How do perceptual grouping cues affect image memorability?

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Motivation

- Image Memorability
  - A probability for an image to be recognised later after a single view
  - Some images are intrinsically more memorable than others
  - Only weakly related to low-level image properties (e.g., colour, saturation, or spatial frequencies)
  - Strongly related to high-level properties (e.g., emotion, object and scene semantics)

Question: How do mid-level perceptual grouping features contribute to image memorability?

- Mid-level perceptual grouping features
  - Scene categories can be decoded from simple line drawing (LD) as just well as from coloured photographs
  - Symmetry and contour/junction properties contain critical information for scene categorization

Methods

- Memorability experiment
  - Recognition memory task
  - Instructed to press the space bar whenever you see an identical repeat of an image at any time in the sequence
  - $d': z(\text{Hit rate}) - z(\text{False alarm rate})$

FIGRIM dataset

- Scene Image set (N = 1543) with Memorability scores
  - (Bystranski et al., 2015)

Mid-level feature computation

- Image processing using MLV Toolbox

Torontoscenes dataset

- Scene Image set (N=472) with artist-drawn LDs

FIGRIM dataset analyses

- Junctions (Y junctions) and curvature affect memorability
- The straighter the lines and the more junctions, the more memorable images are

Summary

- Photos are more memorable than LDs of the same scenes
- Memorability of photos & LDs of the same scenes are correlated
- More junctions are related to higher memorability, presumably due to there being more objects.
- Did not find consistent relationships between memorability & local symmetry