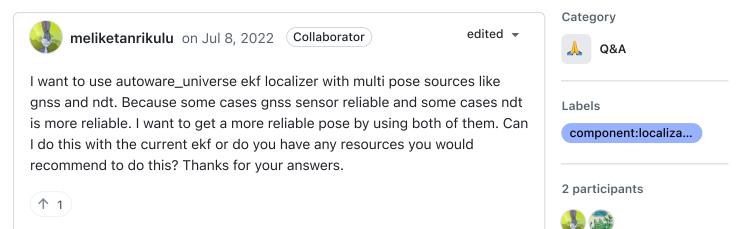# Can I use ekf with multi pose sources (e.g. gnss and ndt) #2714

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

Category

🙏 Q&A

Labels

component:localiza...

---

2 participants

---

meliketanrikulu on Jul 8, 2022   Collaborator   edited ▼

I want to use autoware_universe ekf localizer with multi pose sources like gnss and ndt. Because some cases gnss sensor reliable and some cases ndt is more reliable. I want to get a more reliable pose by using both of them. Can I do this with the current ekf or do you have any resources you would recommend to do this? Thanks for your answers.

↑ 1

---

1 comment · 3 replies

    Oldest | Newest | Top

---

kminoda on Jul 8, 2022   Collaborator

Hi meliketanrikulu,

Thanks for posting your idea. Yes, with the recent update in ekf_localizer (see this PR: tier4/autoware_launch#380), you can put multiple sensor inputs. In case you want to fuse GNSS&NDT, just put both data into /localization/pose_estimator/pose_with_covariance. I am also be very interested in fusing GNSS for better localization performance.

However, I am not sure whether fusing GNSS & NDT with the current EKF motion model is the best approach. The output of GNSS may have a strong non-gaussian noise especially in the existence of multi-path issue, and it is not verified that the current ekf_localizer is capable of addressing that issue.

Would you mind sharing us your plan of how to fuse those two sensors?

↑ 1   3 replies

---

meliketanrikulu on Jul 18, 2022   Collaborator   Author

Hi @kminoda. Thanks for your answer. I'm looking at this PR, there is an input topic, so I don't quite understand how to give an input. The frequencies that I calculated with the data from different sensors and which I will give as input here are different. (NDT 10 hz - GNSS 50 hz). So I thought it might be a problem. In this way, will it be enough for me to publish two same sensors as input from the same topic?

---

meliketanrikulu on Jul 18, 2022   Collaborator   Author

In some cases, the error values of Gnss are quite high. (Like under a tree or going through a tunnel). Likewise, the ndt error may also rise in some cases. Since these situations are independent of each other, I think that two different input sources should be handled separately. Different solutions can be produced by following the covariance values for different input sources.

kminoda on Jul 19, 2022 Collaborator

Hi, thank you for the comment!

> In this way, will it be enough for me to publish two same sensors as input from the same topic?

Yes, you are right. As long as you assume Gaussian noise for all the measurements, you can put all of them into the same topic. If you want to set different covariances for each sensor input, just reflect the values in the covariance field in each message. EKF will read that covariance and calculate the optimal prediction given each observation. The frequency of the sensor input does not matter in the EKF implementation.