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ABSTRACTS

chromatic-discrimination data provide no information concerning underlying chromatic mechanisms. We report experimental tests of these conditions for 1 deg disks, modulated at 1.5 Hz or at 12.5 Hz. These tests include analyses of the residuals of fits to both models. We do not reject the indeterminacy hypothesis.

APPLIED PSYCHOPHYSICS

◆ **The perception of geometrical features on a hexagonal grid**
P A Medennikov, D A Denissov¶ (Computer Science Department, Electrical Engineering University of St Petersburg, ul. prof. Popova 5, 197376 St Petersburg, Russia; ¶Applied Landscape Ecology Section, Environmental Research Institute, Permoserstrasse 15, 04318 Leipzig, Germany)

The geometrical features characterising object shape, size, and orientation are the clue for correct and accurate decisionmaking in object-recognition and image-understanding tasks. Image-digitisation procedures insert distortion into object size, shape, and orientation and make their visual perception difficult. The computer processing of digital images makes this problem more severe since these distortions affect crucially the computation of the corresponding geometrical features. To make the perception of the digitised images comparable to the natural perception mechanisms being performed by the eyes of human beings and animals, hexagonal grids were introduced (Mersereau, 1979 *Proceedings IEEE* 67 930–949). The main advantages of these grids as compared with rectangular ones are the absence of the problem of four or eight neighbours—every hexagonal pixel (hexon) has six equidistant neighbours; and that a hexagonal grid provides more fine-angle resolution. That is why hexagonal grids give us a more accurate discrete representation of an object border and therefore its size and shape. We compare the measurements of geometrical features when rectangular and hexagonal grids are involved. The features under consideration are area, perimeter, thickness, compactness, etc. We simulate the rectangular and hexagonal grids by special averaging procedures in which fine-resolution images are used as input. The relationships of accuracy of geometrical-features estimation with object size and orientation are shown. It is established that the representations on the hexagonal grids provide the lowest variance of geometric-feature estimates for objects with different orientation. Hexagonal grids give more-favourable conditions for correct object-recognition performance.

◆ **A computational retinex algorithm**
J M Artigas, V Arnau, F Martínez-Verdú, A Felipe (Departamento de Optica, Facultat Ciencias Físicas, Universitat de València, València, Spain)

Colour constancy in the human visual system is a complex process involving the retina, the lateral geniculate nucleus, and the visual cortex. From the viewpoint of the retinex theory, we have developed an algorithm by which the colours present in the different regions of a visual scene are coded in such a way that, under certain conditions, they become invariant to changes in the illuminant. From an image in a CCD colour camera, the RGB images are digitised in a grey scale from 0 to 255. For each of these images, a series of relations between the luminosities or grey levels of every colour in the scene are established. We have observed that, when the illuminant is changed, for instance from daylight to a reddish light, the relative positions of the luminosities of the colours are approximately invariant. From these observations, in each RGB channel, we can obtain a set of three descriptors for any colour in the scene. The recognition of any colour is carried out by means of the colorimetric information of the rest of the colours present in the scene. By means of Mondrian patterns (with Munsell chips) we have shown that these descriptors remain approximately constant under different illuminants. This new chromatic codification can be utilised for creating an algorithm formed by a process of recovery, based on a colour database (Munsell chips) coded by these new descriptors. These results may help the development of artificial vision systems based on colour detection and recognition, which have to work under changing illumination. On the other hand, it may also help us to understand the colour-coding process of the human visual system.

◆ **A modular, portable model of image fidelity**
A B Watson, A J Ahumada, Jr (NASA Ames Research Center, Moffett Field, CA 94035-1000, USA)

There is a persistent need for a trustworthy model of perceptual-image fidelity, especially in applications such as image compression and display design. A fidelity model provides a measure of the visual discriminability of two images. Ahumada [1993 *Society for Information Display International Symposium Digest of Technical Papers* Ed. J Morreale (Playa del Rey, CA: Society for Information Display)] has previously shown that the existing fidelity models may be

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Dear Author(s),

Based on the review of your abstract by the chairperson and referees, and taking into account your own preference for poster or oral presentation, the organization committee of the 17th European Conference on Visual Perception is pleased to inform you that your submission is ACCEPTED AS A POSTER PRESENTATION in the session on 'Early visual processing I', on Monday and Tuesday, September 5-6, 1994.

In order to guarantee publication of your abstract in 'Perception' and inclusion in the (preliminary) programme, we request that:
1.   the author who is going to present the paper is registered, and
2.   the final version of the abstract is submitted,
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