What eye movement and memory experiments can tell us about the human perception of visualizations

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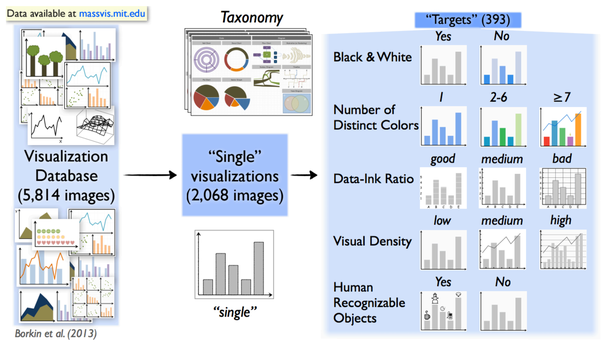
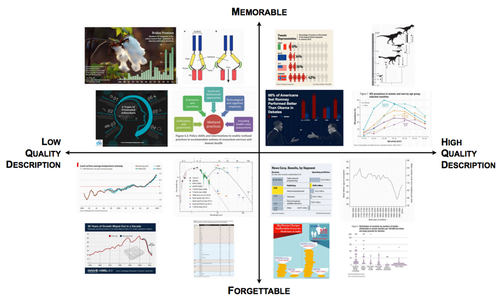
Visualization Dataset

We have released a publicly-available dataset of highly-variable visualizations.



We gathered rich, manual annotations of hundreds of visualizations, for perception and cognition experiments.

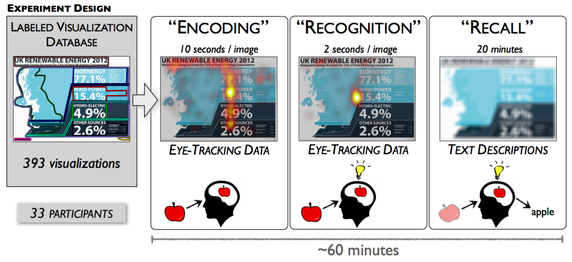
- **dozens** of eye-tracking lab participants
- **100s** of online participants (MTurk)
- **100s** of diverse visualizations
- **1000s** of labels and annotations
- **1000s** of user text descriptions
- **10,000s** of eye fixations



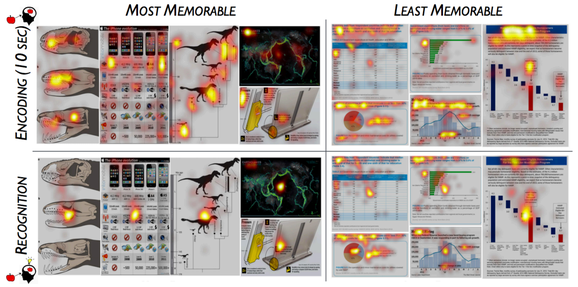
Perception Experiments

To learn what makes a visualization memorable, we ran large-scale online memorability experiments.

In the lab, we measured which elements of visualizations people look at and remember.



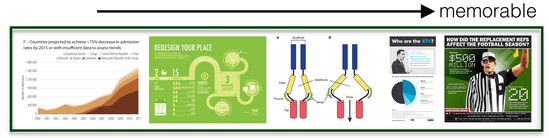
From eye fixation patterns, we can tell which visualizations are harder to recognize.



Key Findings

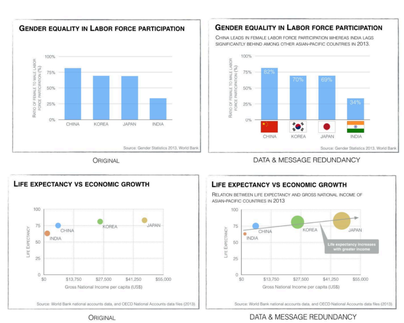
What improves visualization recognition?

- distinctive type and design
- pictograms (human recognizable objects)
- high data-ink ratio, colorful



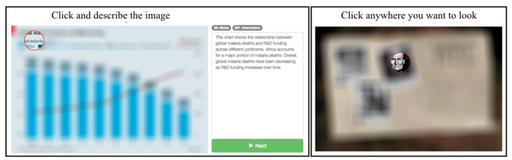
What improves visualization recall?

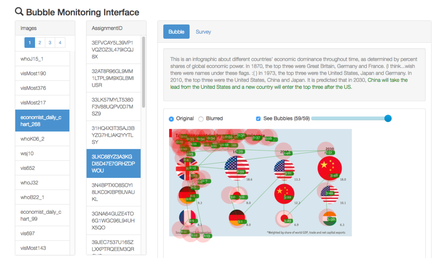
- titles that convey the main message
- pictograms (acting as "memory hooks")
- being memorable"at-a-glance"
- adding data and message redundancy



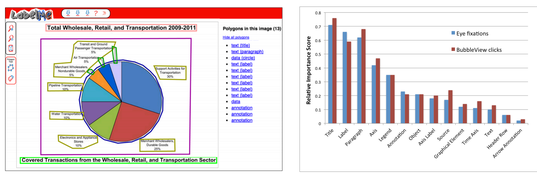
Scaling up data collection

To crowdsource attention patterns online, we designed the BubbleView interface.





The same elements of a visualization are looked at and clicked on the most.



Read more!

Beyond memorability: visualization recognition and recall [InfoVis 2015]
What makes a visualization memorable? [InfoVis 2013]
BubbleView: an alternative to eye-tracking for crowdsourcing image importance [arXiv 2017]
Eye fixation metrics for large scale evaluation and comparison of information visualizations. [Springer 2017]

http://massvis.mit.edu