Progress Report
2019-05-13

June 7, 2019

Parameters: `resample_interval =` 5, $N_{min} = 200$, $N_{max} = 500$.
In the tables below: `amcl`'s figures are in black; the scan-matcher's are in gray. Particles are selected as follows: either the top $100, 50, 10\%$ of particles is selected, or the heaviest, or those whose weight is larger than the mean weight of all particles.

1 `amcl−icp`

selection	loop	MAE-x [m]	MAE-y [m]	MAE-d [m]	MAE-θ [rad]	MAE	r_i	r_o
100 %	open	0.013317	0.031903	0.035389	0.0022859	0.0355274		
		0.012151	0.025681	0.030329	0.0023259	0.030526		
50 %	open	0.012359	0.03126	0.034522	0.0021265	0.034644		
		0.012039	0.02546	0.030067	0.0024014	0.030281		
10 %	open	0.010681	0.030243	0.033144	0.0020947	0.033264		
		0.011832	0.02497	0.029587	0.0023868	0.0298		
top	open	0.012491	0.029875	0.03478	0.0030108	0.035074		
		0.013157	0.024727	0.030838	0.002428	0.031048		
$> \overline{W}$	open	0.013005	0.03221	0.035553	0.0021339	0.03567		
		0.012083	0.025922	0.030436	0.0023471	0.030635		

Table 1: Open-loop mean absolute pose errors per selection percentage. Header: selection: type of selection of particles off `amcl` for outputting the final pose; `loop`: open; $x-$wise, $y-$wise, distance-wise, orientation-wise errors, and total errors. r_i is the rank of a configuration internal to this loop-closure regime. r_o is the rank of a configuration across all loop-closure regimes.

selection	loop	MAE-x [m]	MAE-y [m]	MAE-d [m]	MAE-θ [rad]	MAE	r_i	r_o
100 %	soft-1	0.019022	0.037977	0.049743	0.0025555	0.049961		
		0.018922	0.037815	0.049705	0.0025436	0.04992		
50 %	soft-1	0.01396	0.035321	0.04207	0.0024969	0.042287		
		0.01393	0.03514	0.042066	0.0025232	0.042288		
10 %	soft-1	0.028073	0.036927	0.057736	0.0026055	0.057962		
		0.027983	0.036781	0.057701	0.0025346	0.057915		
top	soft-1	0.026595	0.032701	0.052202	0.0029216	0.052459		
		0.026307	0.032606	0.051944	0.0025852	0.052142		
$> \overline{W}$	soft-1	0.031588	0.042075	0.066329	0.0026644	0.066561		
		0.031394	0.04193	0.066212	0.0025427	0.066422		

Table 2: Soft-closed mean absolute pose errors per selection percentage. Header: % particles selected for averaging the final pose; `loop`: soft-closed; $x-$wise, $y-$wise, distance-wise, orientation-wise, and total errors. r_i is the rank of a configuration internal to this loop-closure regime. r_o is the rank of a configuration across all loop-closure regimes.

selection	loop	MAE-x [m]	MAE-y [m]	MAE-d [m]	MAE-θ [rad]	MAE	r_i	r_o
100 %	soft-50	0.070996	0.04418	0.10779	0.0025666	0.107998		
		0.070747	0.044119	0.10766	0.0026163	0.10786		
50 %	soft-50	0.063787	0.040864	0.097289	0.0025445	0.097492		
		0.063574	0.040801	0.097163	0.00259992	0.097374		
10 %	soft-50	0.014333	0.027446	0.034839	0.0019999	00.034989		
		0.014685	0.027446	0.035117	0.0024572	0.035329		
top	soft-50	0.016556	0.024053	0.034159	0.0019485	0.034298		
		0.017908	0.024274	0.035173	0.0022765	0.035342		
$> \overline{W}$	soft-50	0.13168	0.052013	0.17582	0.0025253	0.176		
		0.13165	0.05207	0.17585	0.0024702	0.17602		

Table 3: Soft-closed mean absolute pose errors per selection percentage. Header: % particles selected for averaging the final pose; `loop`: soft-closed; $x-$wise, $y-$wise, distance-wise, orientation-wise, and total errors. r_i is the rank of a configuration internal to this loop-closure regime. r_o is the rank of a configuration across all loop-closure regimes.

selection	loop	MAE-x [m]	MAE-y [m]	MAE-d [m]	MAE-θ [rad]	MAE	r_i	r_o
100 %	hard	0.015573	0.024857	0.033863	0.0029304	0.034129		
		0.015798	0.025036	0.034057	0.0027538	0.034297		
50 %	hard	0.015567	0.02482	0.033778	0.00247976	0.033969		
		0.016306	0.024993	0.034367	0.0026938	0.0345974		
10 %	hard	0.012953	0.025066	0.031784	0.0021114	0.031933		
		0.014744	0.025336	0.033148	0.0025422	0.0333598		
top	hard	0.010454	0.027907	0.032603	0.0019251	0.03274		
		0.013092	0.028197	0.0344338	0.0023524	0.034624		
$> \overline{W}$	hard	0.014999	0.0248186	0.033137	0.0027889	0.033368		
		0.0152379	0.024992	0.033353	0.0027325	0.033589		

Table 4: Hard-closed-loop mean absolute pose errors per selection percentage. Header: % particles selected for averaging the final pose; `loop`: hard-closed; $x-$wise, $y-$wise, distance-wise, orientation-wise errors, and total error. r_i is the rank of a configuration internal to this loop-closure regime. r_o is the rank of a configuration across all loop-closure regimes.

2 `amcl-icp-dft`

selection	loop	MAE-x [m]	MAE-y [m]	MAE-d [m]	MAE-θ [rad]	MAE	r_i	r_o
100 %	open	0.013467	0.031742	0.035269	0.0022647	0.035404		
		0.011616	0.02438	0.029282	0.0023034	0.029484		
50 %	open	0.012372	0.031203	0.034484	0.0021134	0.034605		
		0.01154	0.024226	0.029082	0.0023938	0.029307		
10 %	open	0.01073	0.030292	0.033214	0.0021039	0.033335		
		0.011469	0.023999	0.028937	0.0023698	0.029152		
top	open	0.012443	0.029843	0.03474	0.0030456	0.035048		
		0.012708	00.023925	0.030219	0.0024443	0.030437		
$> \overline{W}$	open	0.0129221	0.03184	0.035189	0.00212812	0.035308		
		0.011559	0.024494	0.029281	0.0023364	0.029491		

Table 5: Open-loop mean absolute pose errors per selection percentage. Header: selection: type of selection of particles off `amcl` for outputting the final pose; `loop`: open; $x-$wise, $y-$wise, distance-wise, orientation-wise errors, and total errors. r_i is the rank of a configuration internal to this loop-closure regime. r_o is the rank of a configuration across all loop-closure regimes.

selection	loop	MAE-x [m]	MAE-y [m]	MAE-d [m]	MAE-θ [rad]	MAE	r_i	r_o
100 %	soft-1	0.020146	0.058574	0.071454	0.0025299	0.071656		
		0.019637	0.058397	0.071257	0.0025003	0.071456		
50 %	soft-1	0.016956	0.054065	0.063881	0.00249741	0.064082		
		0.0165699	0.053884	0.063744	0.002504	0.063946		
10 %	soft-1	0.022467	0.054584	0.069904	0.0025601	0.070118		
		0.022036	0.054443	0.06976	0.0024828	0.0699536		
top	soft-1	0.027406	0.028969	0.049657	0.0029088	0.04991		
		0.026755	0.028828	0.049084	0.0025624	0.049277		
$> \overline{W}$	soft-1	0.027731	0.063887	0.084262	0.0026327	0.08448		
		0.027148	0.063708	0.083968	0.0024861	0.084163		

Table 6: Soft-closed mean absolute pose errors per selection percentage. Header: % particles selected for averaging the final pose; `loop`: soft-closed; $x-$wise, $y-$wise, distance-wise, orientation-wise, and total errors. r_i is the rank of a configuration internal to this loop-closure regime. r_o is the rank of a configuration across all loop-closure regimes.

selection	loop	MAE-x [m]	MAE-y [m]	MAE-d [m]	MAE-θ [rad]	MAE	r_i	r_o
100 %	soft-50	0.028103	0.049106	0.070326	0.0025134	0.070514		
		0.028083	0.049177	0.070395	0.0024532	0.07057		
50 %	soft-50	0.030578	0.050719	0.0744	0.0025179	0.074588		
		0.030561	0.050802	0.074477	0.0024652	0.074654		
10 %	soft-50	0.021102	0.028455	0.042963	0.0020239	0.043105		
		0.021544	0.028466	0.043336	0.0024213	0.043528		
top	soft-50	0.019151	0.023799	0.036835	0.0019612	0.036967		
		0.02013	0.023843	0.037504	0.0023211	0.037676		
$> \overline{W}$	soft-50	0.027255	0.042492	0.062906	0.0025289	0.063101		
		0.026979	0.042453	0.062797	0.002581	0.062999		

Table 7: Soft-closed mean absolute pose errors per selection percentage. Header: % particles selected for averaging the final pose; `loop`: soft-closed; $x-$wise, $y-$wise, distance-wise, orientation-wise, and total errors. r_i is the rank of a configuration internal to this loop-closure regime. r_o is the rank of a configuration across all loop-closure regimes.

selection	loop	MAE-x [m]	MAE-y [m]	MAE-d [m]	MAE-θ [rad]	MAE	r_i	r_o
100 %	hard	0.051868	0.024072	0.070114	0.0032804	0.070394		
		0.05249	0.024564	0.070605	0.0028405	0.070825		
50 %	hard	0.047862	0.023444	0.065363	0.0027008	0.065555		
		0.049263	0.02386	0.066481	0.0026763	0.066673		
10 %	hard	0.03154	00.023796	0.04976	0.0023734	0.049929		
		0.03385	0.024135	0.051547	0.0026066	0.051751		
top	hard	0.016743	0.024565	0.036045	0.0021224	0.036197		
		0.019646	0.024669	0.037955	0.0024309	0.038148		
$> \overline{W}$	hard	0.042888	0.023361	0.060363	0.0030896	0.06061		
		0.043639	0.023871	0.061023	0.0028339	0.061236		

Table 8: Hard-closed-loop mean absolute pose errors per selection percentage. Header: % particles selected for averaging the final pose; `loop`: hard-closed; $x-$wise, $y-$wise, distance-wise, orientation-wise errors, and total error. r_i is the rank of a configuration internal to this loop-closure regime. r_o is the rank of a configuration across all loop-closure regimes.