Installing 2D Conv in the ARX Platform

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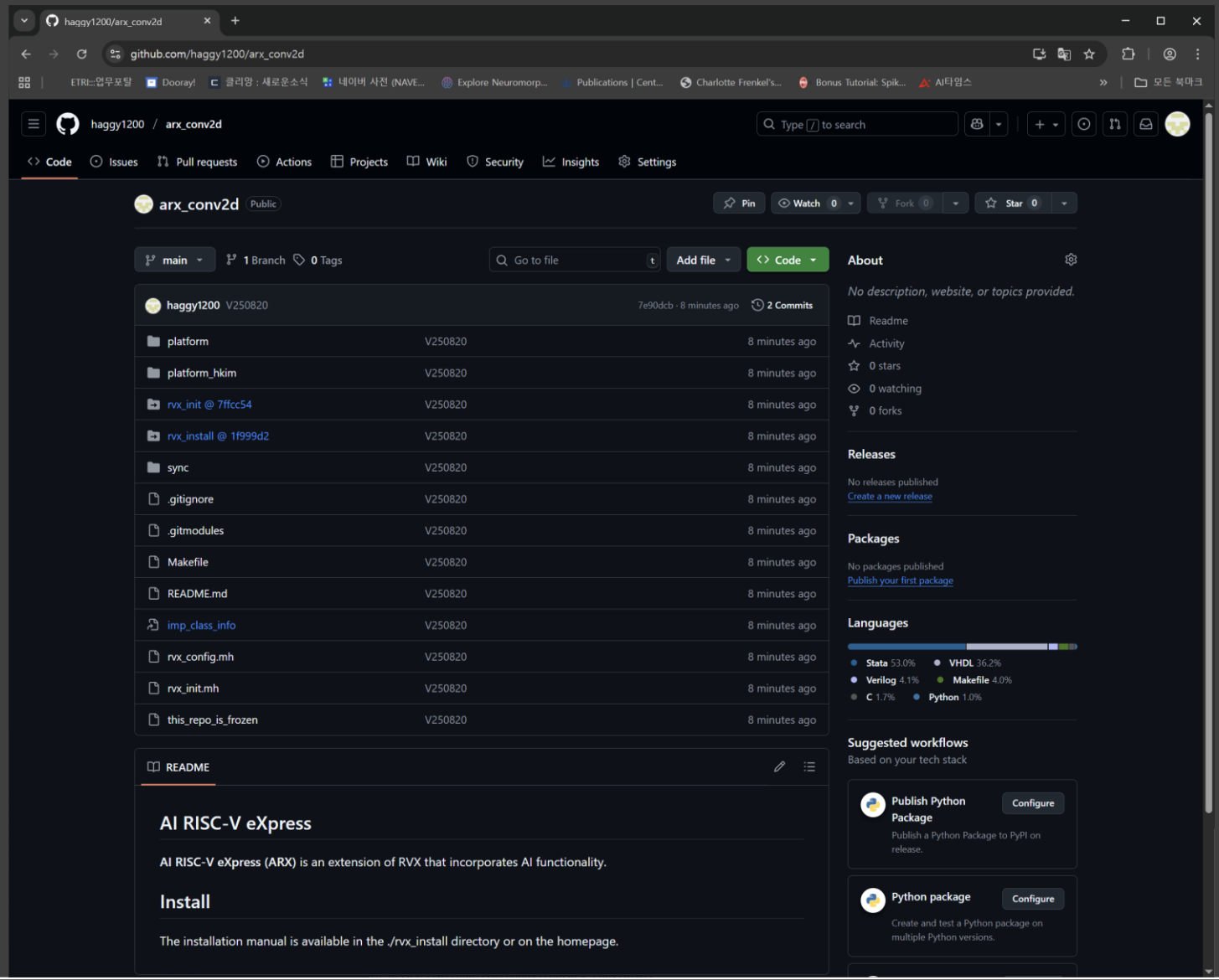
GitHub Address

- https://github.com/haggy1200/arx_conv2d.git



User Platform Configuration – arx_conv2d

- git clone
  - git clone --recursive https://github.com/haggy1200/arx_conv2d.git

```
[bash:hkim: ~/Y2025/aARX] git clone --recursive https://github.com/haggy1200/arx_conv2d.git
Cloning into 'arx_conv2d'...
remote: Enumerating objects: 84, done.
remote: Total 84 (delta 0), reused 0 (delta 0), pack-reused 84 (from 2)
Unpacking objects: 100% (84/84), 56.06 MiB ¦ 10.16 MiB/s, done.
Submodule 'rvx_init' (https://github.com/rvx-etri/rvx_init.git) registered for path 'rvx_init'
Submodule 'rvx_install' (https://github.com/rvx-etri/rvx_install.git) registered for path 'rvx_install'
Cloning into '/home0/hkim/Y2025/aARX/arx_conv2d/rvx_init'...
remote: Enumerating objects: 272, done.
remote: Counting objects: 100% (272/272), done.
remote: Compressing objects: 100% (115/115), done.
remote: Total 272 (delta 162), reused 265 (delta 155), pack-reused 0 (from 0)
Receiving objects: 100% (272/272), 34.04 KiB ¦ 1.70 MiB/s, done.
Resolving deltas: 100% (162/162), done.
Cloning into '/home0/hkim/Y2025/aARX/arx_conv2d/rvx_install'...
remote: Enumerating objects: 630, done.
remote: Counting objects: 100% (630/630), done.
remote: Compressing objects: 100% (223/223), done.
remote: Total 630 (delta 408), reused 611 (delta 389), pack-reused 0 (from 0)
Receiving objects: 100% (630/630), 13.90 MiB ¦ 15.96 MiB/s, done.
Resolving deltas: 100% (408/408), done.
Submodule path 'rvx_init': checked out '7ffcc5450e16cf5aa541394cccf16b0538d4014f'
Submodule path 'rvx_install': checked out '1f999d22727789931f6fc2895c85a5c15e63755b'
[bash:hkim: ~/Y2025/aARX]
```

```
[bash:hkim: ~/Y2025/aARX/arx_conv2d] l
total 60K
drwxrwxr-x 8 hkim hkim 4.0K Aug 20 16:50 ./
drwxrwxr-x 9 hkim hkim 4.0K Aug 20 16:50 ../
drwxrwxr-x 9 hkim hkim 4.0K Aug 20 16:50 .git/
-rw-rw-r-- 1 hkim hkim  273 Aug 20 16:50 .gitignore
-rw-rw-r-- 1 hkim hkim  185 Aug 20 16:50 .gitmodules
lrwxrwxrwx 1 hkim hkim   37 Aug 20 16:50 imp_class_info -> ./rvx_install/mini_git/imp_class_info/
-rw-rw-r-- 1 hkim hkim 1.1K Aug 20 16:50 Makefile
drwxrwxr-x 3 hkim hkim 4.0K Aug 20 16:50 platform/
drwxrwxr-x 3 hkim hkim 4.0K Aug 20 16:50 platform_hkim/
-rw-rw-r-- 1 hkim hkim  209 Aug 20 16:50 README.md
-rw-rw-r-- 1 hkim hkim 1.3K Aug 20 16:50 rvx_config.mh
drwxrwxr-x 2 hkim hkim 4.0K Aug 20 16:50 rvx_init/
-rw-rw-r-- 1 hkim hkim 4.4K Aug 20 16:50 rvx_init.mh
drwxrwxr-x 3 hkim hkim 4.0K Aug 20 16:50 rvx_install/
drwxrwxr-x 2 hkim hkim 4.0K Aug 20 16:50 sync/
-rw-rw-r-- 1 hkim hkim    0 Aug 20 16:50 this_repo_is_frozen
[bash:hkim: ~/Y2025/aARX/arx_conv2d]
```

User Platform Configuration – arx_conv2d

- Fork from baseline platfrom ‘arx-baseline’
  - make fork TARGET=/home0/hkim/Y2025/aARX/arx_conv2d

```
[bash:hkim: ~/RVX_BASE/arx-baseline] make fork TARGET=/home0/hkim/Y2025/aARX/arx_conv2d

"/home0/hkim/RVX_BASE/arx-baseline" is forked to "/home0/hkim/Y2025/aARX/arx_conv2d"
['dca']
[bash:hkim: ~/RVX_BASE/arx-baseline]
```

```
[bash:hkim: ~/Y2025/aARX/arx_conv2d] l
total 68K
drwxrwxr-x 9 hkim hkim 4.0K Aug 20 16:55 ./
drwxrwxr-x 9 hkim hkim 4.0K Aug 20 16:50 ../
drwxrwxr-x 9 hkim hkim 4.0K Aug 20 16:55 .git/
-rw-rw-r-- 1 hkim hkim  273 Aug 20 16:50 .gitignore
-rw-rw-r-- 1 hkim hkim  185 Aug 20 16:55 .gitmodules
lrwxrwxrwx 1 hkim hkim   37 Aug 20 16:55 imp_class_info -> ./rvx_install/mini_git/imp_class_info/
-rw-rw-r-- 1 hkim hkim 1.1K Aug 20 16:55 Makefile
drwxrwxr-x 3 hkim hkim 4.0K Aug 20 16:50 platform/
drwxrwxr-x 3 hkim hkim 4.0K Aug 20 16:50 platform_hkim/
-rw-rw-r-- 1 hkim hkim  209 Aug 20 16:55 README.md
-rw-rw-r-- 1 hkim hkim 1.3K Aug 20 16:55 rvx_config.mh
drwxrwxr-x 2 hkim hkim 4.0K Aug 20 16:55 rvx_init/
-rw-rw-r-- 1 hkim hkim 4.4K Aug 20 16:55 rvx_init.mh
drwxrwxr-x 3 hkim hkim 4.0K Aug 20 16:55 rvx_install/
-rw-rw-r-- 1 hkim hkim   25 Aug 20 16:55 rvx_python_config.mh
drwxrwxr-x 3 hkim hkim 4.0K Aug 20 16:55 rvx_special_ip/
drwxrwxr-x 2 hkim hkim 4.0K Aug 20 16:55 sync/
-rw-rw-r-- 1 hkim hkim    0 Aug 20 16:55 this_repo_is_frozen
[bash:hkim: ~/Y2025/aARX/arx_conv2d]
```

User Platform Configuration – arx_conv2d

- Preparation
  - cd ~/Y2025/aARX/arx_conv2d
  - make prepare
    - sudoer setting
      - yes, no, sudo password

```
[bash:hkim: ~/Y2025/aARX/arx_conv2d] make prepare
Do you want store sudo info? (bool) : yes
Are you registered as nopasswd sudoer? (bool) : no
Sudo password :
Reading package lists... Done
Building dependency tree
Reading state information... Done
gnome-terminal is already the newest version (3.36.2-1ubuntu1~20.04).
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
Reading package lists... Done
Building dependency tree
Reading state information... Done
sshpass is already the newest version (1.06-1).
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.

[bash:hkim: ~/Y2025/aARX/arx_conv2d] l
total 88K
drwxrwxr-x 9 hkim hkim 4.0K Aug 20 17:01 ./
drwxrwxr-x 9 hkim hkim 4.0K Aug 20 16:50 ../
drwxrwxr-x 9 hkim hkim 4.0K Aug 20 16:55 .git/
-rw-rw-r-- 1 hkim hkim  273 Aug 20 16:50 .gitignore
-rw-rw-r-- 1 hkim hkim  185 Aug 20 16:55 .gitmodules
lrwxrwxrwx 1 hkim hkim   37 Aug 20 16:55 imp_class_info -> ./rvx_install/mini_git/imp_class_info/
-rw-rw-r-- 1 hkim hkim 1.1K Aug 20 16:55 Makefile
drwxrwxr-x 3 hkim hkim 4.0K Aug 20 16:50 platform/
drwxrwxr-x 3 hkim hkim 4.0K Aug 20 16:50 platform_hkim/
-rw-rw-r-- 1 hkim hkim  209 Aug 20 16:55 README.md
-rw-rw-r-- 1 hkim hkim 1.3K Aug 20 16:55 rvx_config.mh
-rw-rw-r-- 1 hkim hkim  265 Aug 20 17:01 rvx_engine.log
drwxrwxr-x 2 hkim hkim 4.0K Aug 20 16:55 rvx_init/
-rw-rw-r-- 1 hkim hkim 4.4K Aug 20 16:55 rvx_init.mh
drwxrwxr-x 4 hkim hkim 4.0K Aug 20 17:01 rvx_install/
-rw-rw-r-- 1 hkim hkim   44 Aug 20 17:01 .rvx_key
-rw-rw-r-- 1 hkim hkim   25 Aug 20 16:55 rvx_python_config.mh
-rw-rw-r-- 1 hkim hkim  607 Aug 20 17:01 rvx_setup.sh
drwxrwxr-x 3 hkim hkim 4.0K Aug 20 16:55 rvx_special_ip/
-rw-rw-r-- 1 hkim hkim  334 Aug 20 17:01 .rvx_sudo_config
drwxrwxr-x 2 hkim hkim 4.0K Aug 20 16:55 sync/
-rw-rw-r-- 1 hkim hkim    0 Aug 20 16:55 this_repo_is_frozen
-rwxrwxr-x 1 hkim hkim  176 Aug 20 17:01 update.sh*
[bash:hkim: ~/Y2025/aARX/arx_conv2d]
```

User Platform Configuration – arx_conv2d

- Activation
  - make activate

```
[bash:hkim: ~/Y2025/aARX/arx_conv2d] make activate
[ocd]
Downloaded
[minicom]
[telnet]
[gui]
Downloaded
Activate Success: Reopen the terminal
[bash:hkim: ~/Y2025/aARX/arx_conv2d] l
total 120K
drwxrwxr-x 17 hkim hkim 4.0K Aug 20 17:06 ./
drwxrwxr-x  9 hkim hkim 4.0K Aug 20 16:50 ../
drwxrwxr-x  9 hkim hkim 4.0K Aug 20 17:06 .git/
-rw-rw-r--  1 hkim hkim  273 Aug 20 16:50 .gitignore
-rw-rw-r--  1 hkim hkim  185 Aug 20 16:55 .gitmodules
lrwxrwxrwx  1 hkim hkim   37 Aug 20 16:55 imp_class_info -> ./rvx_install/mini_git/imp_class_info/
drwxrwxr-x  4 hkim hkim 4.0K Aug 20 17:06 local_setup/
-rw-rw-r--  1 hkim hkim 1.1K Aug 20 16:55 Makefile
drwxrwxr-x  2 hkim hkim 4.0K Aug 20 17:06 manual/
drwxrwxr-x  3 hkim hkim 4.0K Aug 20 16:50 platform/
drwxrwxr-x  3 hkim hkim 4.0K Aug 20 16:50 platform_hkim/
-rw-rw-r--  1 hkim hkim  209 Aug 20 16:55 README.md
drwxrwxr-x  5 hkim hkim 4.0K Aug 20 17:06 rvx_binary/
-rw-rw-r--  1 hkim hkim 1.3K Aug 20 16:55 rvx_config.mh
drwxrwxr-x  4 hkim hkim 4.0K Aug 13 15:44 rvx_devkit/
-rw-rw-r--  1 hkim hkim  312 Aug 20 17:06 rvx_engine.log
drwxrwxr-x  9 hkim hkim 4.0K Aug 13 13:06 rvx_hwlib/
drwxrwxr-x  2 hkim hkim 4.0K Aug 20 16:55 rvx_init/
-rw-rw-r--  1 hkim hkim 4.4K Aug 20 16:55 rvx_init.mh
drwxrwxr-x  4 hkim hkim 4.0K Aug 20 17:01 rvx_install/
-rw-rw-r--  1 hkim hkim   44 Aug 20 17:01 .rvx_key
-rw-rw-r--  1 hkim hkim   25 Aug 20 16:55 rvx_python_config.mh
-rw-rw-r--  1 hkim hkim  607 Aug 20 17:01 rvx_setup.sh
drwxrwxr-x  3 hkim hkim 4.0K Aug 20 16:55 rvx_special_ip/
drwxrwxr-x 17 hkim hkim 4.0K Aug 13 10:59 rvx_ssw/
-rw-rw-r--  1 hkim hkim  334 Aug 20 17:01 .rvx_sudo_config
drwxrwxr-x 12 hkim hkim 4.0K Aug 20 17:06 rvx_synthesizer_obfuscated/
drwxrwxr-x  4 hkim hkim 4.0K Aug 20 17:06 rvx_util/
drwxrwxr-x  2 hkim hkim 4.0K Aug 20 17:06 sync/
-rw-rw-r--  1 hkim hkim    0 Aug 20 16:55 this_repo_is_frozen
-rwxrwxr-x  1 hkim hkim  176 Aug 20 17:01 update.sh*
[bash:hkim: ~/Y2025/aARX/arx_conv2d]
```

User Platform Simulation – arx_conv2d

- RTL Simulation
  - If you only want to test the FPGA Board, you can skip this step.

  - Tool
    - QuestaSim 2024.3 (64-bit) or
    - Lower versions of ModelSim or
    - Verification tool you want

  - Verification process is as follows:
    - source rvx_setup.sh
    - cd platform_hkim
    - cd test_conv_hw
    - make syn sim_rtl
    - cd sim_rtl
    - make app_list
    - make verify_conv_hw

```
#        40
#       -41
#        42
#        43
#       -44
#
#        45
#        46
#       -47
#        48
#        49
#       -50
#        51
#        52
#
#       -53
#        54
#        55
#       -56
#        57
#        58
#       -59
#        60
# run @ dca_matrix_conv2d.c
# all correct        ← You can check this message (The SW results and HW results are the same)
# [PROC_STATUS]  1 cores have finished @          848831000 ns
# ** Note: $finish    : /home0/hkim/Y2025/aARX/arx_conv2d/rvx_hwlib/lib_sim/ncsim/src/ncsim_manager.v(65)
#    Time: 8583724120 ps  Iteration: 0  Instance: /TEST_CONV_HW_SIM/i_ncsim_manager
# End time: 17:13:32 on Aug 20,2025, Elapsed time: 0:00:29
# Errors: 0, Warnings: 4
```

User Platform Test on Board – Genesys2

- FPGA Prototyping
  - 1) Check <rvx_each.mh>
  - 2) Check FPGA list
    - make fpga_list
      - edge, genesys2, arty-35t, arty-50,
      - arty-100t, arty-25, edge-19p
  - 3) Generate FPGA Prototype DIR
    - make fpga
      - imp_genesys2_2025-08-20 is generated
  - 4) Generate a Xilinx Project
    - cd imp_genesys2_2025-08-20
    - make project
  - 5) FPGA Implementation (.bit generation)
    - make imp

rvx_each.mh (~/Y2025/aARX/arx_conv2d/platform_hkim/test_conv_hw)

```
1 #TEST_APP_NAME=
2 VERIFY_APP_NAME=verify_conv_hw
3 DEFAULT_FPGA_NAME=genesys2
```

```
[bash:hkim: ~/Y2025/aARX/arx_conv2d/platform_hkim/test_conv_hw] make fpga_list
edge
genesys2
arty-35t
arty-50
arty-100t
arty-25
edge-19p
```

```
[bash:hkim: ~/Y2025/aARX/arx_conv2d/platform_hkim/test_conv_hw] make fpga
[bash:hkim: ~/Y2025/aARX/arx_conv2d/platform_hkim/test_conv_hw] ls
app/   imp_genesys2_2025-08-20/  rvx_each.mh     sim_rtl/          user/
arch/  Makefile                  rvx_engine.log  test_conv_hw.xml  wave.do*
[bash:hkim: ~/Y2025/aARX/arx_conv2d/platform_hkim/test_conv_hw]
```

```
[bash:hkim: ~/Y2025/aARX/arx_conv2d/platform_hkim/test_conv_hw] cd imp_genesys2_2025-08-20/
[bash:hkim: ~/Y2025/aARX/arx_conv2d/platform_hkim/test_conv_hw/imp_genesys2_2025-08-20] make project

****** Vivado v2022.2 (64-bit)
  **** SW Build 3671981 on Fri Oct 14 04:59:54 MDT 2022
  **** IP Build 3669848 on Fri Oct 14 08:30:02 MDT 2022
    ** Copyright 1986-2022 Xilinx, Inc. All Rights Reserved.

source /home0/hkim/Y2025/aARX/arx_conv2d/rvx_devkit/env/xilinx/make_project.tcl
##       source ${SET_FALSE_PATH_FILE}
##       touch ${IMP_RESULT_DIR}/set_false_path
## }
# close_project
INFO: [Common 17-206] Exiting Vivado at Wed Aug 20 17:32:35 2025...
```

```
[bash:hkim: ~/Y2025/aARX/arx_conv2d/platform_hkim/test_conv_hw/imp_genesys2_2025-08-20] make imp

****** Vivado v2022.2 (64-bit)
  **** SW Build 3671981 on Fri Oct 14 04:59:54 MDT 2022
  **** IP Build 3669848 on Fri Oct 14 08:30:02 MDT 2022
    ** Copyright 1986-2022 Xilinx, Inc. All Rights Reserved.
INFO: [Common 17-206] Exiting Vivado at Wed Aug 20 17:56:35 2025...
Bit: Generated
Timing: Success
```

User Platform Test on Board – Genesys2

- Run Application
  - 1) Use existing app
    - ~/platform_hkim/test_conv_hw/app/verify_conv_hw
  - 2) Turn on the test board
  - 3) FPGA programming
    - make program
  - 4) Open the printf output window
    - make printf
  - 5) Check app list
    - make app_list
  - 6) Run app
    - make verify_conv_hw.all
  - The platform is installed properly !!

```
Welcome to minicom 2.7.1

OPTIONS: I18n
Compiled on Dec 23 2019, 02:06:26.
Port /dev/ttyUSB1

Press CTRL-A Z for help on special keys


[RVX/START] EMU@FPGA


***[[ CONV ]]***
run @ dca_matrix_conv2d.c
all correct

[RVX/END]
```

← Check Results

```
[bash:hkim: ~/Y2025/aARX/arx_conv2d/platform_hkim/test_conv_hw/imp_genesys2_2025-08-20] make program

****** Vivado v2022.2 (64-bit)
  **** SW Build 3671981 on Fri Oct 14 04:59:54 MDT 2022
  **** IP Build 3669848 on Fri Oct 14 08:30:02 MDT 2022
    ** Copyright 1986-2022 Xilinx, Inc. All Rights Reserved.

source /home0/hkim/Y2025/aARX/arx_conv2d/rvx_devkit/env/xilinx/program_fpga.tcl
# set define_list {}
# source ./set_path.tcl

...

# }
INFO: [Labtools 27-3164] End of startup status: HIGH
program_hw_devices: Time (s): cpu = 00:00:07 ; elapsed = 00:00:07 . Memory (MB): peak = 3663.984 ; gain = 1.000 ;
free physical = 7401 ; free virtual = 28854
INFO: [Labtoolstcl 44-464] Closing hw_target localhost:3121/xilinx_tcf/Digilent/200300BD50FEB
INFO: [Common 17-206] Exiting Vivado at Thu Aug 21 08:23:50 2025...

[bash:hkim: ~/Y2025/aARX/arx_conv2d/platform_hkim/test_conv_hw/imp_genesys2_2025-08-20] make printf

[bash:hkim: ~/Y2025/aARX/arx_conv2d/platform_hkim/test_conv_hw/imp_genesys2_2025-08-20] make app_list
verify_conv_hw
hello

bash:hkim: ~/Y2025/aARX/arx_conv2d/platform_hkim/test_conv_hw/imp_genesys2_2025-08-20] make verify_conv_hw.all
/home0/hkim/Y2025/aARX/arx_conv2d/rvx_binary/compiler_basic/bin/riscv64-unknown-elf-gcc -g -O1 -march=rv32im -
mabi=ilp32 -fno-delete-null-pointer-checks -MD -Wall -fno-builtin-printf -fno-reorder-functions -fdata-sections -
ffunction-sections -DUSE_MATRIX_OPT -
I/home0/hkim/Y2025/aARX/arx_conv2d/platform_hkim/test_conv_hw/app/verify_conv_hw/genesys2.debug/include -
I/home0/hkim/Y2025/aARX/arx_conv2d/rvx_ssw/memorymap -
I/home0/hkim/Y2025/aARX/arx_conv2d/platform_hkim/test_conv_hw/arch/ssw/src -
I/home0/hkim/Y2025/aARX/arx_conv2d/rvx_ssw/core/orca_plus -I/home0/hkim/Y2025/aARX/arx_conv2d/rvx_ssw/riscv -
I/home0/hkim/Y2025/aARX/arx_conv2d/rvx_ssw/system_utility/src -
I/home0/hkim/Y2025/aARX/arx_conv2d/rvx_ssw/utility/src -I/home0/hkim/Y2025/aARX/arx_conv2d/rvx_ssw/uthash/src -
I/home0/hkim/Y2025/aARX/arx_conv2d/rvx_ssw/image/src -I/home0/hkim/Y2025/aARX/arx_conv2d/rvx_ssw/matrix/src -
I/home0/hkim/Y2025/aARX/arx_conv2d/rvx_ssw/mmiox/src -I/home0/hkim/Y2025/aARX/arx_conv2d/rvx_ssw/api/munoc/src -
I/home0/hkim/Y2025/aARX/arx_conv2d/rvx_ssw/api/platform_controller/src -
I/home0/hkim/Y2025/aARX/arx_conv2d/rvx_ssw/api/uart/src -I/home0/hkim/Y2025/aARX/arx_conv2d/rvx_ssw/api/spi/src -
I/home0/hkim/Y2025/aARX/arx_conv2d/rvx_ssw/api/i2c/src -I/home0/hkim/Y2025/aARX/arx_conv2d/rvx_ssw/api/gpio/src -
I/home0/hkim/Y2025/aARX/arx_conv2d/rvx_ssw/api/external_peri_group/src -
I/home0/hkim/Y2025/aARX/arx_conv2d/rvx_ssw/api/timer/src -I/home0/hkim/Y2025/aARX/arx_conv2d/rvx_ssw/api/dca/src
-I/home0/hkim/Y2025/aARX/arx_conv2d/platform_hkim/test_conv_hw/util/generated/ssw -
I/home0/hkim/Y2025/aARX/arx_conv2d/platform_hkim/test_conv_hw/user/paco -c
/home0/hkim/Y2025/aARX/arx_conv2d/platform_hkim/test_conv_hw/arch/ssw/src/ip_instance_info.c
...
I/home0/hkim/Y2025/aARX/arx_conv2d/rvx_ssw/api/timer/src -I/home0/hkim/Y2025/aARX/arx_conv2d/rvx_ssw/api/dca/src
-I/home0/hkim/Y2025/aARX/arx_conv2d/platform_hkim/test_conv_hw/util/generated/ssw -
I/home0/hkim/Y2025/aARX/arx_conv2d/platform_hkim/test_conv_hw/user/paco -
L/home0/hkim/Y2025/aARX/arx_conv2d/platform_hkim/test_conv_hw/app/verify_conv_hw/genesys2.debug/etc  -o
/home0/hkim/Y2025/aARX/arx_conv2d/platform_hkim/test_conv_hw/app/verify_conv_hw/genesys2.debug/verify_conv_hw.tes
t_conv_hw.elf
```

Application & Limitation

- Location
  - ~/arx_conv2d/platform_hkim/test_conv_hw/app/verify_conv_hw/src/main.c
  - This example,
    - performs 2D Conv with 3×3 kernel on 8×8 input
    - Output (6×6)
      - SW function : matrix_conv_sw()
      - HW function : mop_mapping->matrix_conv()
        - mapping to <i_dca_matrix_conv00_conv>
      - If the results are the same, “all correct” is printed
  - HW Limitation
    - Only integer data is supported
    - Max kernel size = 7×7
    - Max image size = 14×14
      - Kernel/image size can be adjusted during synthesis
    - Fixed to Padding=0 / Stride=1
    - If the output size is larger than 8×8, the result will not be output
      - The platform's output operates based on 8×8 output
      - Operations are possible in 2D Conv, but they are not transmitted to the platform output
      - Currently only possible when (Input size – kernel size > 7)
        - Input = 14×14, kernel < 6×6 – not processed
        - Input = 13×13, kernel < 5×5 – not processed
      - Work in progress to prevent output larger than 8×8 in SW

```
#define NUN_MATRIX 1
#define INPUT_MATRIX_SIZE 8
#define KERNEL_MATRIX_SIZE 3
#define RESULT_CHECK 1

#define MATRIX_DATATYPE MATRIX_DATATYPE_SINT32 // 32-bit signed integer

ErvpMatrixInfo* input_info = NULL;      → input
ErvpMatrixInfo* kernel_info = NULL;     → kernel
ErvpMatrixInfo* output_info = NULL;     → output
ErvpMatrixInfo* ref_info = NULL;        → reference (for checking result)

Int main()
{
  if(EXCLUSIVE_ID==0) {
    ervp_mop_mapping_t* mop_mapping = matrix_op_mapping_alloc();
    map_your_matrix_function(mop_mapping);

    printf_section(1, “CONV”);

    ervp_mconv_option_t conv_option;
    conv_option.value = 0;
    conv_option.br.rshift = 0;

    input_info = matrix_alloc(MATRIX_DATATYPE, INPUT_MATRIX_SIZE, INPUT_MATRIX_SIZE, NULL);
    kernel_info = matrix_alloc(MATRIX_DATATYPE, KERNEL_MATRIX_SIZE, KERNEL_MATRIX_SIZE, NULL);
    output_info = matrix_conv_alloc_output(input_info, kernel_info, conv_option.value);
    ref_info = matrix_conv_alloc_output(input_info, kernel_info, conv_option.value);

    for(int i=0; i<NUN_MATRIX; i=i+1) {
      // generate input
      generate_test_matrix(input_info, i);
      generate_test_matrix(kernel_info, i);
      matrix_conv_sw(input_info, kernel_info, ref_info, conv_option.value); → SW
      mop_mapping->matrix_conv(mop_mapping, input_info, kernel_info, output_info, conv_option.value); → HW

      if(RESULT_CHECK) { → SW/HW result check
        int all_are_equal = matrix_compare(output_info, ref_info, 1);
        if(!all_are_equal)
        {
          //matrix_print(input_info);
          //matrix_print(kernel_info);
          matrix_print(output_info);
          matrix_print(ref_info);
          assert(0);
          break;
        }
      }
    }
  }
  return 0;
}
```