

TASK MP.7**The number of keypoints by Detector**

Detector	Average Keypoints	Neighborhood Average size
SHI-TOMASI	117.9	471.6
HARRIS	24.8	148.8
FAST	149.1	1043.7
BRISK	276.2	6061.1
ORB	116.1	6500.1
AKAZE	167	1285.8
SIFT	138.6	698.1

TASK MP.8**The number of matched keypoints**

Detector\Descriptor	BRIEF	ORB	FREAK	AKAZE	SIFT
SHI-TOMASI	104.9	100.8	85.1	x	103
HARRIS	19.2	17.8	16.2	x	18.1
FAST	122.1	120.1	97.9	x	116.2
BRISK	189.3	167.8	169.6	x	182.9
ORB	60.6	84.6	46.8	x	84.8
AKAZE	140.6	131.8	132	139.9	141.111
SIFT	78	131.8	66.2	x	88.9

TASK MP.9**Detection time**

Detector	Average time (ms)
SHI-TOMASI	9.7
HARRIS	13.4
FAST	1.2
BRISK	238.6
ORB	47.8
AKAZE	48
SIFT	85.1

Description time

Detector\Descriptor	BRIEF	ORB	FREAK	AKAZE	SIFT
SHI-TOMASI	0.7	3	31.9	x	13.7
HARRIS	0.5	3	30.8	x	12.9
FAST	0.8	4.7	32	x	15.1
BRISK	0.9	9.6	32.2	x	24
ORB	0.6	10.9	34.8	x	29.7
AKAZE	0.6	7	31.8	37.9	16.9
SIFT	0.8	x	32.3	x	58.8

Total time (detection + description + matching)

Detector\Descriptor	BRIEF	ORB	FREAK	AKAZE	SIFT
SHI-TOMASI	10.6	13	43.2	x	23.6
HARRIS	13.9	15	41.7	x	25
FAST	2.2	6.4	33.3	x	16.2
BRISK	240	250	270.7	x	268.4
ORB	48.6	56.4	80.8	x	83.1

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AKAZE	48.9	56.2	78.5	87.1	72.6
SIFT	86x		115x		135

Top3 detector/descriptor combination

RANK	Detector	Discriptor	Justification
1	FAST	BRIEF	High speed + High Accuracy
2	FAST	ORB	High speed + High Accuracy
3	AKAZE	BRIEF	Mid speed + High Accuracy

% BRISK detector is highest accuracy (matched keypoints) but time to detect is too long to apply

y real vehicle system