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Programming for Mechatronic Systems Autumn 2017 41012-2017-AUTUMN-CITY | Discussion Board

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Thread: Please elaborate on Fusion

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Peter De Jersey 7 days ago

Please elaborate on Fusion

Overall Rating:

What is meant by

"On creation be set to a fusion method (min/max/average)"

and

"Produce a fusion of sensor reading with specified fusion method and dealing with readings that are on the boundary of the sensing range (max range)."

The returned data from each sensor will most likely be in the form of an array or vector with both a value and an angle. Is this saying that the returned data should be sorted using min/max/average?

Please elaborate on fusion.

Cheers,
Pete

Reply

Nicolas Giovanangeli 7 days ago

RE: Please elaborate on Fusion

Overall Rating:

Copied over from other discussion thread

I also was wondering if we could some more information on fusion.

Also what is meant by: "No implicit coupling between classes that disables reuse"

I've found a couple examples of implicit/explicit coupling in terms of virtual functions, though I am a bit unsure in terms of translating them into a clear criteria for modularity.
Could we also get an example/elaboration on this component to better understand this part of the criteria?

Cheers,
Nicolas

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Alen Alempijevic 5 days ago

RE: Please elaborate on Fusion

Overall Rating:

The sensors provide data with overlapped field of view (FOV). This means some sensor readings will originate from the same physical space. In these circumstances the data needs now to be combined/fused together. While in robotic perception this is often done probabilistically, taking into account sensor modalities for the purpose of this subject fusion implies the data is combined using a simplistic approach, the max/min or mean of the data in the overlapping FOV of each readings needs to be processed.

Tad confused over the comment of sorting, the data needs to be combined, but the overall data after fusion is still in same order (data is generally counterclockwise if it is an array or other STL container). Another algorithm would take the data and make decision, such as you have done in maze in Mechatronics 2. Let's say just pure random walk avoiding the closest wall, so if the sensor data is supplied out of order this would be catastrophic for selecting where to move the robot.

No implicit coupling means that you need to ensure which classes of the project need to know of the other class (have the header files included). Not every class needs to know about the other, a tangled web can not be broken, and if you added another class to use output of fusion or maybe raw sensors then you would need to make sure if has dependency on only a subset of the original classes.

▲ Hide 3 replies

Peter De Jersey 5 days ago

RE: Please elaborate on Fusion

COLLAPSE

Overall Rating:

Thanks for clearing that oNe up Alen, that makes a lot more sense.

I just have one more question - the laser range finder is the only sensor with an

angular resolution. Are we just assuming the angular resolution for the other sensors? I.e. Take measurements every 5 degrees or something similar for the Sonar and Radar Sensors?

Cheers,

Pete

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Alen Alempijevic 3 days ago

RE: Please elaborate on Fusion

Overall Rating:

The laser scanner returns multiple readings, the sonar and radar only return a single reading (as per drawing), from entire field of view.

▲ Hide 1 reply

Peter De Jersey 1 day ago

RE: Please elaborate on Fusion

Overall Rating:

To clarify further;

if we have a laser range finder with angular resolution of 30 we will have 7 readings at angles: 0, 30, 60, 90, 120, 150, and 180 degrees.

Will our fused data also have 7 readings (or 13 if a 15 degree resolution is chosen)?

OR are you expecting something else such as fused data in one degree increments?

Thanks,

Peter

Select: All None

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