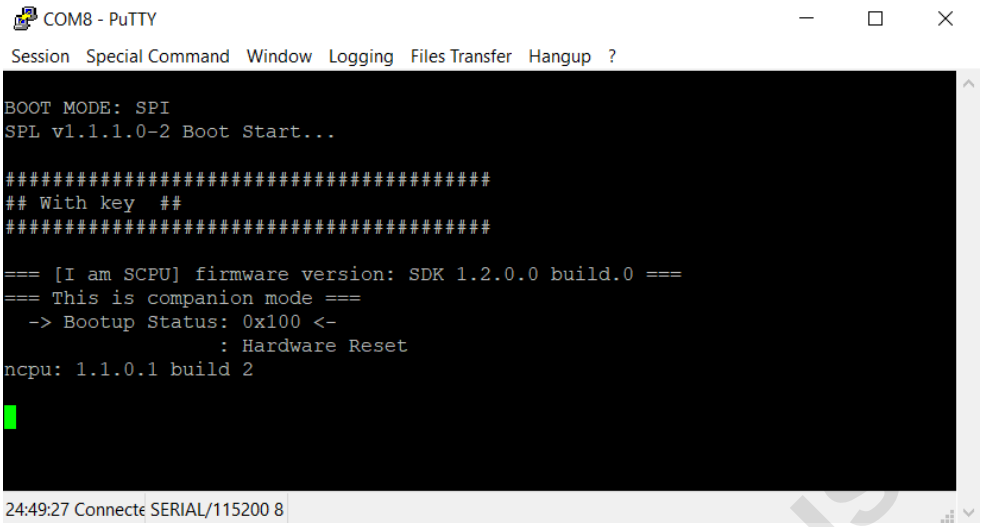
Currently, no password is needed for logging in, sudo, etc. If need to provide password, the password of virtual Ubuntu is: Kneron

(5) Power on Kneron device and boot it on

If the code in flash is not for companion mode, need re-flash the code for companion mode.

If the boot mode is manual, press power key and select option 1 in serial software, such as putty, to boot the Kneron device on.

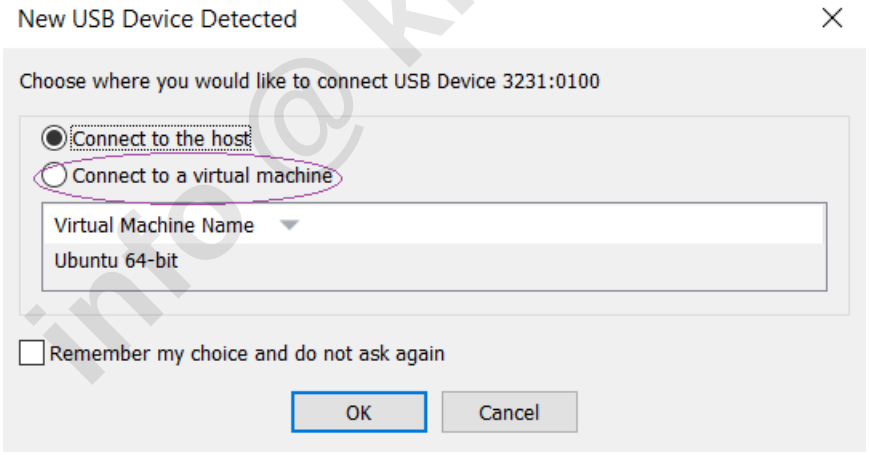
If the boot mode is SPI, press power key to boot the Kneron device on.



(6) Connect the Kneron USB device to virtual machine in VM Player

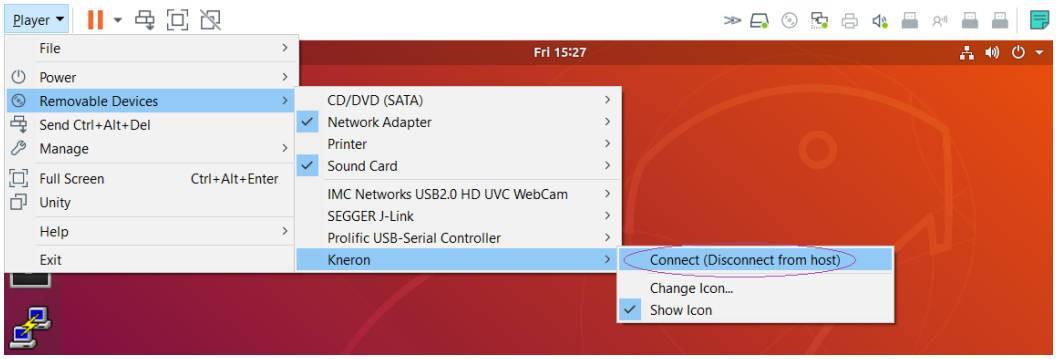
A. Connect USB device to the PC

B. Connect USB device to VM through pop-up window in VM Player



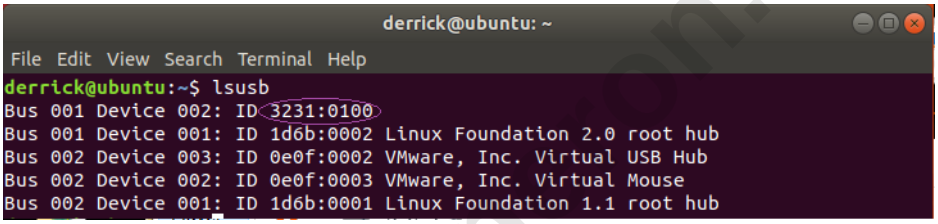
Select “Connect to a virtual machine”, then USB device is connect to virtual machine.

C. Or connect Kneron USB device to VM through menu of WM Player: Player -> Removable Devices -> Kneron USB device

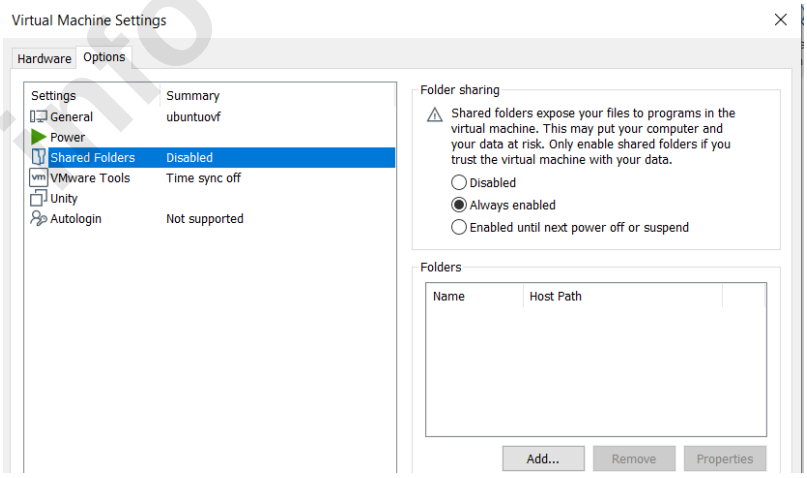


(7) Check Kneron USB device in virtual machine

Execute “lsusb” in terminal of virtual machine to check whether Kneron USB device has been connected into virtual machine



(8) Share new folder in Windows to virtual machine: Player -> Manage -> Virtual Machine Settings -> Options -> Shared Folders



A. If the shared folder could not be accessed in virtual machine after reboot, re-disable and re-enable the shared folder to get access to it.

B. The folders of SDK release with host lib in Windows is shared into **/mnt/hgfs** of virtual machine

1.4.2 VMware Workstation Fusion in Mac

To be added.

2. Run Examples of Host Lib in Virtual Machine

2.1 Known Issues and Limitations

(1) OpenCV example is not stable when testing in virtual machine. However, it is stable in native Ubuntu.

(2) After testing DME cases, need reset Kneron device before testing ISI cases.

(3) The maximum model size is 28M.

2.2 Build Host Lib

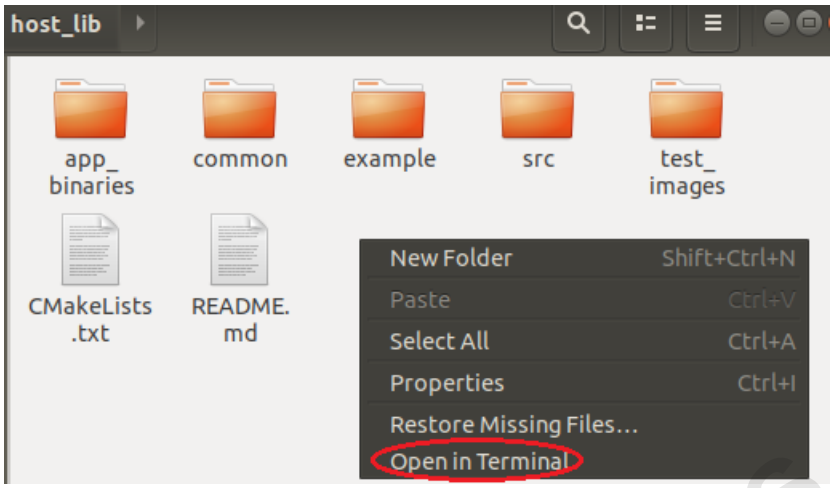
(1) Build the host lib code in virtual machine by following the steps in host_lib/README.md.

(2) libusb-1.0-0-dev has already been installed in virtual machine, and /etc/udev/rules.d/10-local.rules has been created.

(3) Opencv 3.4.1 has been installed in virtual machine.

2.2.1 Build without OpenCV Example

(1) Open host_lib and open in terminal for this directory



(2) Execute the following commands in terminal to build

mkdir build && cd build

cmake ..

make -j4

2.2.2 Build with OpenCV Example

(1) Open host_lib and open in terminal for this directory

(2) Execute the following commands in terminal to build

mkdir build && cd build

cmake -DBUILD_OPENCV_EX=on ..

make -j4

2.2.3 Executable and Example Code

(1) ISI indicates that the model data is loaded from flash.

(2) DME indicates that the model data is sent from host to KL520.

(3) OTA upgrade the corresponding firmware code and model before test

Executable	Example Code	FW Code and Model Data	Category	How to Run

cam_od_8class	cam_od_8class.cpp	app_binaries\object_detection	ISI	./cam_od_8class
cam_ssd_fd	cam_ssd_fd.cpp	app_binaries\ssd_fd	ISI	./cam_ssd_fd
deluser	deluser.cpp	app_binaries\cpn_fdfr	Other	(1) Reg user 1 firstly (2) Del user 1 ./deluser 1
dme_age_gender	dme_age_gender.cpp	app_binaries\cpn_fdfr	DME	./dme_age_gender
dme_async_mobilenet_classification	dme_async_mobilenet_classification.cpp	Any one	DME	./dme_async_mobilenet_classification
dme_async_yolo	dme_async_yolo.cpp	app_binaries\cpn_fdfr	DME	./dme_async_yolo
dme_async_yolo_3models	dme_async_yolo_3models.cpp	app_binaries\cpn_fdfr	DME	./dme_async_yolo_3models
dme_serial_yolo	dme_serial_yolo.cpp	(1) Postprocess in KL520: app_binaries\cpn_fdfr (2) Postprocess in host: any one	DME	(1) Postprocess in KL520 ./dme_serial_yolo 1 (2) Postprocess in host ./dme_serial_yolo 2
fid	fid.cpp	app_binaries\cpn_fdfr	Other	./fid
fmcmp	fmcmp.cpp	app_binaries\cpn_fdfr	Other	(1) Del all users (2) Test ./fmcmp
isi_age_gender	isi_age_gender.cpp	app_binaries\age_gender	ISI	./isi_age_gender
isi_od	isi_od.cpp	app_binaries\object_detection	ISI	./isi_od
isi_ssd_fd	isi_ssd_fd.cpp	app_binaries\ssd_fd	ISI	./isi_ssd_fd
isi_yolo	isi_yolo.cpp	app_binaries\tiny_yolo_v3	ISI	./isi_yolo
lw3d	lw3d.cpp	app_binaries\cpn_fdfr	Other	./lw3d

reguser	reguser.cpp	app_binaries\cpn_fdfr	Other	(1) Reg user 1 ./reguser 1
update_app	update_app.cpp	Any one	Other	./update_app
update_fw	update_fw.cpp	Any one	Other	(1) Upgrade scpu ./update_fw 1 (2) Upgrade ncpu ./update_fw 2
update_model	update_model.cpp	Any one	Other	./update_model 1
veruser	veruser.cpp	app_binaries\cpn_fdfr	Other	(1) Reg user 1 (2) Verify user test ./veruser

2.3 Run Examples of Host Lib

Run the example executable (**/hostlib/build/bin**) in command line of virtual machine.

2.3.1 Run FW Upgrade and Model Upgrade in VM Player

(1) Copy the fw and model data in app_binaries**.bin into app_binaries\ready_to_load

(2) Boot mode after upgrade

If the boot mode is manual, select option 1 in serial software, such as putty, to boot the Kneron device on.

(3) Upgrade them by following “How to Run” in chapter 2.2.3

2.3.2 Run OpenCV Example for Object Detection in VM Player

(1) Flash the scpu/ncpu code of companion mode for object detection and object detection model to 96board, and reset the board

(2) In VM player, connect USB camera of host to virtual machine by Player -> Removable Devices -> ***Webcam -> Connect (disconnect from host)

(3) In VM player, connect Kneron USB device to virtual machine

(4) Run executable of Object Detection for 8 Class in virtual machine: ./cam_od_8class

The demo uses the frames from camera, feeds them to KL520, retrieve back the detection results, and display the results on frames in a window.