Computational Understanding of Image Memorability

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What is memorability?

- objective and quantifiable measure of images
- consistent across observers
- filter for visual data

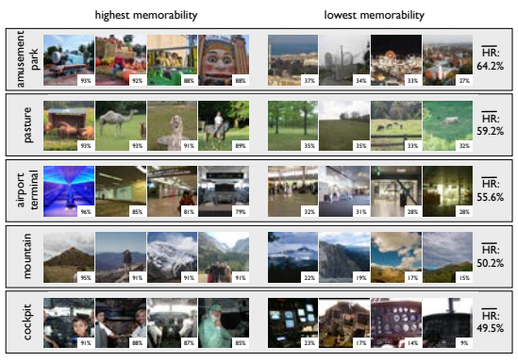
$$\mathrm{HR(I)} = \frac{\mathrm{hits(I)}}{\mathrm{hits(I)+misses(I)}} \times 100\%$$

Crowd-sourced (AMT) memory (image recognition) games

Application areas

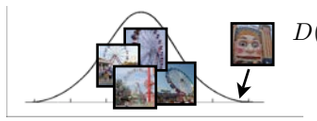
Is memorability predictable?

FIGRIM Dataset



Memorability rank is consistent across participants

Can we model image context?



$$D(I;C) = -\log P_c(f_i)$$

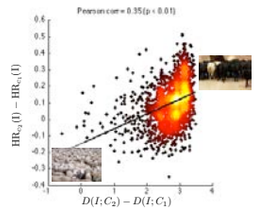
$$P_c(f_i) = \frac{1}{\|C\|}\sum_{j \in C} K(f_i - f_j)$$

ran 21 separate experiments: one per scene category → within-category experiment

AND

an additional experiment, combining images from all categories → across-category experiment

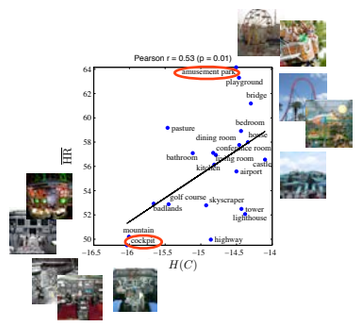
Contextually distinct images are more memorable



Memorable within categories

Memorable across categories

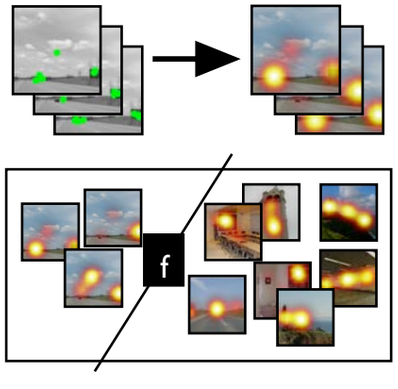
More varied image contexts are more memorable overall

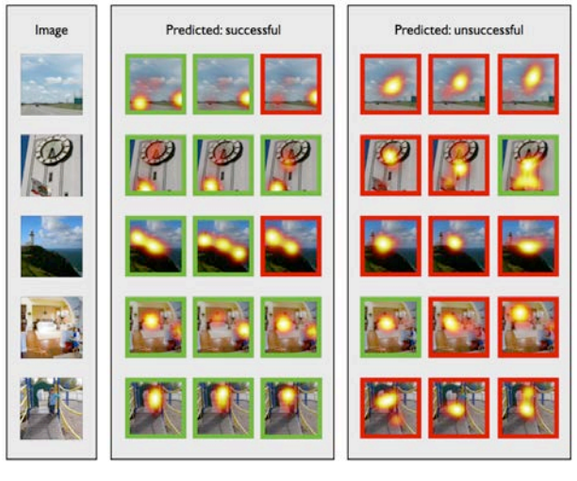


$$H(C) = \mathbb{E}_c[-\log P_c(f_i)]$$

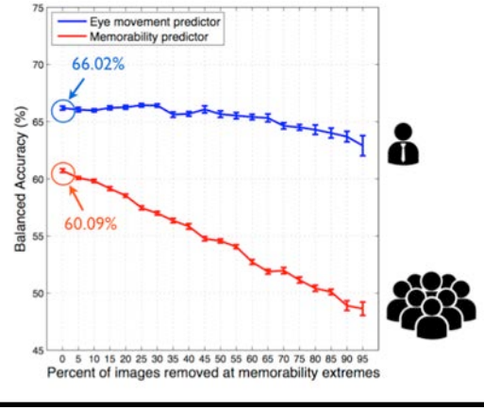
Can we use eye behavior to make predictions for individuals?

We train a classifier to predict whether a set of eye movements will lead to a successful encoding

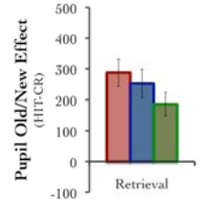


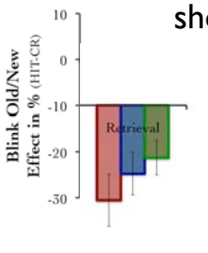


Where you look in an image is predictive of whether you'll remember it later



Your pupil dilations and blink rates are indicative of how difficult it is to retrieve an image from memory





Memorability differences show up early!