

What makes an object memorable?

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Abstract

Recent work by Isola et. al. (2011) has demonstrated that memorability is an intrinsic property of images that is consistent across viewers and can be predicted accurately with current computer vision techniques. Despite progress, a clear understanding of the specific components of an image that drive memorability are still unknown. While previous studies such as Khosla et. al. (2012) have tried to investigate computationally the memorability of image regions within individual images, no behavioral study has systematically explored which memorability of image regions. Here we study which region from an image is memorable or forgettable. Using a large image database, we obtained the memorability scores of the different visual regions present in every image. In our task, participants viewed a series of images, each of which were displayed for 1.4 seconds. After the sequence was complete, participants similarly viewed a series of image regions and were asked to indicate whether each region was seen in the earlier sequence of full images.

1. Introduction

Consider the image and its corresponding objects in Figure 1. Even though the person on the right is comparable in size to the left person, he is remembered far less by humans (indicated by their memorability scores of 0.18 and 0.64 respectively). People tend to remember the fish in the center and the person on the left, even after 30 minutes have passed (memorability score = 0.64). Interestingly, despite vibrant colors and considerable size, the boat is also remembered far less by humans (memorability = 0.18).

While recent studies related to image memorability have shed light on what distinguishes the memorability of different images and the intrinsic and extrinsic properties that make those images memorable, the above example raises an interesting question: what exactly about an image is remembered? The memorability of complex images may be principally driven by its most memorable object, or alternatively, by a combination of particular objects. Furthermore,



Figure 1: Memorability of different objects. Memorability scores of objects for the image in the top row obtained from our psychophysics experiment.

not all objects in an image will be equally remembered by people and the example seems to suggest that there exists significant and interesting differences in memorability of objects in an image previously not studied in the literature. Can specific objects inside images be memorable to all us and what exactly makes them memorable/ can we better understand what those objects more memorable? Despite progress in the computer vision literature on image memorability, a clear understanding of the specific components of an image that drive memorability is still unknown. Studying these questions, might not only help understand image and object memorability in more detail, but it can also have important contributions to computer vision. For example, understanding which regions and objects in an image are memorable would enable us to modify the memorability of images which can have applications in advertising etc.

In this paper, we systematically explore the memorability of objects within individual images and shed light on the various factors and properties that drive object memorability. Firstly, our work explores if object memorability

is a property shared across subjects and answers - can specific objects inside an image can be memorable to all of us? Next, I want to quantify which objects in general are most memorable and which ones are least memorable. This could lead to interesting questions like if an image contains highly memorable objects, could it's memorability still be low? Another way would be think can an image still be memorable even if the objects inside it have low memorability? Not only am I curious about this question, I believe that this will be very beneficial for object detection algorithms. For example, classes like person, dogs are easy to detect for current state-of-the-art computer vision algorithms but objects like chairs, bottles are very hard to detect. Could there be a correlation between the two? Are classes like chair and bottles tough to detect because these objects are less memorable? If there is, then object detection algorithms could use memorability as one of the features to improve the detection performance in future. Lastly, I want to study the correlation between salient objects and memorable objects. Are objects that are more salient, easier to memorize as well? Finding the overlap and differences between saliency and memorability would go a long way to help object detection algorithms.

no study has systematically explored memorability of objects within individual images. Inspired by this, here, we are not just interested in understanding image memorability, we are interested in understanding memorability of objects in an image. Can some objects in individual images be more memorable to us and can we estimate their predictability? And how exactly do different objects matter, whether it be size, spatial arrangement, etc.

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