SMAC_tuning_experiments

The below table shows the comparison of AMCL and SMAC results, obtained with different initial pose-errors.

Experiment Number	Initial_error in x(m)	Initial_error in y(m)	Amcl_error	SMAC_error
1.	0.5	0	x=7.4 cm y=5.9 cm yaw=0.046 rad	x=11.5cm y=6.1cm yaw=0.023 rad
2.	1	0	x=23 cm y= 6.8 cm yaw=0.020 rad	x=23 cm y= 7.8 cm yaw=0.021 rad
3.	0	0.5	x=3.3cm y= 9.4cm yaw=0.054rad	x=5.1cm y= 9.7cm yaw=0.027rad
4.	0	1	x=4.65cm y=14.9cm yaw=0.027rad	x=5cm y=13.1cm yaw=0.021rad
5.	0.5	0.5	x=5.4cm y=10.9cm yaw=0.022rad	x=6cm y=9.9cm yaw=0.021rad
6.	0	0	x=6.29cm y=8.17cm yaw=0.020rad	x=5.8cm y=6.2cm yaw=0.020rad

Observations-

1.If the initial **error in x/y is more than a meter,** the error using only amcl is larger **at least by 50cm as compared to SMAC.**

2.In areas of the warehouse where there are **few features,SMAC performs better as compared to AMCL.**Example of one such experiment- Errors are obtained as follows-

AMCL error= x_error=117cm, y_error=36.8cm, yaw_error=0.044rad

SMAC error= x_error= 64.8cm, y_error=30.7cm, yaw_error=0.049rad

3.In Other parts of the warehouse, with good features, in most of the experiments conducted, SMAC tuning performs better or as good as AMCL . Some

more iterations of SMAC tuning can help reduce the errors reported in the table further.

NOTE: **The parameters obtained from SMAC were-**

-kld_err '0.0366394404538739',-kld_z '0.6925130633018381', -laser_lambda_short '0.5114815211016092', -laser_likelihood_max_dist '7.312398731153672', -laser_max_beams '26' , -laser_sigma_hit '0.4302069226688259' , -laser_z_hit '0.8972853426119696', -laser_z_max '0.28921813687541', -laser_z_rand '0.04666475182245521' , -laser_z_short '0.8060182390251047' , -max_particles '5515' , -min_particles '427' -odom_alpha1 '0.009223537199298842', -odom_alpha2 '0.004044195879800564' , -odom_alpha3 '0.006141051837658902', -odom_alpha4 '0.009116177551874539' ,-odom_alpha5 '0.005256964537717442' , -recovery_alpha_fast '0.07015876760995188', -recovery_alpha_slow '0.002600058416039676', -resample_interval '3', -update_min_a '0.677270814370675', -update_min_d '0.11621789329205279'