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# 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   = 'KITTI' );
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+):*

*KITTI*

*EightPt*

*Nister*

*Kukelova*

*QuEst*

Tran err mean	0.049233	0.13449	0.14946	0.061282
Tran err std	0.048413	0.11632	0.13914	0.065601
Tran err median	0.014529	0.049237	0.053502	0.011805
Tran err Q_1	0.01076	0.040477	0.032613	0.0073206
Tran err Q_3	0.094997	0.26048	0.30012	0.13456
Rot err mean	0.06361	0.0059552	0.013913	0.003214
Rot err std	0.091232	0.0069446	0.018129	0.0031175
Rot err median	0.0029372	0.0020042	0.0020599	0.0013304
Rot err Q_1	0.0022136	0.00088513	0.00083714	0.0007197
Rot err Q_3	0.11534	0.010447	0.025988	0.0059129

VEst module:

Here, we compare  $Q\_VEst$  ( $exp\_map(W)$ ) for each frame with the  $Q\_est$  of each method for the same frame.

KITTI

	<u>EightPt</u>	<u>Nister</u>	<u>Kukelova</u>	<u>QuEst</u>
$exp(W)$ err mean	0.069416	0.01402	0.023925	0.011402
$exp(W)$ err std	0.094338	0.013331	0.029362	0.01104
$exp(W)$ err median	0.0053402	0.0056608	0.00566	0.0059584
$exp(W)$ err Q_1	0.0044457	0.0024398	0.0023193	0.0022079
$exp(W)$ err Q_3	0.12704	0.029152	0.043497	0.020439

QEKF module:

KITTI

	<u>EightPt</u>	<u>Nister</u>	<u>Kukelova</u>	<u>QuEst</u>
GT-X T err mean	0.056377	0.14443	0.19491	0.079309
GT-X T err std	0.056328	0.12846	0.16122	0.086737
GT-X T err median	0.019313	0.049183	0.17393	0.013941
GT-X T err Q_1	0.010506	0.040525	0.022324	0.0071436
GT-X T err Q_3	0.10743	0.27137	0.36605	0.17914
	<u>EightPt</u>	<u>Nister</u>	<u>Kukelova</u>	<u>QuEst</u>
GT-X Q err mean	0.3334	0.3334	0.3334	0.3334
GT-X Q err std	0.00068932	0.00068932	0.00068932	0.00068932
GT-X Q err median	0.33352	0.33352	0.33352	0.33352
GT-X Q err Q_1	0.33262	0.33262	0.33262	0.33262
GT-X Q err Q_3	0.33413	0.33413	0.33413	0.33413
	<u>EightPt</u>	<u>Nister</u>	<u>Kukelova</u>	<u>QuEst</u>
GT-X V err mean	0.45609	0.37082	0.31811	0.45931
GT-X V err std	0.41376	0.30639	0.26212	0.41803
GT-X V err median	0.1889	0.19859	0.17431	0.18124
GT-X V err Q_1	0.098276	0.099639	0.078591	0.10292
GT-X V err Q_3	0.95458	0.71765	0.63372	0.96285

	<i>EightPt</i>	<i>Nister</i>	<i>Kukelova</i>	<i>QuEst</i>
Z-XH T L1 mean	0.4638	1.0518	1.362	0.58794
Z-XH T L1 std	0.39753	0.83541	0.54263	0.49896
Z-XH T L1 median	0.31985	0.82123	1.3702	0.62167
Z-XH T L1 Q_1	0.07234	0.25385	0.97006	0.030814
Z-XH T L1 Q_3	0.87971	1.9351	1.7041	1.0766
	<i>EightPt</i>	<i>Nister</i>	<i>Kukelova</i>	<i>QuEst</i>
Z-XH Q L1 mean	1.1693	1.033	1.0719	1.0158
Z-XH Q L1 std	0.22947	0.035738	0.09182	0.013733
Z-XH Q L1 median	1.0152	1.0108	1.0108	1.007
Z-XH Q L1 Q_1	1.0107	1.0056	1.0054	1.0051
Z-XH Q L1 Q_3	1.3101	1.0591	1.1331	1.0268
	<i>EightPt</i>	<i>Nister</i>	<i>Kukelova</i>	<i>QuEst</i>
Z-XH V L1 mean	0.14893	0.15701	0.15334	0.15025
Z-XH V L1 std	0.087713	0.093298	0.055379	0.087478
Z-XH V L1 median	0.14873	0.14873	0.14873	0.14873
Z-XH V L1 Q_1	0.08336	0.088342	0.11107	0.089343
Z-XH V L1 Q_3	0.20987	0.21732	0.19753	0.20986
	<i>EightPt</i>	<i>Nister</i>	<i>Kukelova</i>	<i>QuEst</i>
Z-XH T L2 mean	0.33298	0.72895	1.3286	0.3984
Z-XH T L2 std	0.39642	0.77901	0.92407	0.43123
Z-XH T L2 median	0.084	0.36063	1.159	0.15478
Z-XH T L2 Q_1	0.002327	0.026549	0.81816	0.00050412
Z-XH T L2 Q_3	0.68216	1.4339	1.6412	0.87726
	<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	2.2753e-16	2.7195e-16	2.2753e-16	2.5317e-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	0.018496	0.020182	0.018656	0.018653
Z-XH V L2 std	0.017774	0.020377	0.015601	0.017674
Z-XH V L2 median	0.014845	0.014845	0.014845	0.014845
Z-XH V L2 Q_1	0.002852	0.0031988	0.0047557	0.0034085
Z-XH V L2 Q_3	0.030297	0.032233	0.029368	0.03031

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