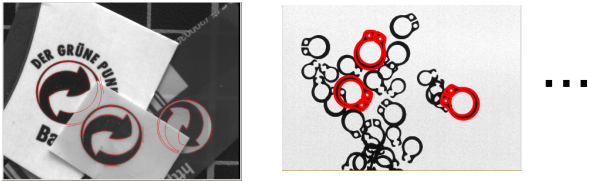


Temporal Constraint and Relative Vector Clustering for High Frame Rate and Ultra-low Delay Arbitrary Shape Detection

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Research Background

Application

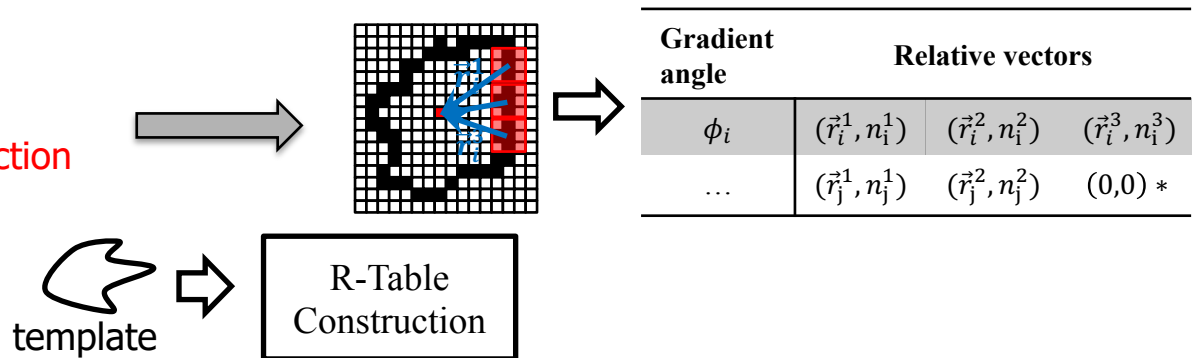


- Target
 - High frame rate and ultra-low delay (1ms) arbitrary shape detection
- Challenges
 - High memory consumption of vote space
 - Random process time for each pixel and extra interframe delay

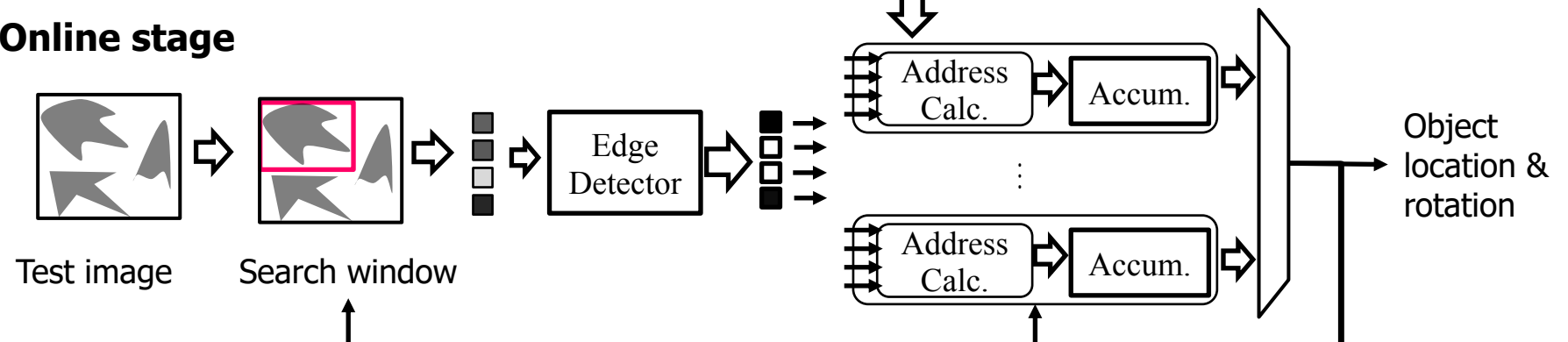
Proposed method

Proposal 1.1: Relative Vectors Clustering based R-Table Construction

Offline stage

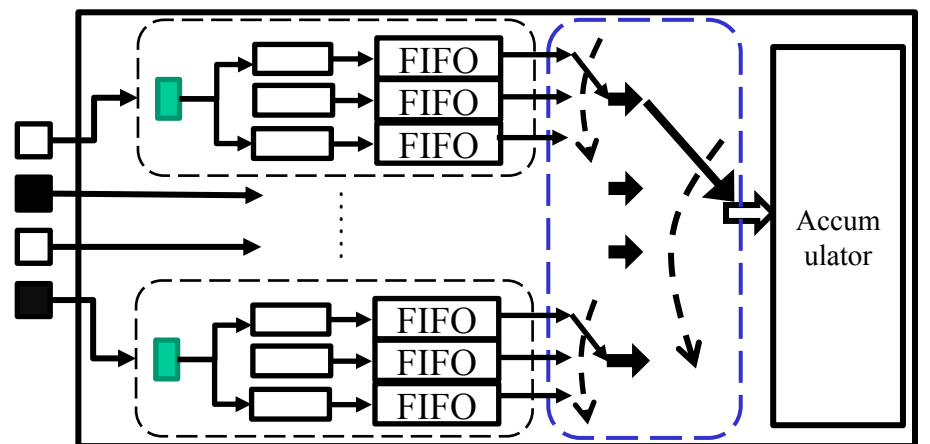
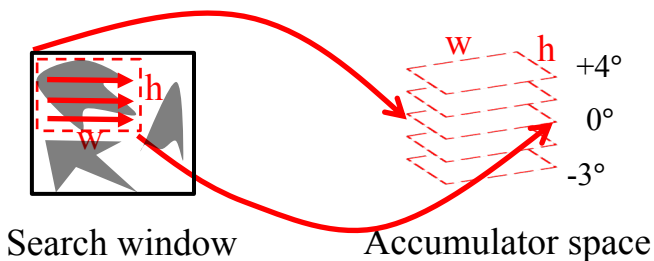


Online stage



Proposal 2: Temporal Constraint based GHT Compression and Interframe Delay Reduction

Proposal 1.2 : 4-pixel-paralleled GHT Structure



Experiments Result

# LUT	# FF	# DSP	# BRAM
23448(11.51%)	33576(25.23%)	768(91.4%)	288(64.71%)
System Frequency(MHz)		process time per frame(ms)	
100		0.7761	

Test sequence (bell)	RMSE of x coordinate (pixel)	RMSE of y coordinate (pixel)	RMSE of angle (degree)
Conventional GHT	0.5	0.282843	0.374166
Proposed	0.412311	0.173205	0.374166

Conclusion

The GHT detection core reached the processing speed of 0.7761ms/frame

