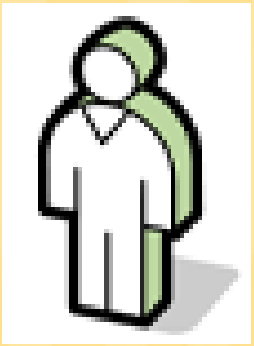

SEC: Stochastic ensemble consensus approach to unsupervised SAR sea-ice segmentation

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Motivation

Climate monitoring

Territorial claim

Ship navigation

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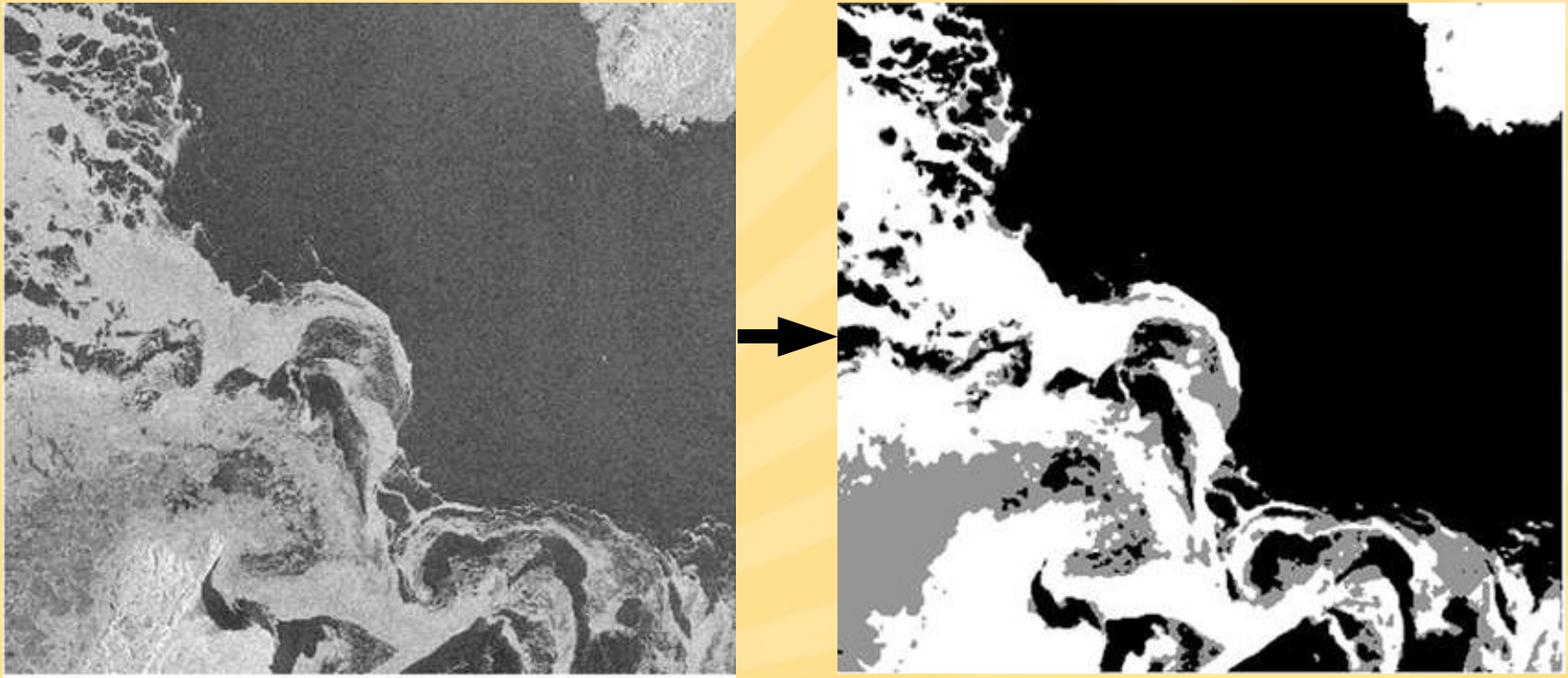
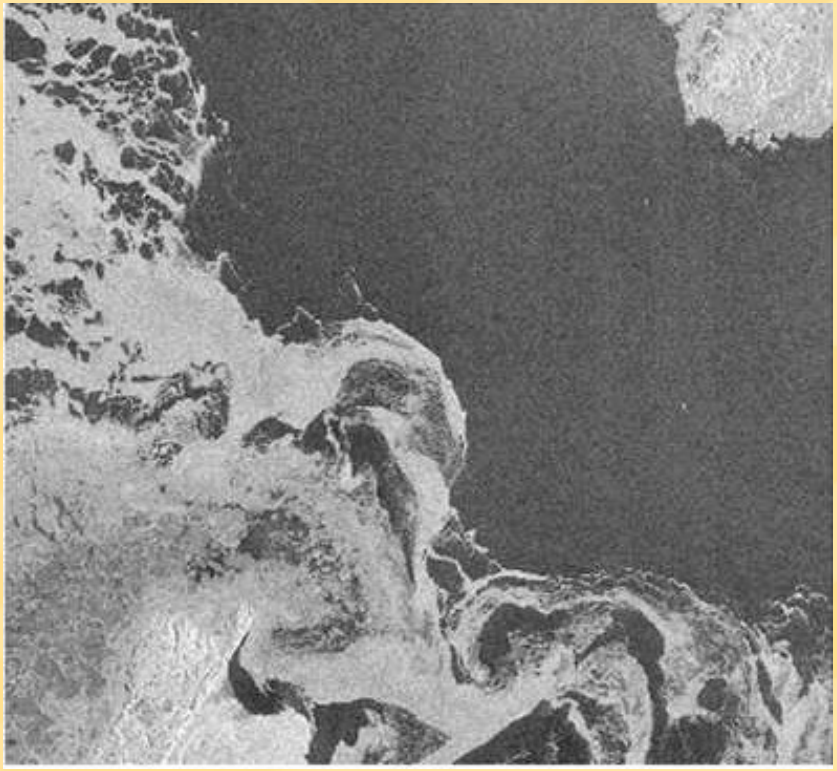
Segmentation Problem

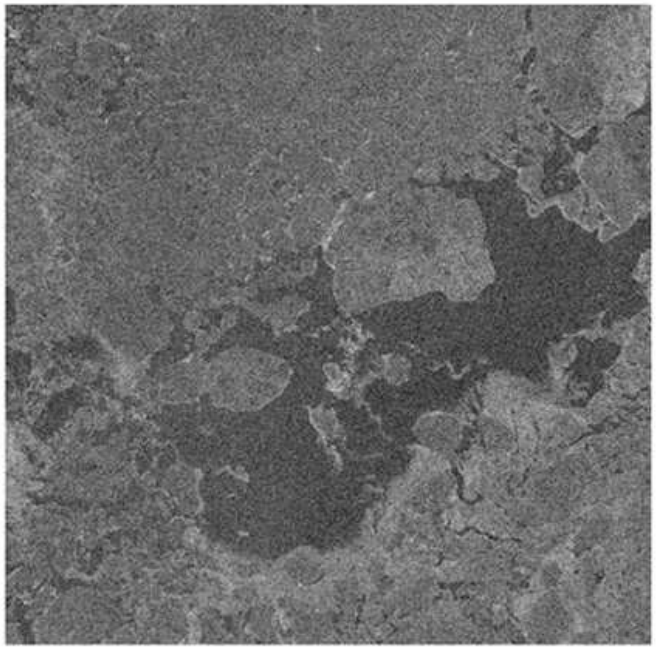


Challenges

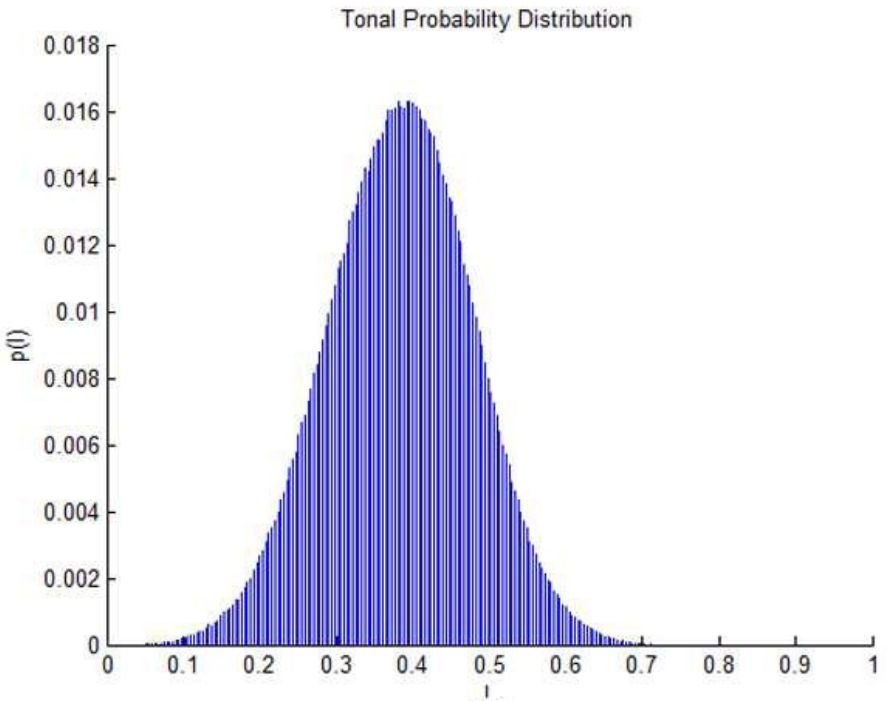
Non-homogeneities due to SAR backscatter and environmental conditions



Challenges



(a)

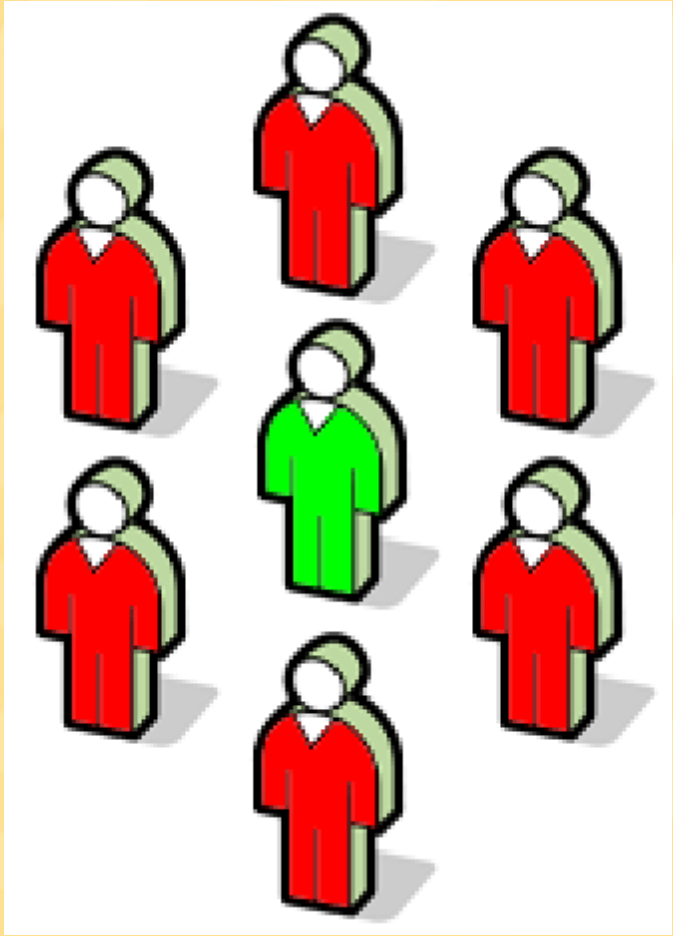


(b)

Speckle Noise

Consensus Decision Making

A group decision-making concept where the underlying goal is to achieve general agreement amongst the participants in the group with regards to the final decision



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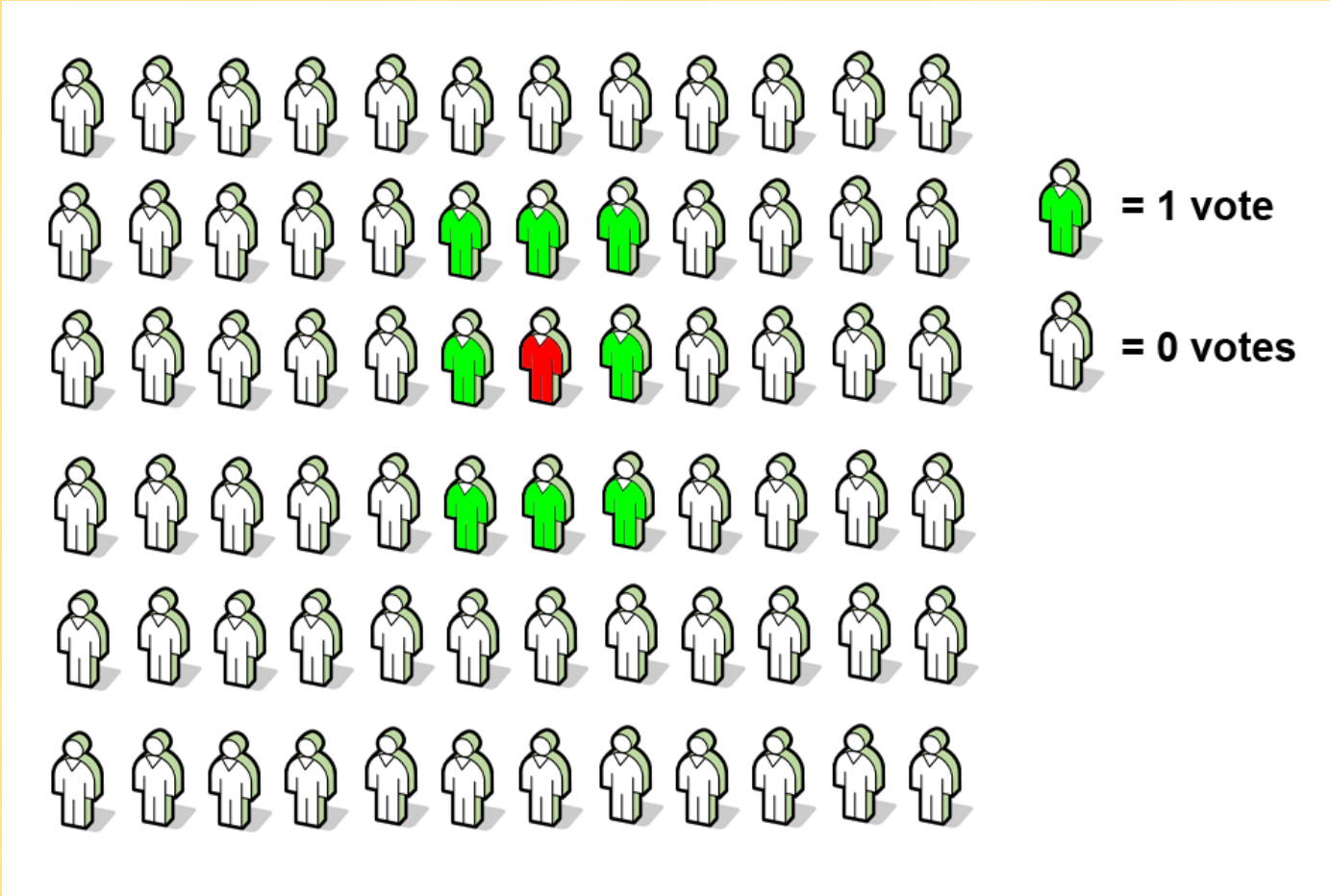
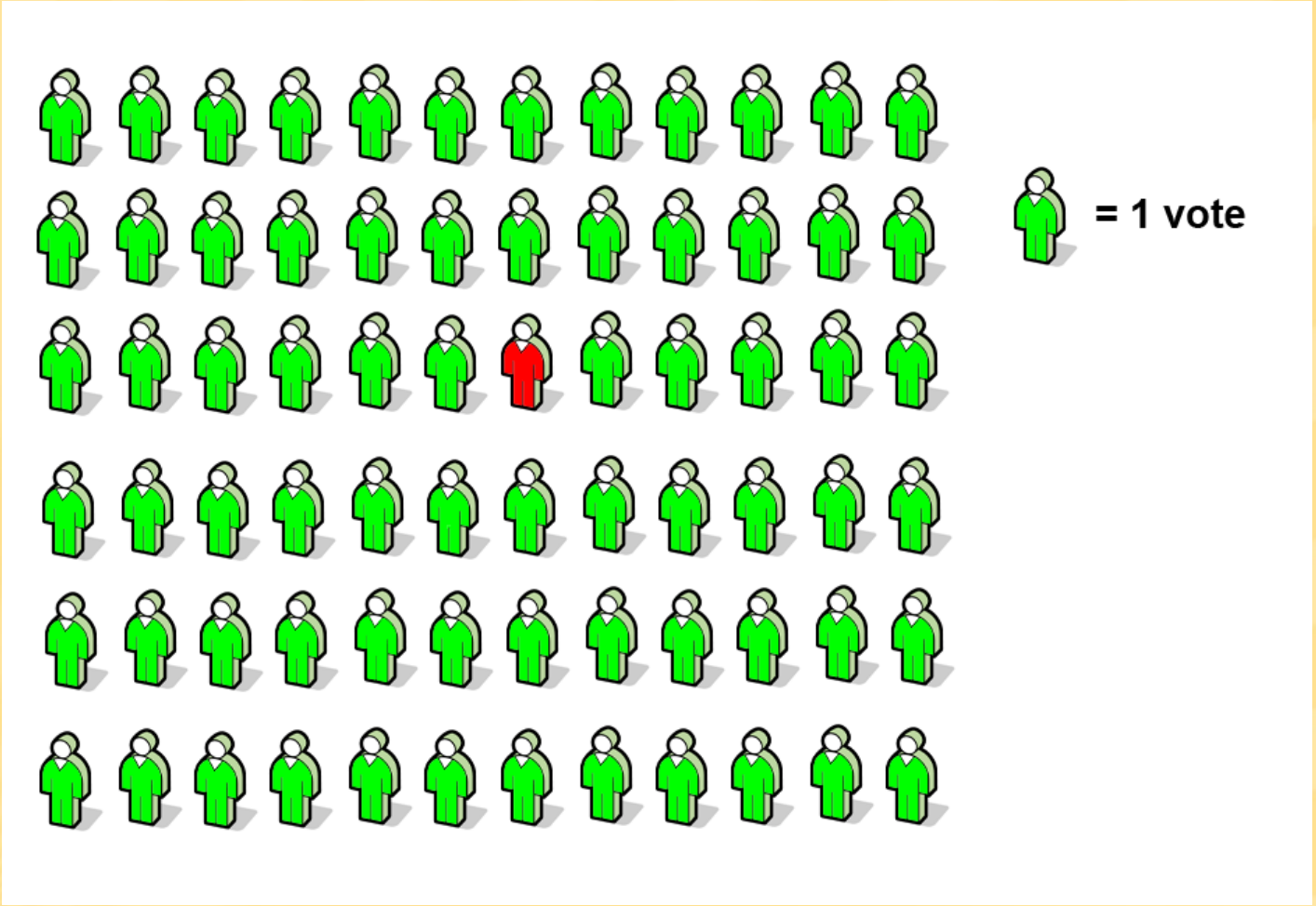
Local segmentation methods



Global segmentation methods



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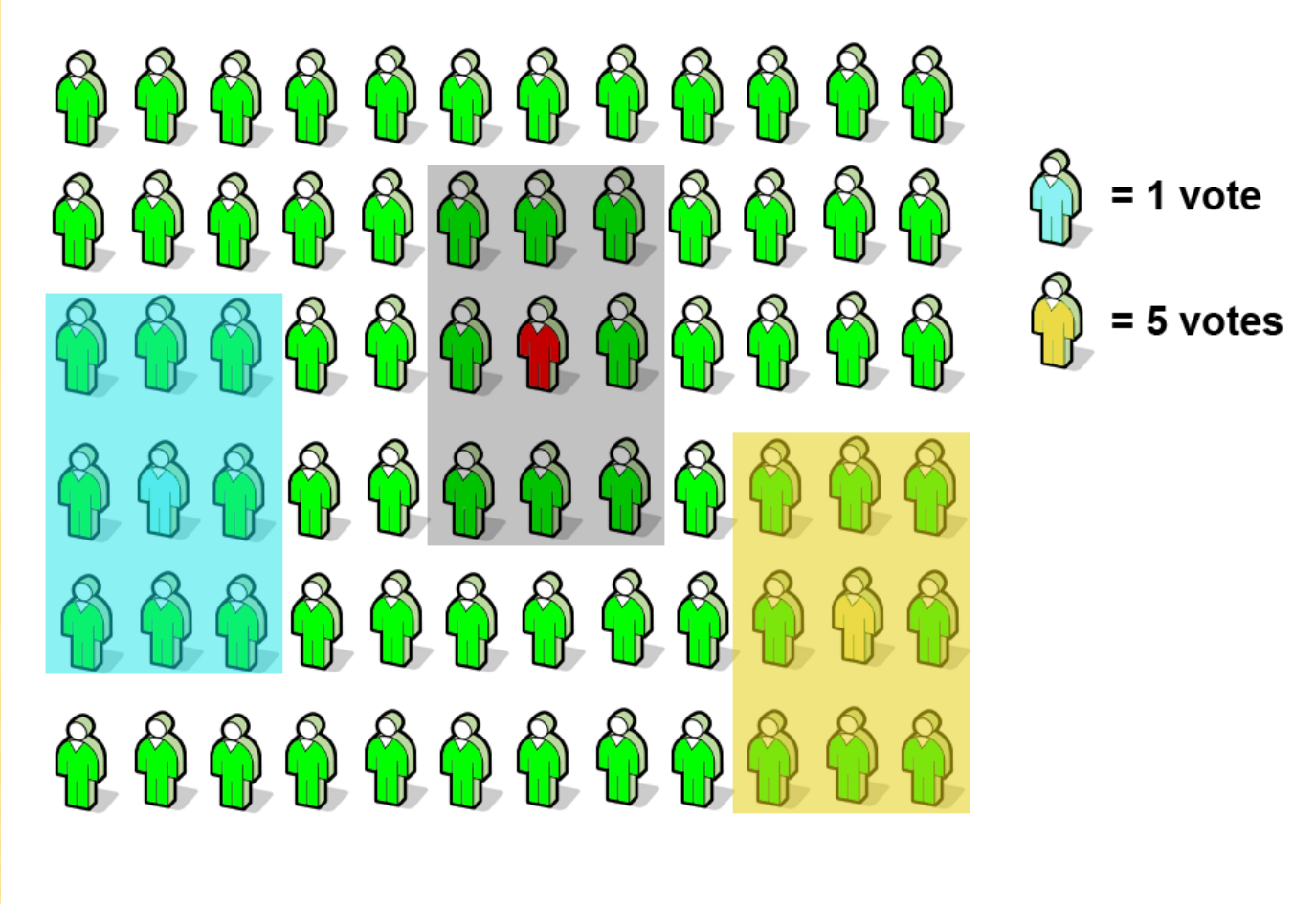
Local + Global = Hybrid?



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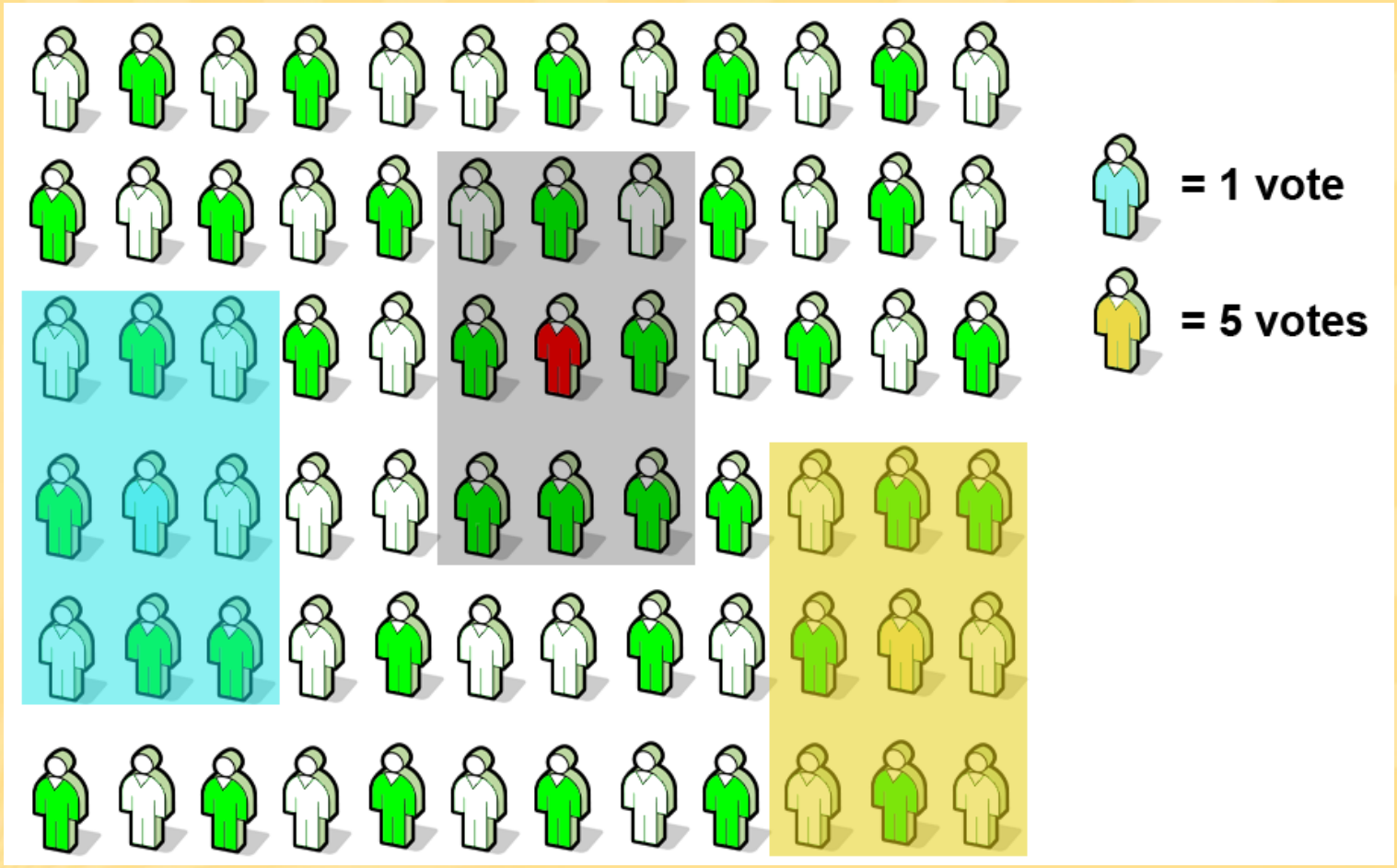
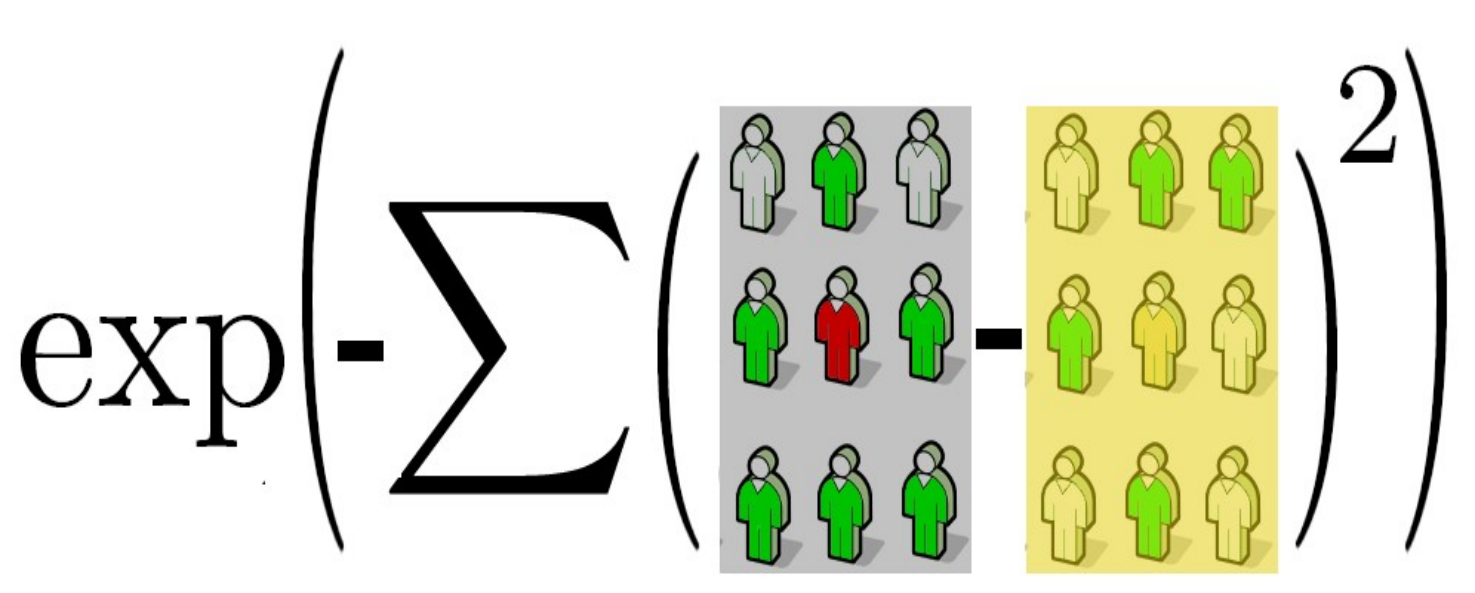
Random Ensemble Consensus



Random Ensemble Consensus Strategy

- Number of votes determined using cummulative tonal difference between local neighborhoods



- Decision based on median of votes

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Experiments

SAR sea-ice images from Canadian Ice Service (CIS):

- Test 1: RADARSAT-1, C-band HH, 100m pixel spacing.
- Test 2: RADARSAT-2, C-band HV, 50m pixel spacing.
- Test 3: RADARSAT-2, C-band HV, 50m pixel spacing.
- Test 4: RADARSAT-2, C-band HH, 50m pixel spacing.

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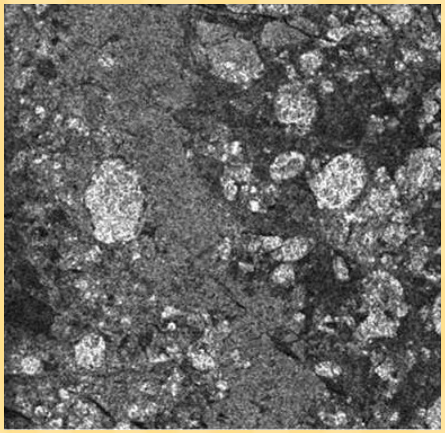
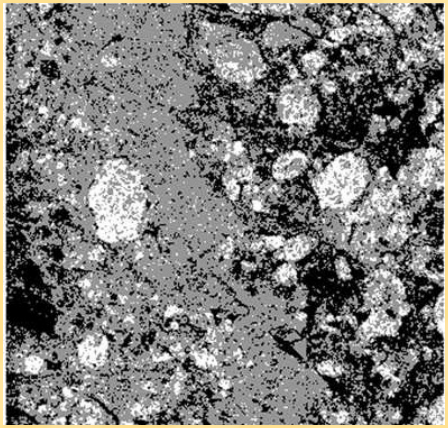
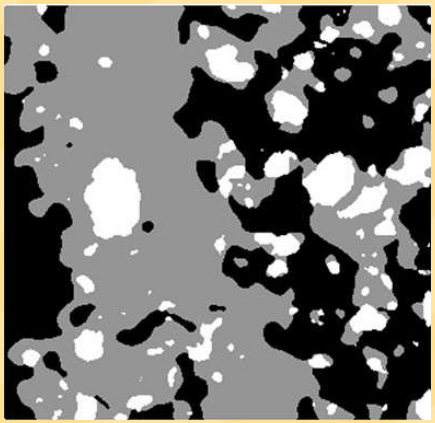
Experimental Results (Test 1)



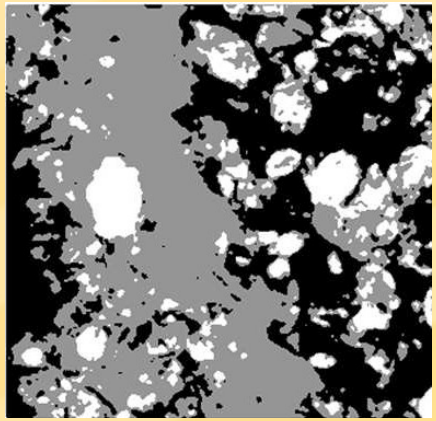
SAR image



Gamma mixture model



MRF model



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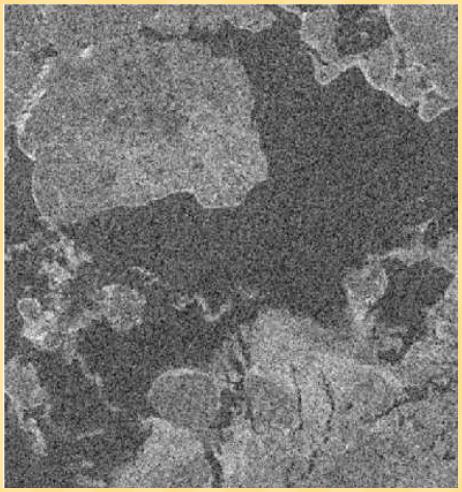
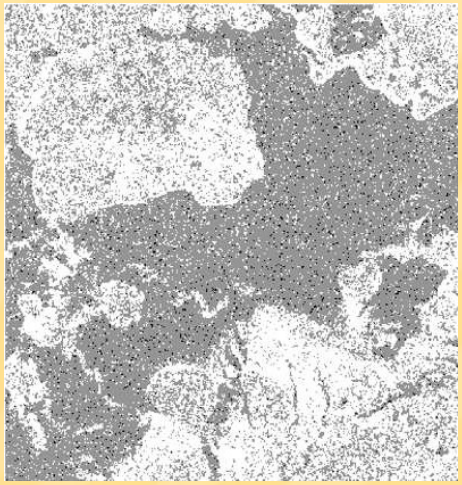
Experimental Results (Test 2)

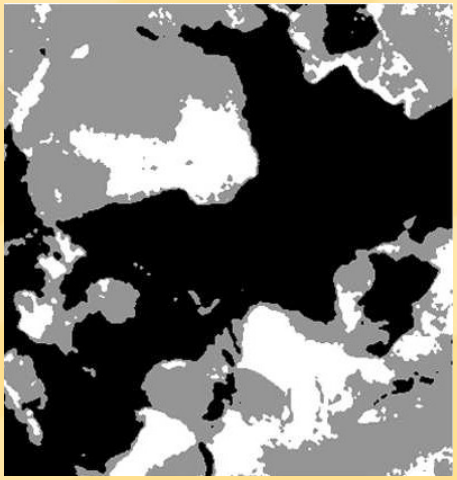


SAR image



Gamma mixture model

MRF model



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Future Work

- Investigate alternative sampling schemes for the stochastic ensemble construction process
- Alternative approaches for evaluating the similarity between local neighborhood configurations

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Thank you!

- Any questions?