Introduction to Recursive Filtering and Estimation

Results Programming Exercise 2 (Particle Filter)

Nummer	total %	Mistakes / Improvements
183424	100	
00-000-000	92,5	re-initialization ineffective (minor error, -7.5%); roughening not depending on number of samples (result ok, -0%);
01-910-140		
02-924-132		
03-908-035	92,5	re-initialization ineffective (minor error, -7.5%); roughening not depending on number of samples (result ok, -0%);
03-908-571	70	function vec() was needed and not provided (-15%); no re-initialization (-15%); no lower bound on roughening constant (result ok, -0%);
03-909-892	100	roughening at beginning of filtering routine (result ok, -0%);
03-918-604		
04-910-501		
04-915-559		
04-921-334	85	no re-initialization, just keeping old particles (minor error, -7.5%); no lower bound on roughening constant with noticeable effect (minor error, -7.5%);
05-057-542	100	
05-906-755	100	roughening small for certain cases (result ok, -0%);
05-906-896	100	
05-908-868	92,5	no lower bound on roughening constant with noticeable effect (minor error, -7.5%);
05-909-239	100	dimension in roughening constant is wrong (result ok, -0%); no lower bound on roughening constant (result ok, -0%);
05-910-047	100	roughening small for certain cases (result ok, -0%);
05-910-310	62,5	implementation error in first initialization (-15%); no re-initialization (-15%); no lower bound on roughening constant with noticeable effect (minor error, -7.5%);
05-910-559	100	
05-910-856	100	
05-912-522	92,5	roughening small for certain cases with noticeable effect (minor error, -7.5%);
05-913-587	100	roughening small for certain cases (result ok, -0%);
05-914-528	100	roughening at beginning of filtering routine (result ok, -0%)
05-914-734	85	error when calculating the updated particle likelihoods (-15%);

05-915-152	62,5	implementation error in first initialization (-15%); no re-initialization (-15%); no lower bound on roughening constant with noticeable effect (minor error, -7.5%);
05-915-350	85	error when calculating the updated particle likelihoods (-15%);
05-915-566	92,5	no lower bound on roughening constant with noticeable effect (minor error, -7.5%);
05-915-954	100	
05-919-352		
05-919-766	100	
05-919-816	92,5	roughening small for certain cases with noticeable effect (minor error, -7.5%);
05-919-840	100	
05-925-680	100	
05-929-849		
06-906-440	85	no re-initialization (-15%);
06-906-556		
06-907-380	77,5	implementation error: one output line in code missing (-15%); bias particles not re-initialized with noticeable effect (minor error, -7.5%); roughening independent of number of samples (result ok, -0%);
06-907-943	77,5	no re-initialization (-15%); no lower bound on roughening constant with noticeable effect (minor error, -7.5%);
06-907-976	100	
06-908-230	85	no re-initialization (-15%);
06-908-354	62,5	implementation error in first initialization (-15%); no re-initialization (-15%); no lower bound on roughening constant with noticeable effect (minor error, -7.5%);
06-908-859	100	
06-909-501	85	code not running in the case of time interval between halfplane measurements is not a multiple of time interval between distance measurements (-15%);
06-909-527	70	code not running in the case of sum==0 (-15%); no re-initialization (-15%);
06-909-915	77,5	implementation error: one output line in code missing (-15%); bias particles not re-initialized with noticeable effect (minor error, -7.5%); roughening independent of number of samples (result ok, -0%);
06-909-956	100	no roughening but artificial noise on bias (result ok, -0%);
06-910-178	92,5	no lower bound on roughening constant with noticeable effect (minor error, -7.5%);
06-911-093	100	dimension in roughening constant is wrong (result ok, -0%); no lower bound on roughening constant (result ok, -0%);
06-911-440	92,5	no lower bound on roughening constant with noticeable effect (minor error, -7.5%);
06-912-273	92,5	no re-initialization, just keeping old particles (minor error, -7.5%);
06-913-198	70	no re-initialization (-15%); roughening at beginning of filtering routine with ineffective formula (-15%);
06-914-659		

06-914-998	70	code not running in the case of sum==0 (-15%); no re-initialization (-15%);
06-915-029	85	code not running in the case of time interval between halfplane measurements is not a multiple of time interval between distance measurements (-15%);
06-915-490	70	no re-initialization (-15%); roughening at beginning of filtering routine with ineffective formula (-15%);
06-916-001	100	
06-916-936	85	no re-initialization (-15%);
06-916-985	100	roughening at beginning of filtering routine (result ok, -0%);
06-917-397	40	error in implementation 'pdf_likelihood' used at wrong place (-15%); error when calculating the updated particle likelihoods (-15%); no re-initialization (-15%); no roughening (-15%);
06-918-254	77,5	no re-initialization (-15%); no lower bound on roughening constant with noticeable effect (minor error, -7.5%);
06-919-765	77,5	implementation error: one output line in code missing (-15%); bias particles not re-initialized with noticeable effect (minor error, -7.5%); roughening independent of number of samples (result ok, -0%);
06-920-599		
06-920-755		
06-926-000	70	no re-initialization (-15%); roughening at beginning of filtering routine with ineffective formula (-15%);
08-906-307	100	roughening at beginning of filtering routine (result ok, -0%);
08-932-626	100	
08-938-714	85	no re-initialization, just keeping old particles (minor error, -7.5%); no lower bound on roughening constant with noticeable effect (minor error, -7.5%);
09-900-069		
09-901-521		
09-902-453		
09-907-403	100	re-initialization in the case of a distance measurement might be improved (result ok, -0%); no lower bound on roughening (result ok, -0%);
09-907-411	100	re-initialization in the case of a distance measurement might be improved (result ok, -0%); no lower bound on roughening (result ok, -0%);
09-907-502	92,5	roughening too small with noticeable effect (minor error, -7.5%);
09-908-302	100	re-initialization in the case of a distance measurement might be improved (result ok, -0%); no lower bound on roughening (result ok, -0%);
09-909-052	85	no re-initialization for distance measurement (minor error, -7.5%); roughening ineffective (no lower bound, at beginning of filtering routine) (minor error, -7.5%);

09-924-739	55	error in measurement update (-15%); error when calculating the updated particle likelihoods (-15%); bias particles not re-initialized for distance measurement (minor error, -7.5%), no lower bound on roughening constant with noticeable effect (minor error, -7.5%);
09-931-676	100	
09-935-123	85	no re-initialization for distance measurement (minor error, -7.5%); roughening ineffective (no lower bound, at beginning of filtering routine) (minor error, -7.5%);
09-935-156	62,5	code not running in the case of no particle satisfies distance measurement equation (-15%); error in measurement update (-15%); no lower bound on roughening constant with noticeable effect (minor error, -7.5%);
09-935-164		
09-935-362		
09-935-958	85	no re-initialization for distance measurement (minor error, -7.5%); roughening ineffective (no lower bound, at beginning of filtering routine) (minor error, -7.5%);
09-936-451		
80-911-258		
count	66	
mean	87,84	
std	13,97	

Notes:

If you have questions regarding the grading of your programming exercise, please make an appointment with Angela (aschoellig@ethz.ch).

The results will be combined at the end of the class to a final grade.

General comments:

* Re-initialization of particles is necessary if none of the existing particles can explain the obtained measurements (based on the given the process and measurement model).

* Re-initialization by swapping the particles to the other side is a problem-specific solution and works very well for most cases. Be aware that it may cause problems in certain cases (e.g. if the bias value of the particles follow the correct value but the angle values of the particles are wrong)

* Roughening should be done after the resampling to have to best effect.

* Your roughening perturbation may decrease over time but, in order to achieve robustness, it should never become zero.

* Make sure that the values of the particles are within the given bounds ([0,2 pi] and [-sbar, +sbar]) after the predicition, roughening, and re-initialization step.