**Motivation and Overview**

Natural scenes have complex statistical structure, including correlations of low and intermediate order, such as gratings and white noise. This motivates us to develop a library of models that can capture these correlations for responses to natural scenes.

This motivated us to develop a library of models that can capture these correlations for responses to natural scenes. To reduce the dimensionality of the problem, we focus on the local statistics of images. This leads to a space of visual textures: the 10 coordinates of this space completely capture correlations of order 3 through 4.

**Extraction of Local Orientation Signals**

In natural images and in the texture space, this is true of all orientations and can therefore serve as a measure of orientation information. Consequently, we have therefore examined how local orientation signals interact, and whether this interaction is consistent across subjects.

**Second-order Statistics**

Second-order statistics are processed independently, and the shape of the isodiscrimination contour indicates how the image statistics interact. In this case, there is no pooling index from 0 to 1. A coordinate axes.

**Pooling Index**

The pooling index shows which pairs of image statistics are processed separately (PI<1), and which are pooled (PI>1). Second-order statistic pairs P1 and P2, and second-order statistic pairs P3, P4, and P5 are processed separately. Second-order statistic pairs P1 and P2 are pooled.

**Summary and Conclusions**

- To study how image statistics intersect, we abstracted the complex statistical structure of natural scenes into a reduced space of binary textures with pool correlations.
- Within this 10-dimensional space, statistics of individual image statistics are highly consistent with and across N=8 observers, thresholds for third-, fourth-, and fourth-order statistics are in the range of 12.5%.
- Tokens representing multiple orientations can consist, and orientation information can be carried by second- and higher-order statistics.
- The perceptual interactions of these image statistics are also highly consistent across N=8 observers, and correspond to an approximate local-biased perceptual space.
- Orientation signals carried by second-order statistics are generally processed independently, while orientation signals carried by higher-order statistics are pooled.

Jonathan D. Victor, Daniel J. Thengone, Mary M. Conte
Department of Neurobiology, Weill Cornell Medical College

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**Characterizing the salience and interactions of informative image statistics**

**Methods and Psychometric Functions**

To quantify the extent of interaction, correlations of order 3 through 4 have been characterized using the isodiscrimination contour. The shape of the isodiscrimination contour indicates how the image statistics interact. In this case, there is no pooling index from 0 to 1. A coordinate axes.

**Pooling Index Summary**

The pooling index shows which pairs of image statistics are processed separately (PI<1), and which are pooled (PI>1). Second-order statistic pairs P1 and P2, and second-order statistic pairs P3, P4, and P5 are processed separately. Second-order statistic pairs P1 and P2 are pooled.

**Coordinate Planes**

Simple interactions between statistics

Each panel illustrates a texture coordinate plane that was studied. Within each panel, the texture image indicates the gain of the coordinate pair: the center of each image is constant, the border indicates the limits imposed by consistency conditions. One can get an idea of the salience of each coordinate and how they interact by noting where each image becomes adjacent to the texture image. This is quantified by isodiscrimination contours, shown for three subjects adjacent to the texture image.