Add independent camera module to Autoware #2646

plane-li started this conversation in **General**

plane-li on Jun 2, 2022   `Collaborator`

Camera is an important sensor in Autoware, which detects object with semantic information, lane mark ,traffic light and traffic sign.
However it need more computing power, memory, and bandwidth than other modules. It is more convenient and reasonable to make the camera detection pipeline into an independent launch file which allows users to deploy Autoware on distributed hardware platform.

There are three main reasons:
1.Compared to LiDAR which is used for detection and localization, camera is only used for detection and could be easily decoupled from the arch.
2.Users of Autoware often do some changes in the quantity of camera,cnn-model and algorithm about visual detection. It is easy for users to do more research.
3.Hardware configurations of each automatic driving company/OEM are different,and some of them select smart camera such as Mobileye to handle visual detection. Considering the compatibility of hardware, this can help to commercialize Autoware.

The architecture we propose is that all the sub modules such as camera-driver, image processing, CNN run on the same hardware with hardware acceleration unit, and it has independent launch file to run them. The perception module receives the camera detection results for fusion.
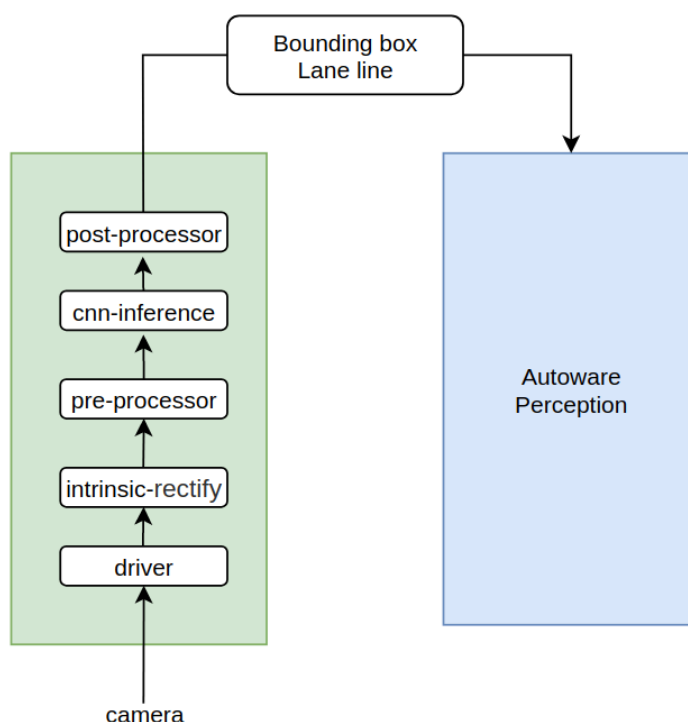
Category

💬 General

Labels

None yet

4 participants

↑ 1

0 comments · 5 replies

yukkysaito on Jun 6, 2022 `Maintainer`

@plane-li In TIER IV, we use edge ECUs(ROS Cube) for camera and neural networks. And the result of neural networks on the edge ECU send to the main Autoware ECU. @miursh @aohsato Can you share more details of our distributed perception system?

↑ 1   4 replies

plane-li on Jun 6, 2022 `Collaborator` `Author`

Thank you! Is your result of neural networks 2D-bbox or 3D-bbox ? yolo only outputs 2D-bbox in image,which is hard to fuse with lidar when the object is far away from ego-car.
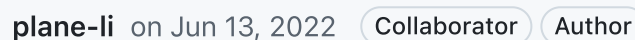
miursh on Jun 6, 2022 `Collaborator`

Out output from the edge ECU is 2D-bbox.
This is the rough diagram for out perception system.

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aohsato on Jun 13, 2022 (Collaborator)

@plane-li As you say, processing camera data requires a lot of resources, so we have already distributed the processing to JetsonXavier-based ECUs.
Another reason is that we want to use a GMSL camera for automotive.

Currently, it outputs the 2D bounding box and the result of traffic signal recognition.
The output of the 3D bounding box is still in the research stage, but it is possible in the future.

👍 1

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plane-li on Jun 13, 2022 (Collaborator) (Author)

Oh,we are doing the same work about visual perception,thank u!

👍 1