The effects of 2nd-order feature interactions in predicting human gaze
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Introduction

In this study, we address the question of how individual features may be combined to guide bottom-up attention.

We compare the performance of several models, including:

1) a simple linear model
2) a weighted linear model which was optimized using a genetic algorithm approach
3) a weighted linear 2nd-order model representing feature interactions
4) a highly non-linear max model

Methods

8 subjects watched videos containing synthetic and natural scenes.

- a total of 158,476 frames of video were shown to subjects (≈25 min of video)
- Eye tracking was conducted with an ISCAN eye tracker at 60 Hz
- The instruction was to “follow main actors and actions in the scene and not worry about the details”

Stimulus and Paradigm

8 subjects watched videos containing synthetic and natural scenes.

- The effects of 2nd-order feature interactions in predicting human gaze
- 158,476 frames of video were shown to subjects - a total of 8 subjects watched videos containing synthetic and natural scenes.

AUC Analysis

- An Interobserver model performs a lot better than either single features or simple bottom-up models that linearly sum features.

AUC Results

- We investigated several models of feature integration and evaluated how well each model can predict human gaze.
- We found that while some 2nd-order feature combinations may receive a fairly high score, the contribution of 2nd-order feature interactions in gaze prediction is minimal.
- We are currently investigating a new dynamic highly non-linear feature interaction rule that may be at play when humans engage in visual tasks.

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