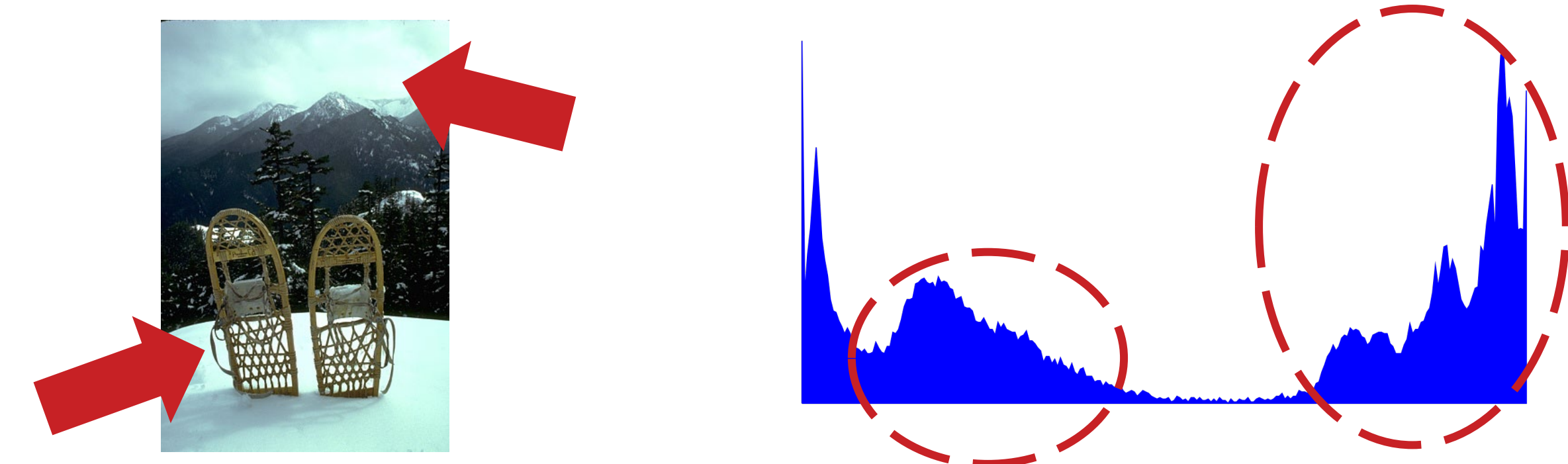


Motivation

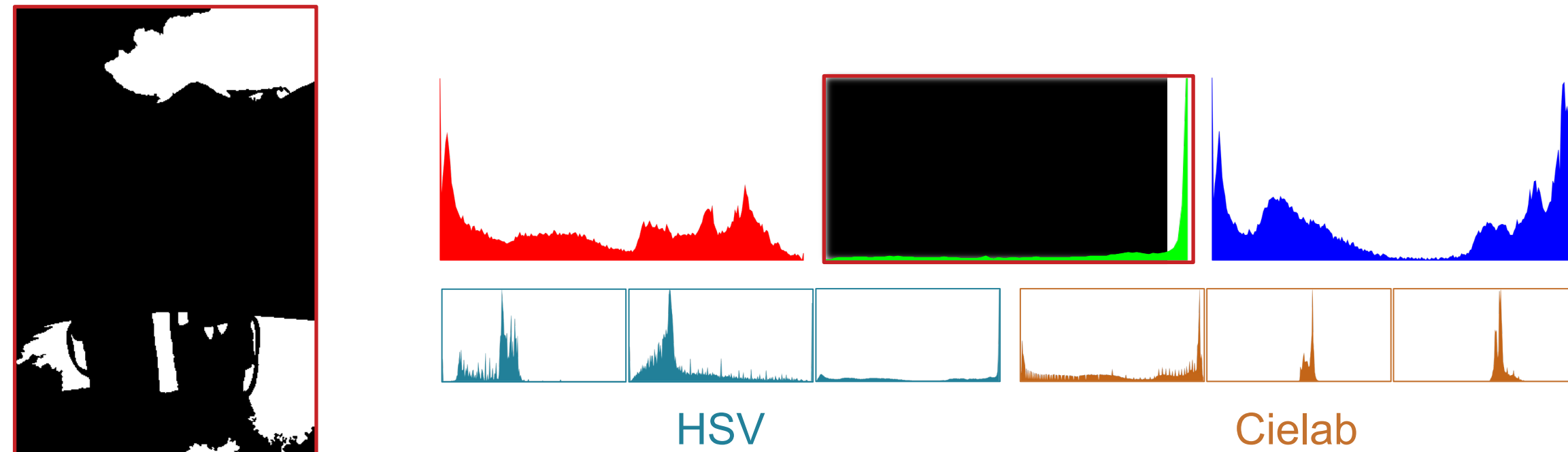
- Get superpixels with extraordinary boundary adherence (BR, MDE)
- Reduce input parameter dependencies (initialization, termination)

Key Idea

- Assumption: Color histogram clusters correspond to object classes



- Usage: Separate object classes by color intensity thresholding at histogram cluster boundaries across multiple color channels



- Progression: Hierarchically split color-inhomogeneous segments into more homogeneous ones (until color information exhaustion)

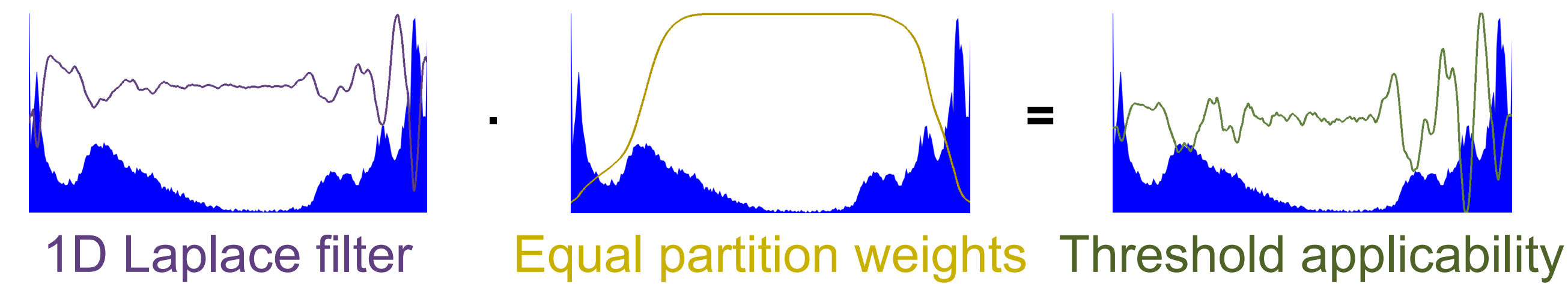


Challenges

- Where to threshold? → 1D Laplace filter & equal partition weights
- What segments to prioritize? → segment size & color variance
- When to stop? → color information exhaustion / superpixel count
- How to handle tiny segments? → min size & spatial connectivity

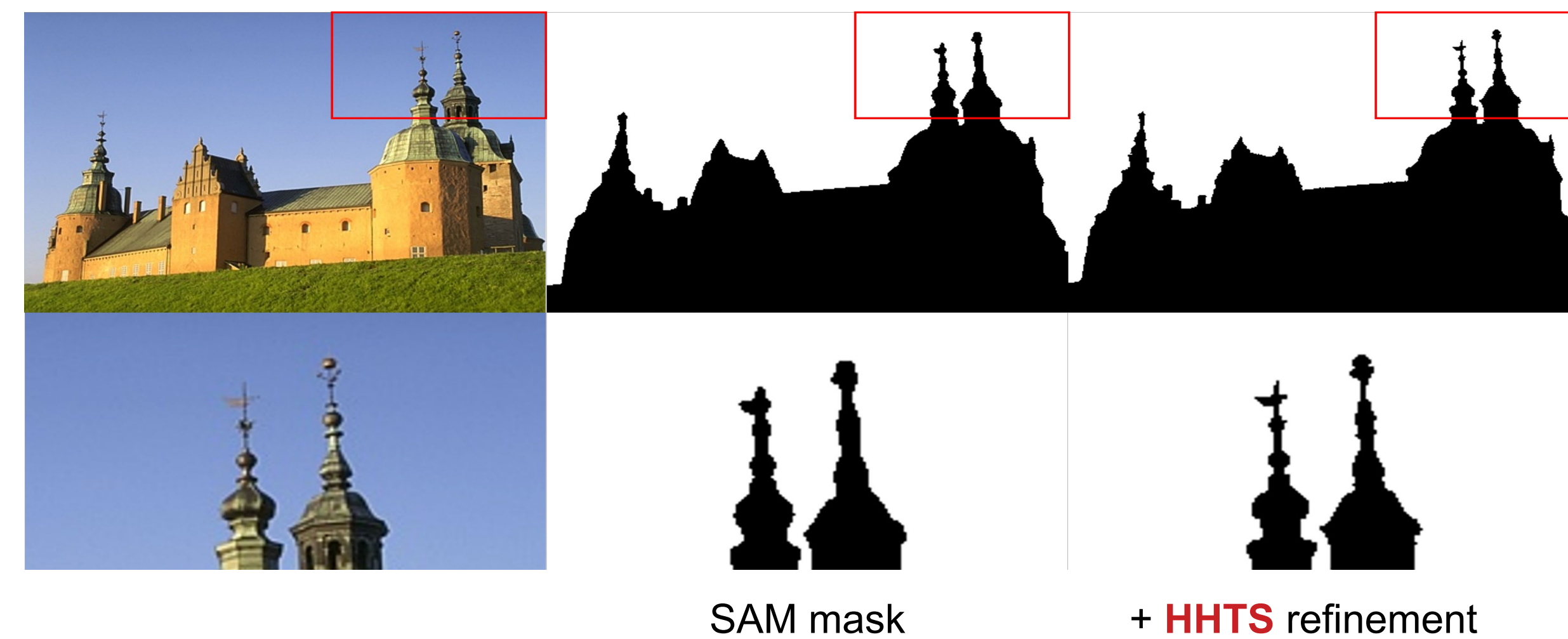
Thresholding

- A threshold should equally split an image at object class boundaries
- 1D Laplace kernel to find limits of object classes in a color histogram
- Cauchy distribution of accumulated histogram for a balanced partition



Application

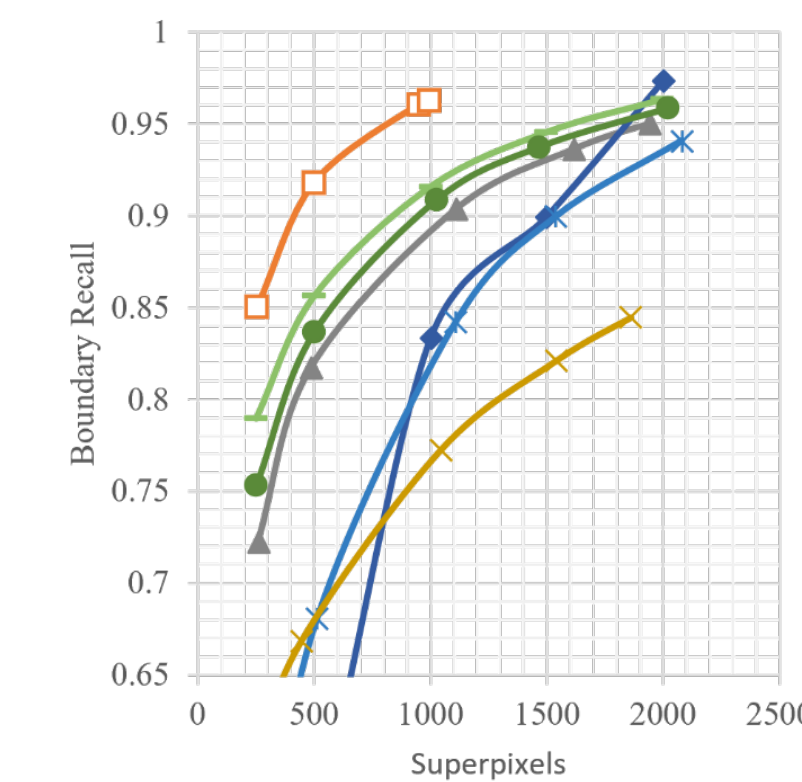
- Refine semantic masks (e.g., Segment Anything Model – SAM)



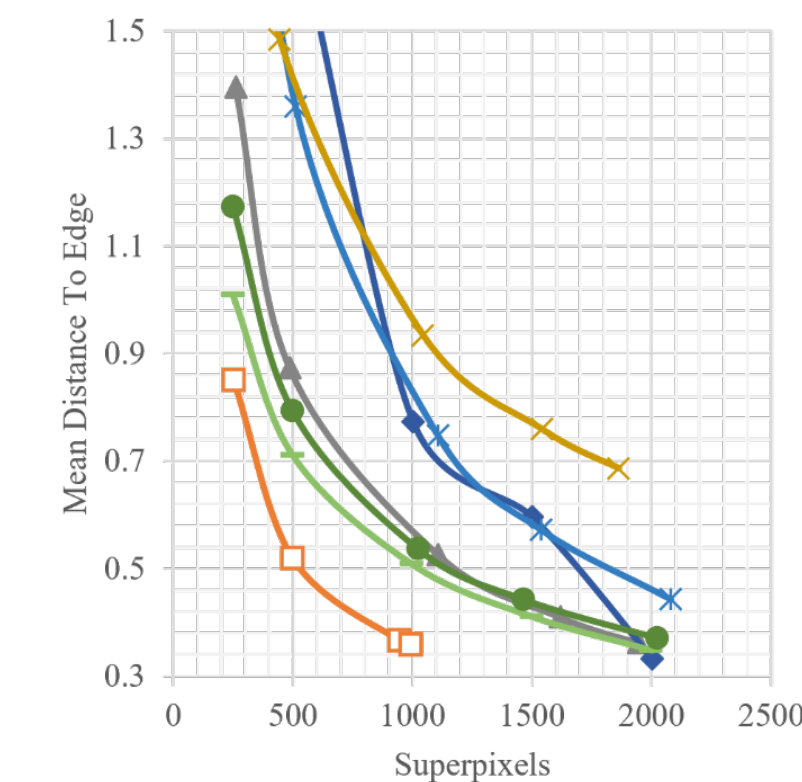
Experiments



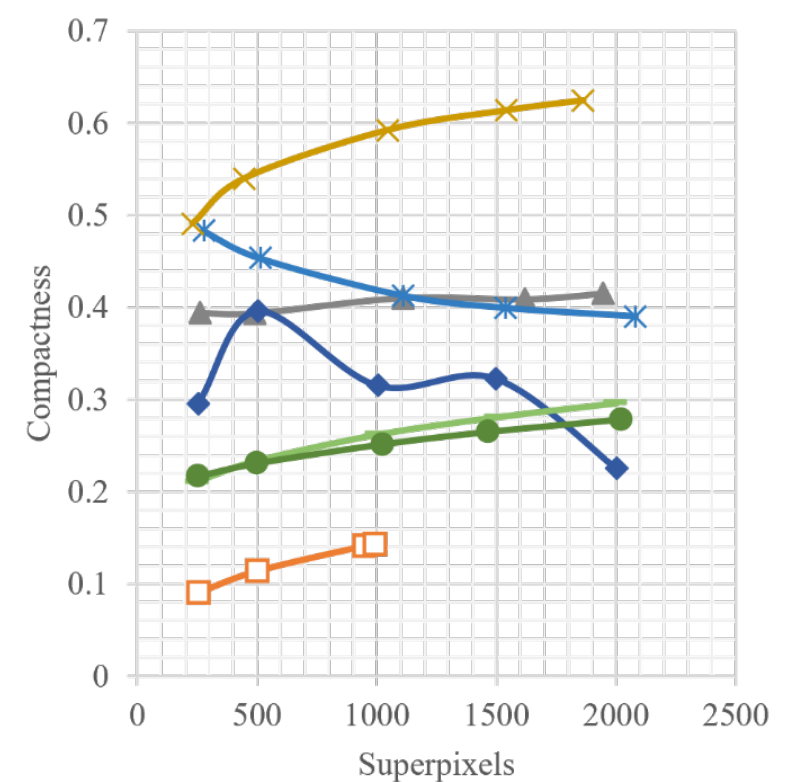
CRS - HHTS



SLIC - HHTS



ERGC - HHTS



Superpixels	Method	UE	BR	ASA	EV	CO	BP
250	SH	0.0970	0.8080	0.9510			
	HHTS	0.0668	0.8502	0.9332			
600	SCAC	0.0680	0.8260	0.9660	0.8750	0.4420	
	HHTS	0.0373	0.9326	0.9627	0.8989	0.1215	
1000	VSSS	0.0324	0.9188	0.9676	0.9123	0.1953	
	HHTS	0.0307	0.9626	0.9693	0.9100	0.1411	
1200	APENet		0.9204	0.9758			0.1878
	HHTS		0.9626	0.9693			0.0744
1300	LDFUNet		0.9300	0.9734			0.0996
	HHTS		0.9626	0.9693			0.0744
2000	CRTREES	0.0716	0.9624		0.9482		
	HHTS	0.0307	0.9626		0.9100		