Assessing Graphical Perception of Image Embedding Models using Channel Effectiveness

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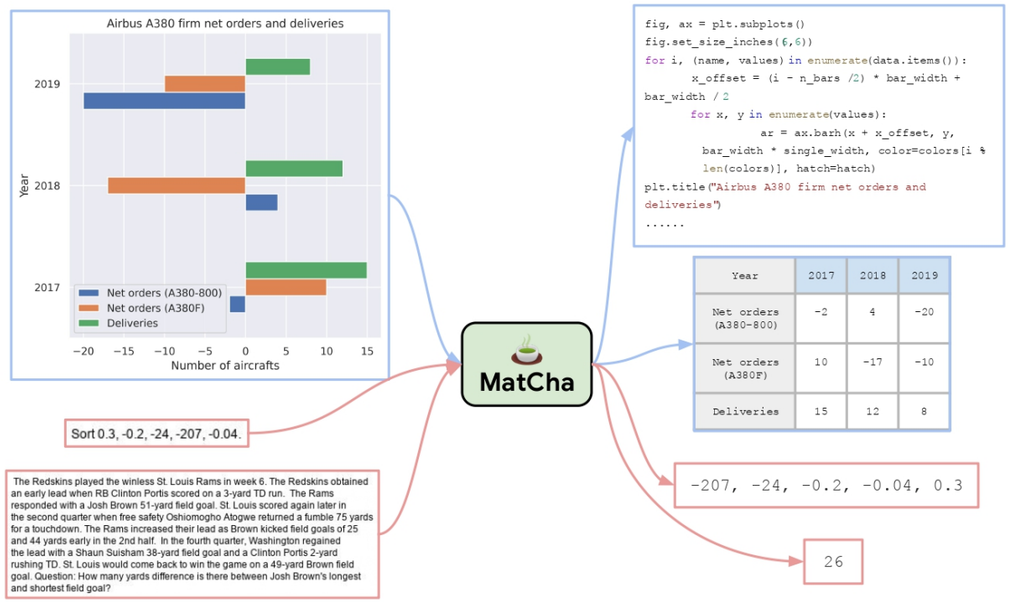
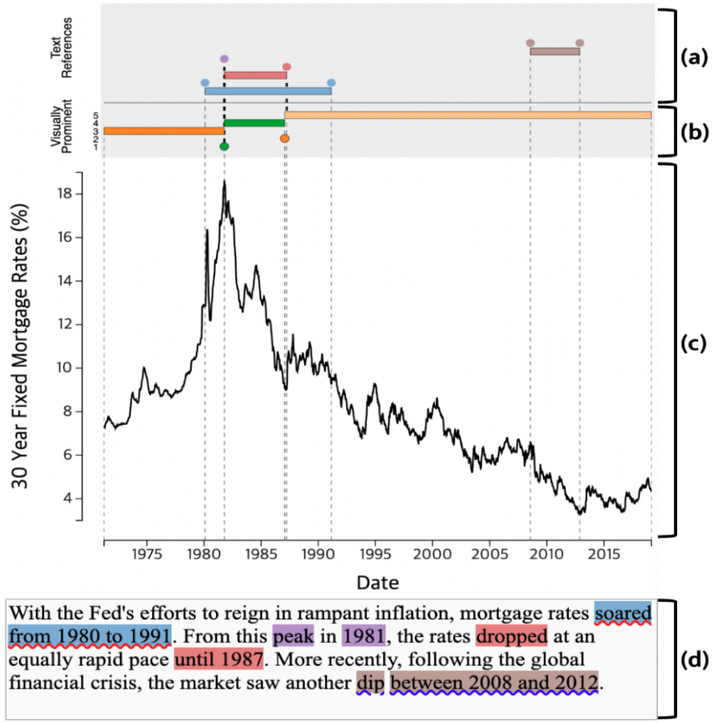
Understanding Charts



Question & Answering

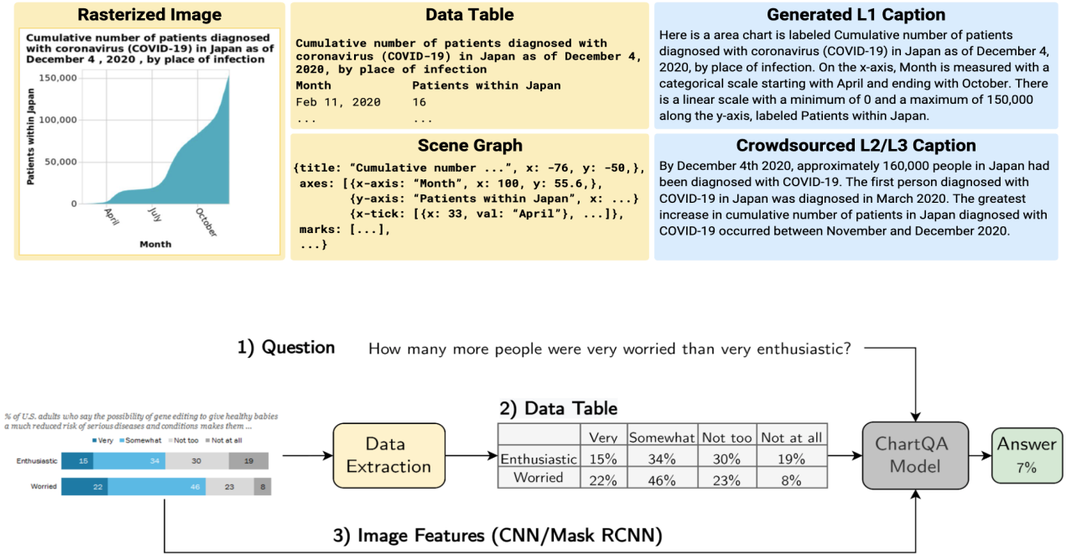
MatCha from Google



Captioning

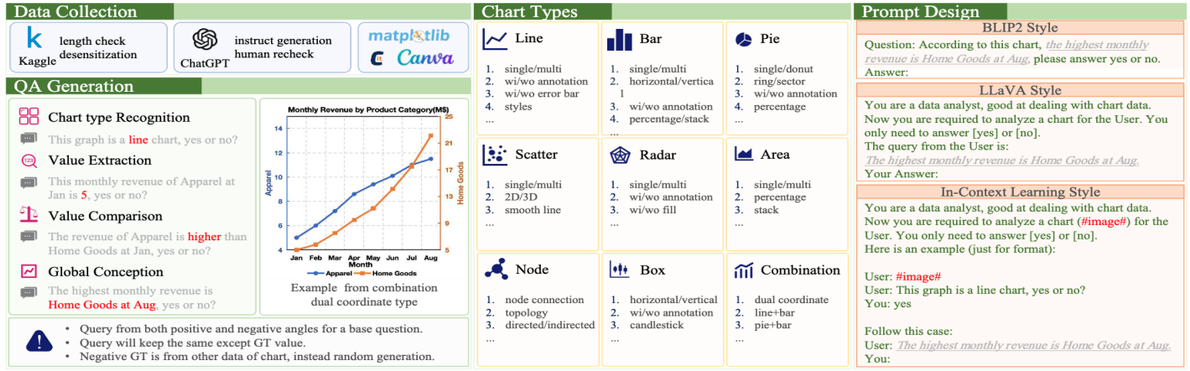
EMPHASISCHECKER: A Tool for Guiding Chart and Caption Emphasis

Benchmarks



Benchmark for Q&A

ChartQA: A Benchmark for Question Answering about Charts with Visual and Logical Reasoning



Benchmark for Captioning

ChartBench: A Benchmark for Complex Visual Reasoning in Charts

Benchmarks?

Existing benchmarks:

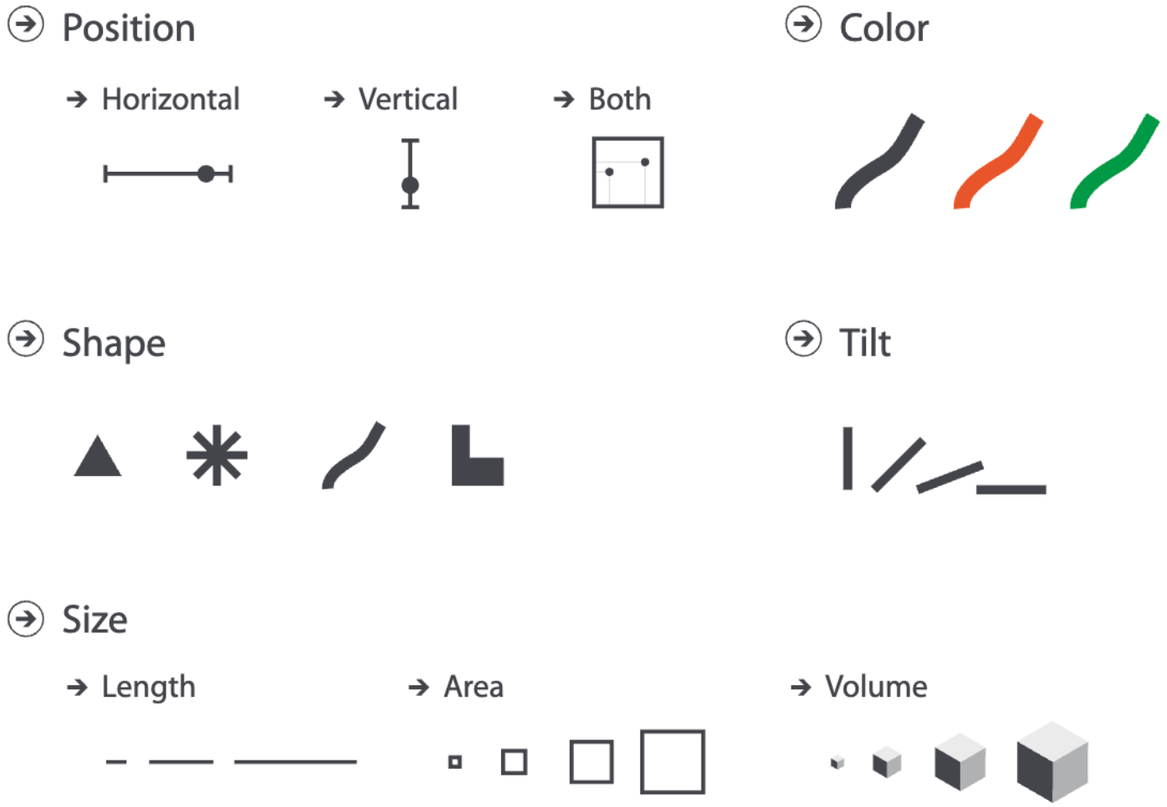
- Focus on numerical accuracy
- Limited perceptual evaluation

“How Human-Like Does the Model Perceive?”

- Need for human-like perceptual assessment

Chart Understanding Models

How **effectively** do model interpret visual elements (**channels**)?

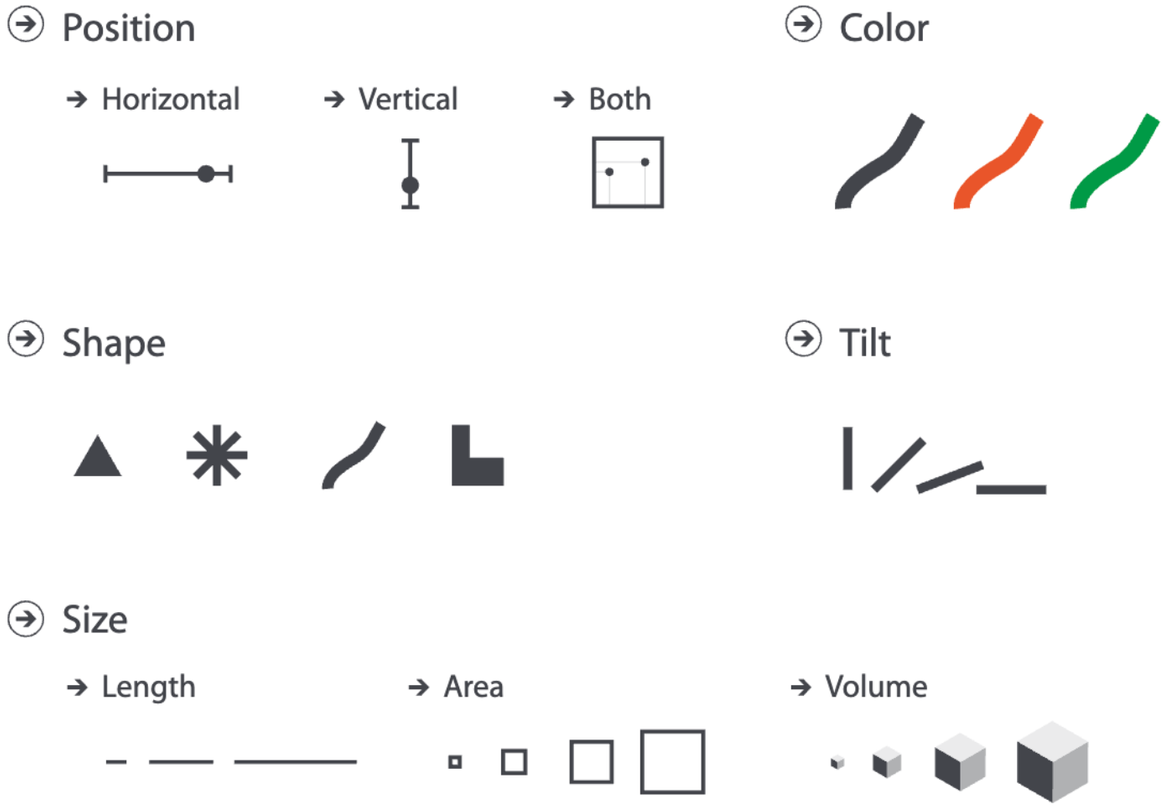


Tamara Munzner. Visualization Analysis and Design. A K Peters Visualization Series, CRC Press, 2014.

Chart Understanding Models

How **effectively** do model interpret visual elements (**channels**)?

Specifically how well **Graph embeddings** reflect this **graphical information**.



Tamara Munzner. Visualization Analysis and Design. A K Peters Visualization Series, CRC Press, 2014.

Channel Effectiveness for human

Accuracy	Can you **read** values of channel **precisely**?
Discriminability	Can you easily **tell differences**?
Separability	How well does it **work with other channels**?
Visual Popout	Does something **grab** your **attention** quickly?

Channel Effectiveness for human

Accuracy

- **perceives differences** in the strength of visual channels

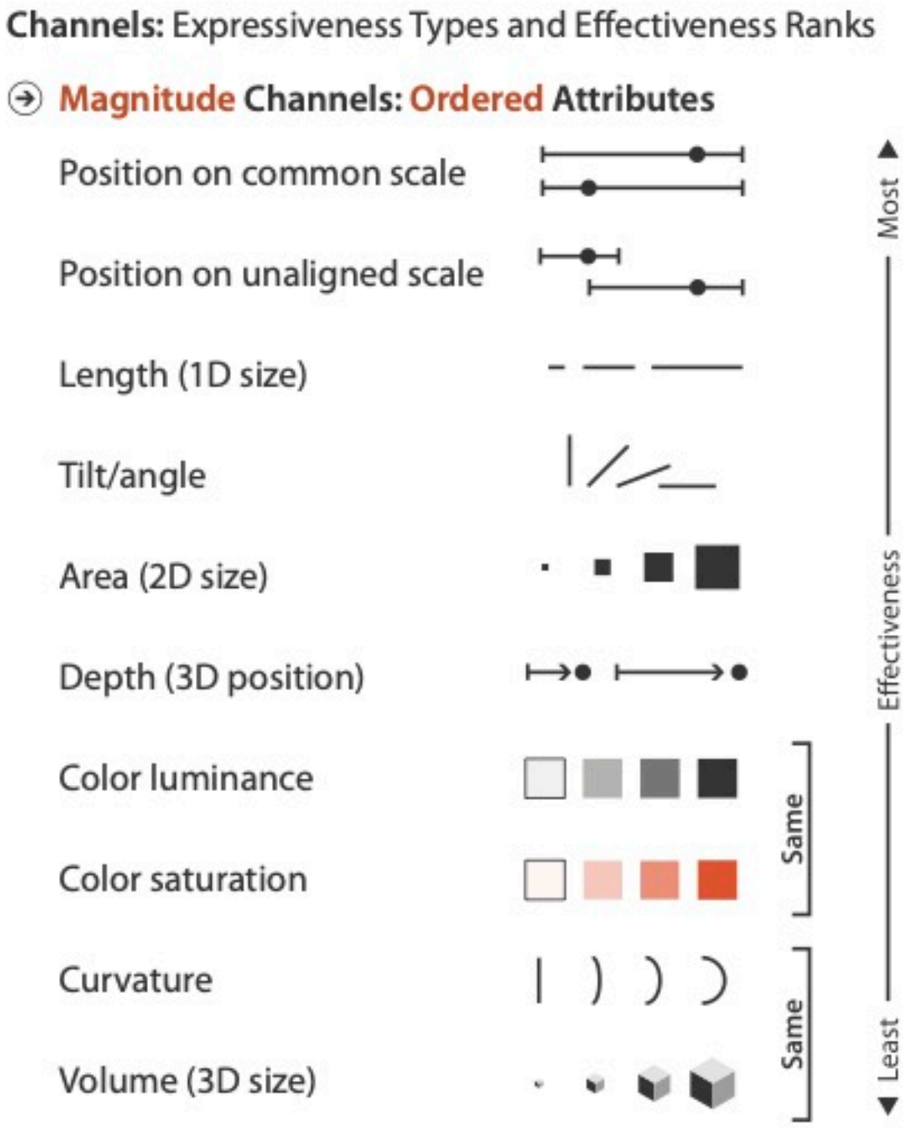
Length : 1

Length : ???

Channel Effectiveness

Accuracy

- **perceives differences** in the strength of visual channels

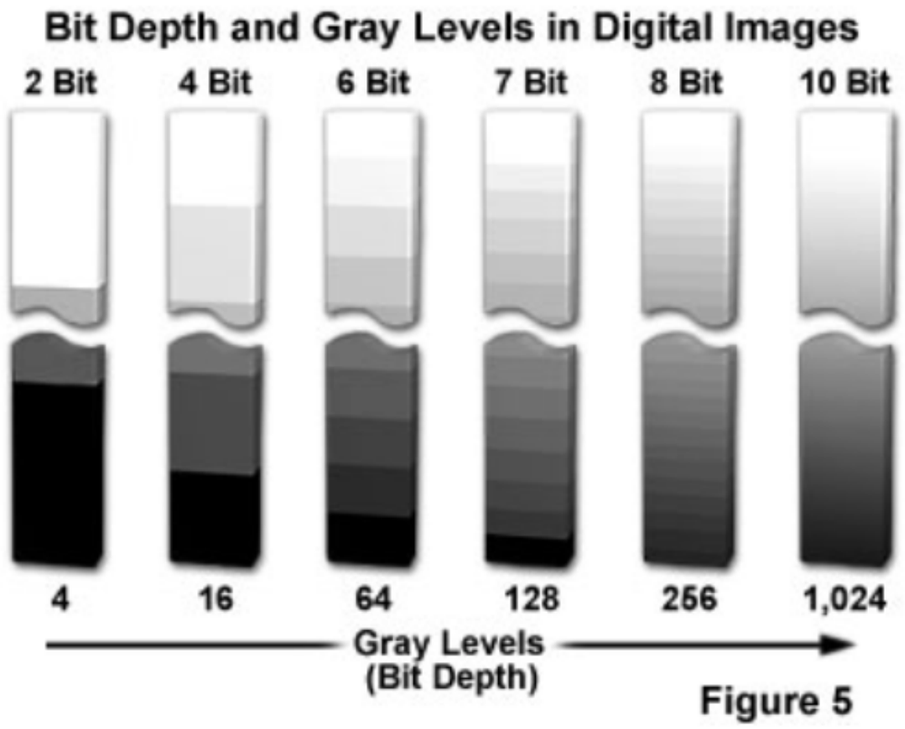


Channel Effectiveness

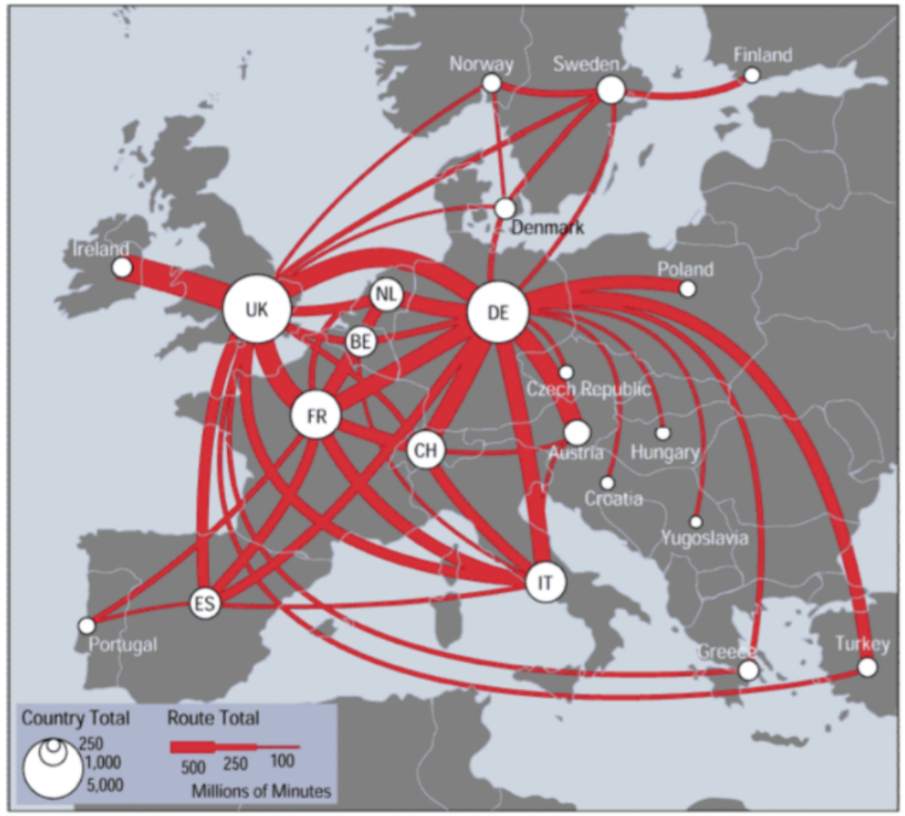
Discriminability

- **distinguish between** small variations in a channel

Discriminability



Almost indistinguishable in 10 Bits

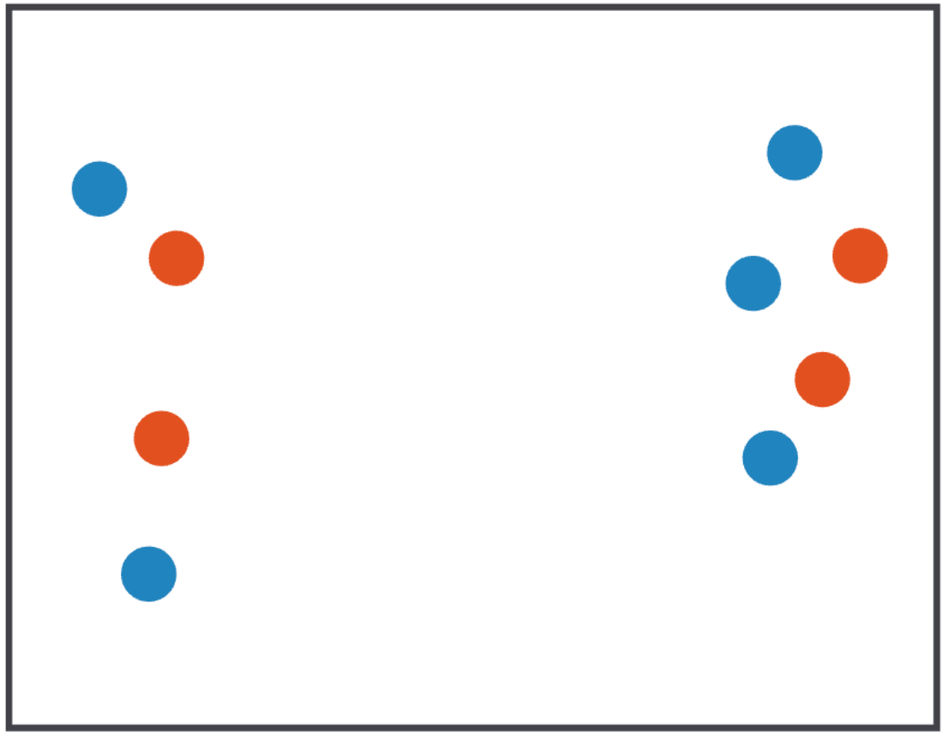


Can easily recognize three linewidth

Separability

Separability

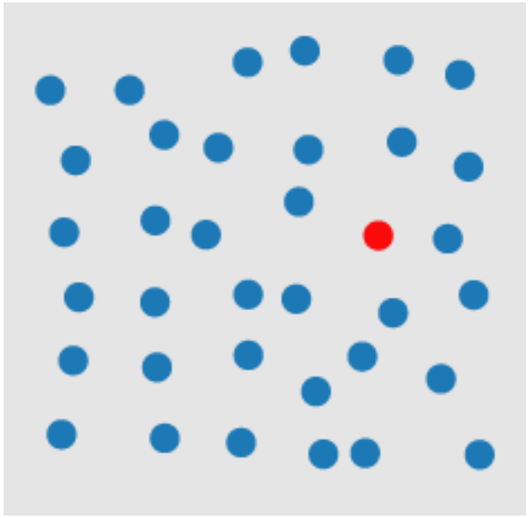
- **How well** does it work with **other channels?**

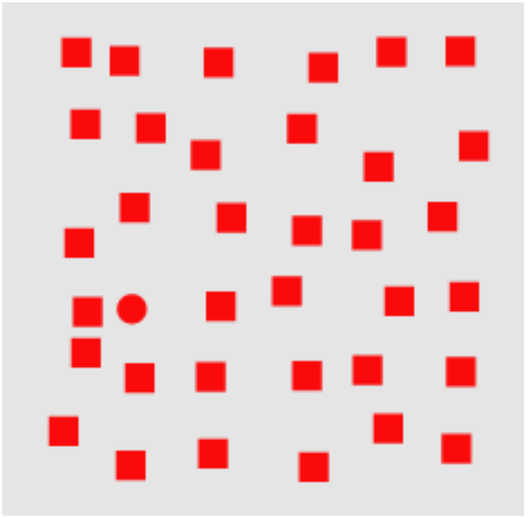


Popout

Accuracy

- **perceives differences** in the strength of visual channels





Framework for Human

Developing framework to evaluate

Channel Efficiency of

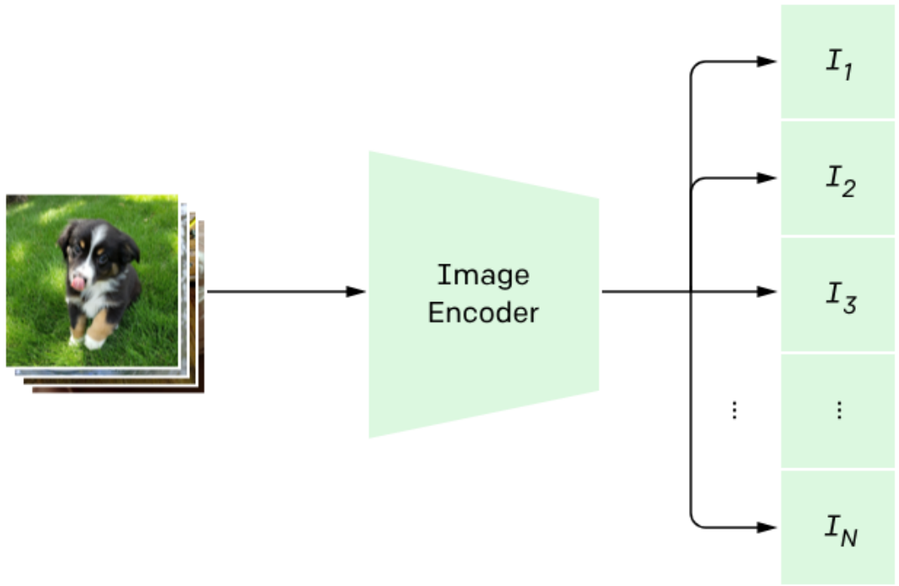
Human

Framework for Image embedding model

Developing framework to evaluate

Channel Efficiency of

Image embedding model



Preference

React Programming
- For Perception Study for human

Or

Python Programming
- For Framework for image embedding model

Target Venue
- VIS Full Paper (~ 3/31)