Build Petalinux 2021.1 with Vitis AI 2.0 and Smartcam

首先需要的環境有

1. Ubuntu 18.04
2. PetaLinux Tools - Installer - 2021.1
3. Kria K26 SOM Board Support Package - 2021.1

建置開始

◆ Step 1:

下載完 PetaLinux Tools – Installer 後

安裝 Dependencies

<command> sudo apt-get install gcc g++ libncurses5-dev libncursesw5-dev libtool net-tools autoconf xterm texinfo gcc-multilib gawk zlib1g libz1:i386 zlib1g-dev build-essential

<command> ./petalinux-v2021.1-final-installer.run -d <自訂安裝的路徑>

- 不能執行請先 sudo chmod -R 777

<command> source <自訂安裝的路徑>/settings.sh

以上便安裝完 PetaLinux Tools 與設定好環境變數

有時候同個版本像是 petalinux 2021.1 有 update 1，有加入新的 Vitis ai layers，會影響到使用，因此會建議更新 petalinux tool

---> From Network:

<command> petalinux-upgrade -u http://petalinux.xilinx.com/sswreleases/rel-v2021/sdkupdate/2021.1_update1/ -p "aarch64" --wget-args "--wait 1 -nH --cut-dirs=4"

---> From Local:

<command> petalinux-upgrade -f <Local eSDK Directory Path> -p "aarch64"

◆ Step 2: 創建 petalinux project

<command> petalinux-create -t project -s /<放 kv260 BSP 的路徑>/xilinx-k26-starterkit-v2021.1-final.bsp -n kv260_os(此為專案名稱與資料夾)

<command> cd ./kv260_os

<command> ls 後可看見下圖:

```
parallels@parallels-Parallels-Virtual-Platform:~/kria_kv260$ petalinux-create -t project -s ../kria_bsp/xilinx-k26-starterkit-v2
021.1-final.bsp -n kv260_os
INFO: Create project: kv260_os
INFO: New project successfully created in /home/parallels/kria_kv260/kv260_os
parallels@parallels-Parallels-Virtual-Platform:~/kria_kv260$ cd ./kv260_os/
parallels@parallels-Parallels-Virtual-Platform:~/kria_kv260/kv260_os$ ls
components  config.project  hardware  pre-built  project-spec  README  README.hw
parallels@parallels-Parallels-Virtual-Platform:~/kria_kv260/kv260_os$
```

要先將基本的 Petalinux build 起來，後面再加入 accelerated application 和 AI 等

等之類的項目

<command> petalinux-build

- 看電腦性能，我筆電 build 了兩小時

◆ Step 3: Applications

將 kv260 加入到 BOARD_VARIANT 中

<command> echo 'BOARD_VARIANT = "kv"' >> project-spec/meta-user/conf/petalinuxbsp.conf

接下來再將每個 kv260 四個 demo 加入到 user-rootfsconfig 中

- 這步應該是確保在用 xmutil getpkgs 時找得到相對應的 app 包

<command> echo 'CONFIG_packagegroup-kv260-smartcam' >> project-spec/meta-user/conf/user-rootfsconfig

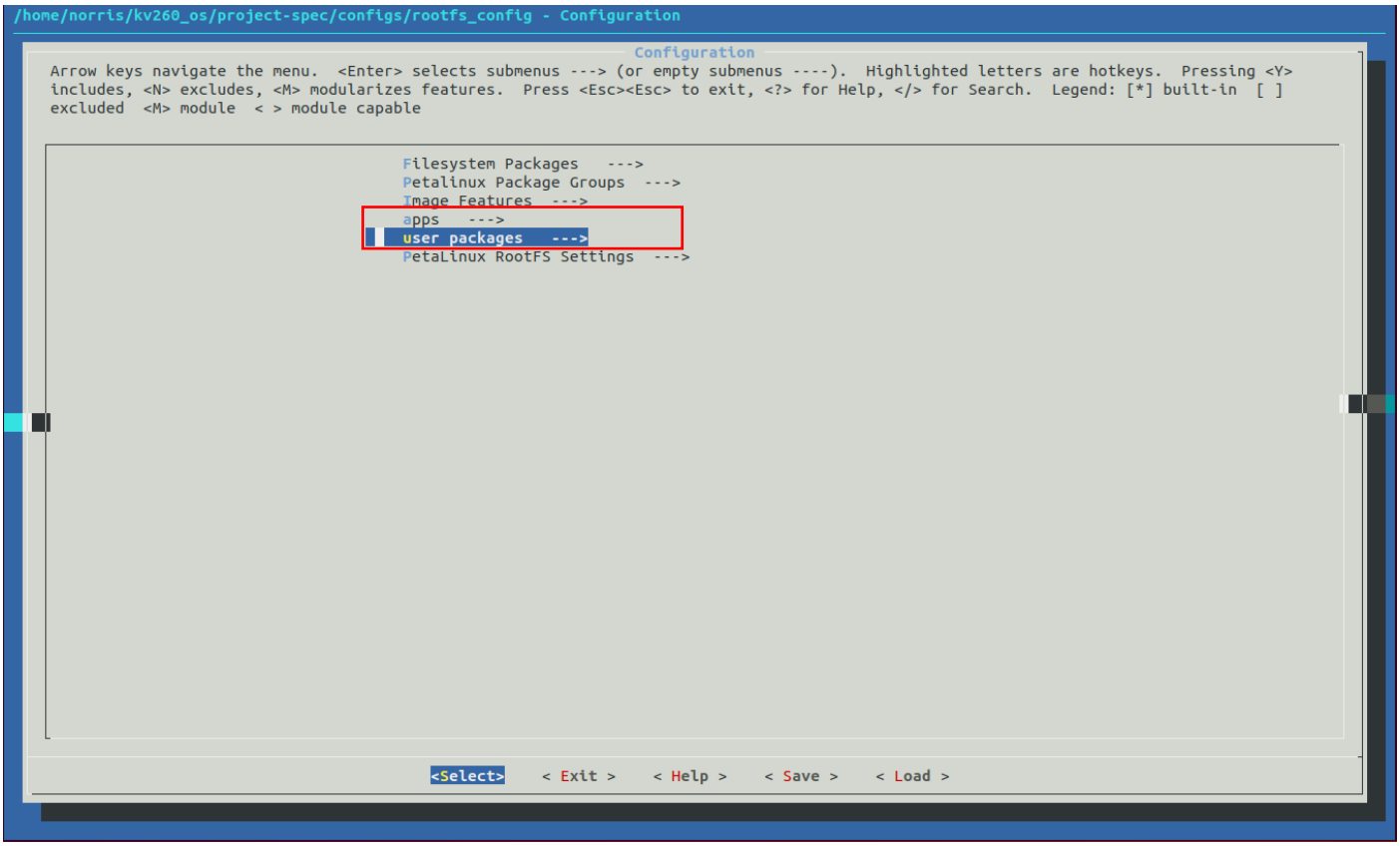
<command> echo 'CONFIG_packagegroup-kv260-aibox-reid' >> project-spec/meta-user/conf/user-rootfsconfig

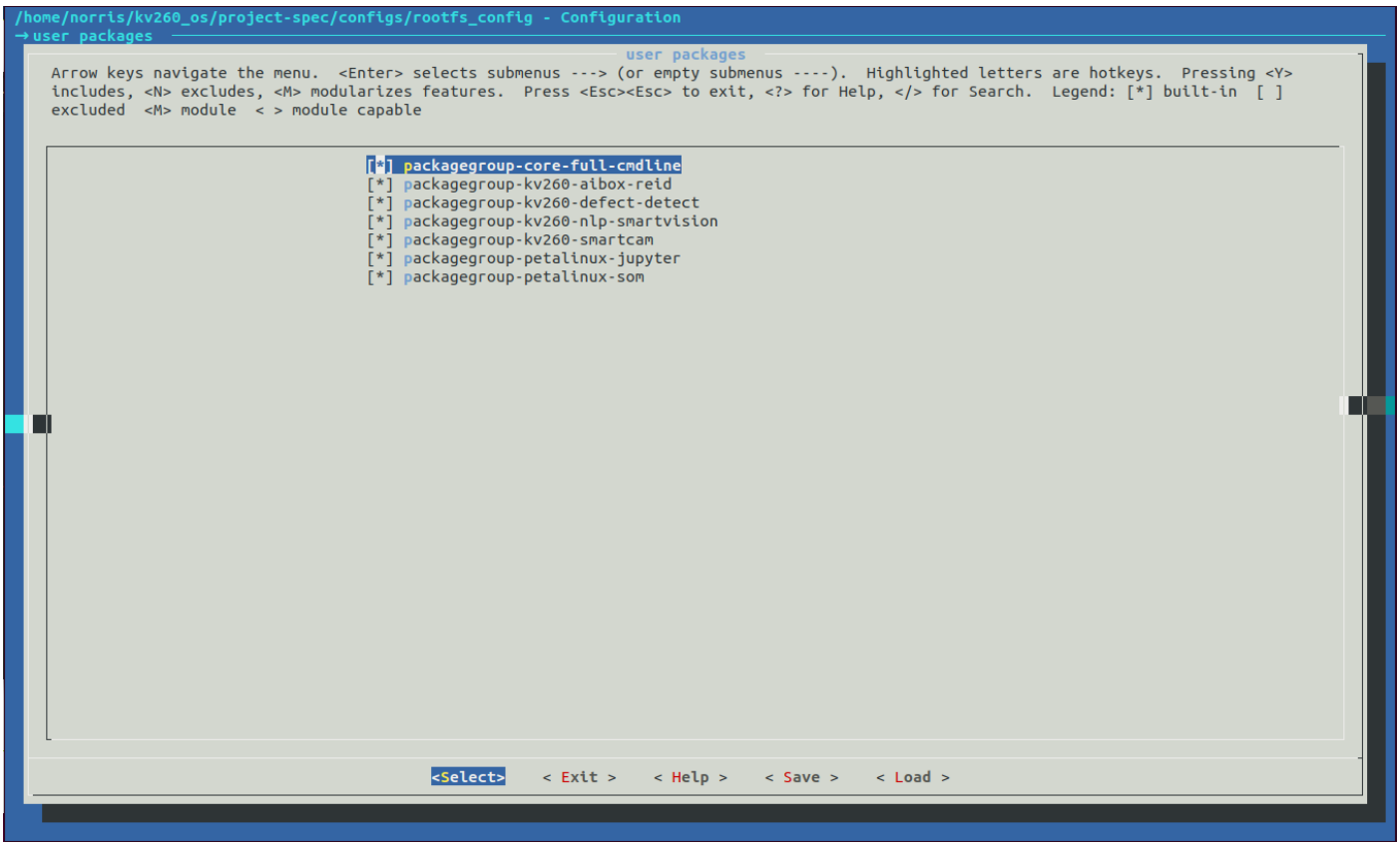
<command> echo 'CONFIG_packagegroup-kv260-defect-detect' >> project-spec/meta-user/conf/user-rootfsconfig

<command> echo 'CONFIG_packagegroup-kv260-nlp-smartvision' >> project-spec/meta-user/conf/user-rootfsconfig

最後啟用 root config 來勾選 image 要使用的應用

<command> petalinux-config -c rootfs


/home/norris/kv260_os/project-spec/configs/rootfs_config - Configuration
Configuration
Arrow keys navigate the menu. <Enter> selects submenus ---> (or empty submenus ----). Highlighted letters are hotkeys. Pressing <Y> includes, <N> excludes, <M> modularizes features. Press <Esc><Esc> to exit, <?> for Help, </> for Search. Legend: [*] built-in [ ] excluded <M> module < > module capable
Filesystem Packages --->
Petalinux Package Groups --->
Image Features --->
apps --->
user packages --->
PetaLinux RootFS Settings --->
<Select>
< Exit >
< Help >
< Save >
< Load >


/home/norris/kv260_os/project-spec/configs/rootfs_config - Configuration
→user packages
user packages
Arrow keys navigate the menu. <Enter> selects submenus ---> (or empty submenus ----). Highlighted letters are hotkeys. Pressing <Y> includes, <N> excludes, <M> modularizes features. Press <Esc><Esc> to exit, <?> for Help, </> for Search. Legend: [*] built-in [ ] excluded <M> module < > module capable
[*] packagegroup-core-full-cmdline
[*] packagegroup-kv260-aibox-reid
[*] packagegroup-kv260-defect-detect
[*] packagegroup-kv260-nlp-smartvision
[*] packagegroup-kv260-smartcam
[*] packagegroup-petalinux-jupyter
[*] packagegroup-petalinux-som
<Select>
< Exit >
< Help >
< Save >
< Load >

```
norris@ubuntu:~/kv260_os$ petalinux-config -c rootfs
[INFO] Sourcing buildtools
[INFO] Silentconfig project
[INFO] Generating kconfig for Rootfs
[INFO] Menuconfig rootfs


*** End of the configuration.
*** Execute 'make' to start the build or try 'make help'.

[INFO] Generating plnxtool conf
[INFO] Successfully configured rootfs
```

- **Step 4: Build Petalinux Image**
  <command> petalinux-build

- **Step 5: Create SD Card Image**
  <command> petalinux-package --boot --u-boot --dtb images/linux/u-boot.dtb --force
  <command> petalinux-package --wic

- **Step 6: 使用 balenaEtcher 燒錄至 SD 卡**