autware source code can build and test in Hardware environment like Renesas environment #3058

Unanswered **anilbommareddy** asked this question in **Q&A**

anilbommareddy on Nov 21, 2022

Is autware source code can build and test in Hardware environment like Renesas environment(only CPU-multi core)
example : In Renesas board connected-camera sensors or simulation like Canoe environment + autoware build source code- falsh binaries to the Renesas board -check the runtime behavior like pedestrian or obstacle detection ?

↑ 1

Category
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Labels
None yet

4 participants

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harihitode on Nov 22, 2022

@anilbommareddy Hi, I have the same interests to you about porting Autoware to some emdedded platforms.
Dose your target board have Ubuntu or any OS supporting ROS2 stack?

↑ 1 👍 1 2 replies

anilbommareddy on Nov 28, 2022 Author

@harihitode yes it have Ubuntu packages.

harihitode on Nov 28, 2022

Hi, @anilbommareddy

Basically you can build Autoware.universe on any Ubuntu-supported platforms except some packages like scenario simulator or tensor-rt based perception packages. They might depend on Intel or nvidia specific libraries.

As @liuXinGangChina says in https://github.com/orgs/autowarefoundation/discussions/3058#discussioncomment-4251563, some tweaks will be required to run object detection without GPGPU.

YOLO v4 is the NN model for object detection now and it seems compute-intensive.
There are another detection packages, Euclidean Clustering using LiDAR, but it also takes lots of CPU power.

I have ported Autoware to a non-Intel systems. I am sure you can also do it if your system's CPU power meets your Autoware configurations.

liuXinGangChina on Nov 22, 2022 Collaborator

Hi, **@anilbommareddy** .
Currently you can run autoware without build from the source code. Please take look into this tutorial

Autoware use yolo(tensor-rt based) for camera based segmentation of pedestrian or obstacle. You may need to implement that part using the unique neural accelerator on your board.

Welcome joining the Autoware big family!
Happy hacking!

↑ 1 👍 1 0 replies

arjunshetty955 on Nov 28, 2022

@liuXinGangChina **@harihitode** **@anilbommareddy** I'd also interest in porting Autoware to embedded platforms -multi core envrinoment(CPU) instead of using GPU accelerator.off course GPU accelerator may have better performance compared to multi core environment.And also I would like to contribute and check feasibility in multi core environment like shared/Distributed environment using OpenMP+OpenMPI. I'm able successful build autoware branch . Could you please help me how to test the use cases like traffic light detection use case,lidar_centerpoint use case,euclidean_cluster - with using simulator + data sets need to uses and without using simulator +data set.

↑ 1 4 replies

liuXinGangChina on Nov 28, 2022 Collaborator edited

hi, **@arjunshetty955**

1. For testcase like traffic light detection , you need some work to run NN-models on cpu rather than gpu(like using TVM)
2. For testing, you may consider using autoware's new-released offcial simulator AWSIM to generate sensor data

Welcome joining the Autoware big family!
Happy hacking

arjunshetty955 on Nov 28, 2022 edited

Hi liuXinGangChina ,
For euclidean_cluster and lidar_centerpoint use cases also need some work to run NN-Models on CPU.?
is any sample data can be run in Ubuntu(Desktop) environment like hard coded in command line like terminal rather than using Simulator or test tools. ?
In this link https://autowarefoundation.github.io/autoware-documentation/main/how-to-guides/running-autoware-without-cuda mentioned Running traffic light detection without CUDA-It mean this traffic light dection run in CPU environment ?

liuXinGangChina on Nov 29, 2022 Collaborator edited

hi, **@harihitode**
euclidean_cluster only use cpu to do the math
while lidar_centerpoint is definitely an nn based solution

yes any nodes in autoware is developed following the data-driven concept. If you want to test them you have to feed some data into those nodes(eg. data from a rosbag or data from a real sensor or data from a simulator)

Happy hacking!

👍 1

anilbommareddy on Dec 11, 2022 Author

I'd following the questions on Autoware.it help me on better understanding in CPU environment i.e without using GPU-to implement that part using the unique neural accelerator on your board.

1. for complete use case like 360-degree sensing by the camera-LiDAR fusion or Recognition of dynamic objects or any sample use case-how to understand code flow & testing flow using Data sets via command line in terminal example:
   $ rosbag play --pause
   ~/shared_dir/sample_moriyama_150324.bag --clock
   $roslaunch autoware_quickstart_examples my_map.launch
   $roslaunch autoware_quickstart_examples my_sensing.launch
   $ roslaunch lidar_localizer ndt_matching_monitor.launch &
   $ rostopic echo /ndt_monitor/ndt_status

2.How to build autoware.universe(https://github.com/autowarefoundation/autoware.universe.git) repo only and test .
3.I tried to download below sample data gets and got an error like timeout
wget http://db3.ertl.jp/autoware/sample_data/sample_moriyama_data.tar.gz
$ wget http://db3.ertl.jp/autoware/sample_data/sample_moriyama_150324.tar.gz
4.Euclidean Clustering using LiDAR:Could you please provide a sample data to test via command line in the terminal.
5.In my environment not able to use AWSIM simulation demo due to GPU drivers issues

arjunshetty955 on Nov 28, 2022

hi **@daichi** Murakami,
I'm also able to build autoware like https://github.com/autowarefoundation/autoware.git in the Ubuntu environment.
Here I'm not able to figure out how to run one sample test case in an autoware environment to check the behaviour of CPU serial execution(without
using Cuda/GPU) and underon it stand and try to execute in openMPI+openMP
environment rather than using Cuda wrt Autoware.
...

↑ 1

2 replies

harihitode on Nov 30, 2022

Hi, **@arjunshetty955**

@liuXinGangChina already has commented a helpful answer, but this is just my note ;)

For lidar point segmentation, Autoware.universe has two packages. One is lidar center point using an NN model and the other is euclidian clustering without NN model.

Now the packages which use NN models are not executed on CPU-only environment. Therefore you can check only euclidian clustering as lidar point segmentation in your case. (Every other NN packages like traffic light recognition, object detection need GPGPU.)

For dataset to check there functionalities, there seems not to be any rosbag, but you can use AWSIM which is a full-end to end world simulator including LiDAR/Camera sensors.

I'm sure you can generate dataset as you wish using AWSIM. I can actually generate dataset to check traffic-light-recognition successfully.

arjunshetty955 on Nov 30, 2022

@harihitode Thank you for sharing your note. I will check on this note in my environment

@harihitode and @liuXinGangChina: Instead of using colcon configuration and colcon build, Autoware repos can be build using Cmake-gcc/clang ?