
XEst main

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init

```
close all; clear; clc
addpath(genpath('./'));

% config - datasets handled by cfg object
cfg = config_class( test_ID    = 'test_001', ...
                   benchmark   = 'ICL');
dlog = dlogger_class();
dlog.load_cfg(cfg);
quest = quest_class();
quest.load_cfg(cfg);
vest = vest_class();
vest.load_cfg(cfg);
qekf = qekf_handler_class();
qekf.load_cfg(cfg);
```

run

```
cntr = 0;
for frame_idx = cfg.dat.keyFrames % ---> iter keyframes
    cntr = cntr+1;
    TQVW_sols = quest.get_pose(frame_idx, cfg.dat); % get pose
    TQVW_sols = vest.get_vel(cfg.dat.matches, TQVW_sols); % get velocity
    st_sols = qekf.run_filter(TQVW_sols); % run filter

    dlog.log_state(cntr, frame_idx, TQVW_sols, st_sols);
end % for frame_idx = cfg.dats.keyFrames
```

results

```
quest_res = quest.get_res(cfg, dlog);
vest_res  = vest.get_res(cfg, dlog);
qekf_res  = qekf.get_res(cfg, dlog);
```

Pose estimation module (QuEst+):

ICL

EightPt

Nister

Kukelova

QuEst

Tran err mean	0.35684	0.36008	0.40947	0.37134
Tran err std	0.051426	0.068961	0.067391	0.05834
Tran err median	0.34197	0.35476	0.42785	0.36769
Tran err Q_1	0.31048	0.29358	0.34804	0.31348
Tran err Q_3	0.4032	0.42658	0.47089	0.42921
Rot err mean	0.0010922	0.23039	0.22911	0.00058779
Rot err std	0.0006694	0.23005	0.22886	0.00033422
Rot err median	0.0011073	0.2292	0.22805	0.00059275
Rot err Q_1	0.00043139	0.0003558	0.00025794	0.00025402
Rot err Q_3	0.001753	0.46043	0.45796	0.00092156

VEst module:

Here, we compare $Q_VEst(exp_map(W))$ for each frame with the Q_est of each method for the same frame.

ICL

	<u>EightPt</u>	<u>Nister</u>	<u>Kukelova</u>	<u>QuEst</u>
exp(W) err mean	0.00049812	0.23069	0.22946	0.00043301
exp(W) err std	0.00030038	0.23047	0.2292	0.00021571
exp(W) err median	0.00052669	0.22935	0.2283	0.00046998
exp(W) err Q_1	0.0002031	0.00022626	0.00026875	0.00023013
exp(W) err Q_3	0.00079314	0.46115	0.45866	0.00063589

QEKF module:

ICL

	<u>EightPt</u>	<u>Nister</u>	<u>Kukelova</u>	<u>QuEst</u>
GT-X T err mean	0.34597	0.44742	0.42373	0.3748
GT-X T err std	0.064454	0.25575	0.14587	0.058637
GT-X T err median	0.34839	0.34327	0.43205	0.38247
GT-X T err Q_1	0.29026	0.25479	0.30223	0.31904
GT-X T err Q_3	0.40168	0.64004	0.54523	0.43056

	<u>EightPt</u>	<u>Nister</u>	<u>Kukelova</u>	<u>QuEst</u>
GT-X Q err mean	0.33336	0.33336	0.33336	0.33336
GT-X Q err std	0.00015922	0.00015922	0.00015922	0.00015922
GT-X Q err median	0.3333	0.3333	0.3333	0.3333
GT-X Q err Q_1	0.33324	0.33324	0.33324	0.33324
GT-X Q err Q_3	0.33348	0.33348	0.33348	0.33348

	<u>EightPt</u>	<u>Nister</u>	<u>Kukelova</u>	<u>QuEst</u>
GT-X V err mean	0.66168	0.54281	0.60342	0.61744
GT-X V err std	0.082448	0.27437	0.18511	0.065068
GT-X V err median	0.63919	0.62482	0.56401	0.59149
GT-X V err Q_1	0.60047	0.34399	0.4582	0.56757
GT-X V err Q_3	0.72288	0.74163	0.74864	0.6673

	<i>EightPt</i>	<i>Nister</i>	<i>Kukelova</i>	<i>QuEst</i>
Z-XH T L1 mean	3.2149	3.0257	2.3761	3.056
Z-XH T L1 std	0.95708	0.56805	1.1147	1.0021
Z-XH T L1 median	3.3505	3.1467	2.0974	3.1899
Z-XH T L1 Q_1	2.4737	2.5035	1.3978	2.2295
Z-XH T L1 Q_3	3.9561	3.548	3.3545	3.8826
	<i>EightPt</i>	<i>Nister</i>	<i>Kukelova</i>	<i>QuEst</i>
Z-XH Q L1 mean	1.0052	1.3483	1.3524	1.0038
Z-XH Q L1 std	0.002335	0.34532	0.34978	0.0013152
Z-XH Q L1 median	1.0048	1.3312	1.3365	1.0035
Z-XH Q L1 Q_1	1.003	1.0038	1.0034	1.0026
Z-XH Q L1 Q_3	1.0074	1.6928	1.7015	1.0049
	<i>EightPt</i>	<i>Nister</i>	<i>Kukelova</i>	<i>QuEst</i>
Z-XH V L1 mean	0.067528	0.056849	0.056984	0.06171
Z-XH V L1 std	0.06876	0.058777	0.057408	0.062805
Z-XH V L1 median	0.055975	0.044208	0.049284	0.051293
Z-XH V L1 Q_1	0.00089729	0.0011184	0.00071959	0.00079688
Z-XH V L1 Q_3	0.13416	0.11258	0.11325	0.12262
	<i>EightPt</i>	<i>Nister</i>	<i>Kukelova</i>	<i>QuEst</i>
Z-XH T L2 mean	5.6025	4.5374	2.9115	5.1005
Z-XH T L2 std	3.0561	1.6741	2.6709	2.9255
Z-XH T L2 median	5.9801	5.0411	1.8828	5.3101
Z-XH T L2 Q_1	2.7338	3.0829	0.85484	2.4678
Z-XH T L2 Q_3	8.4713	5.9918	4.9681	7.7332
	<i>EightPt</i>	<i>Nister</i>	<i>Kukelova</i>	<i>QuEst</i>
Z-XH Q L2 mean	1	1	1	1
Z-XH Q L2 std	1.6653e-16	2.4825e-16	1.4687e-16	1.5701e-16
Z-XH Q L2 median	1	1	1	1
Z-XH Q L2 Q_1	1	1	1	1
Z-XH Q L2 Q_3	1	1	1	1
	<i>EightPt</i>	<i>Nister</i>	<i>Kukelova</i>	<i>QuEst</i>
Z-XH V L2 mean	0.0039438	0.0035177	0.0026113	0.0036106
Z-XH V L2 std	0.004213	0.0042143	0.0027169	0.0039853
Z-XH V L2 median	0.0028951	0.0018762	0.0020798	0.002417
Z-XH V L2 Q_1	7.3155e-07	1.0324e-06	5.5926e-07	5.6713e-07
Z-XH V L2 Q_3	0.0078869	0.0070345	0.0052221	0.0072206

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