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The effect of deviations from linearity on the detection of dotted line patterns

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Abstract

Four experiments were carried out to determine the detectability of dotted line stimulus patterns embedded in backgrounds of randomly dotted visual noise. The results indicate that straight lines are more easily detected than curves or angles. This finding holds robustly even though interdot spacings (local geometry) are held constant in each experiment. The global organization of the stimulus, therefore, is a strong determinant of the ease of visual pattern detection. The implications of these findings for pattern recognition theory are considered using an optical computer.

Résumé

On détermine par quatre expériences la possibilité de détecter un stimulus dessiné en lignes ponctuelles, noyées dans des fonds de bruit visuel obtenu par des points au hasard. Les lignes droites sont détectées plus facilement que les courbes

ou les angles. Ce résultat résulte solidement bien que les espaces entre points (géométrie locale) restent constants dans chaque expérience. L'organisation globale du stimulus détermine donc fortement la facilité de détection du dessin. On considère au moyen d'un calculateur optique les implications de ces résultats pour la théorie de reconnaissance des figures.

Zusammenfassung

In vier Experimenten wurde die Erkennbarkeit einer punktierten Linie auf einem Rauschmuster untersucht. Die Ergebnisse zeigen, dass gerade Linien leichter erkannt werden als Kurven oder Winkel. Dieses Ergebnis bleibt bestehen, auch wenn der Abstand zwischen den Punkten (die lokale Geometrie) bei jedem Versuch konstant gehalten wird. Die Erkennbarkeit eines Testreizes wird also entscheidend durch seine globale Organisation bestimmt. Die Folgerungen dieser Ergebnisse für die Mustererkennung werden mit einem optischen Rechner untersucht.

PeĐ · Žme

Đ·Ń<Đ>>Đ ;poĐ ,Đ ·Đ²eĐ' eĐ^{1/2}o Ń...eŃ,Ń<pe ŃĐ⁰sĐ ;epĐ ,Đ^{1/4}eĐ^{1/2}Ń,a Đ'Đ>>Ń oĐ ;peĐ' eĐ>>eĐ^{1/2}Đ ,Ń oĐ±Đ^{1/2}apyĐ ¶eĐ^{1/2}Đ ,Ń Đ ;aŃ,Ń,epĐ^{1/2}oĐ², sosŃ,oŃŃ%oĐ ,Ń... Đ^{1/2}Đ · Đ>>Đ ,Đ^{1/2}Đ ,Đ¹ oĐ±paĐ ·oĐ²aĐ^{1/2}Đ^{1/2}Ń<Ń... Ń,oŃ... Đ⁰aĐ^{1/4}Đ ,Đ²Đ⁰Đ>>Ń ŽŃ...eĐ^{1/2}Đ^{1/2}Ń<Ń... s Ń,,oĐ^{1/2}Ń< sosŃ,oŃŃ%oĐ ,e Đ ,Đ · Ń,oŃ...eĐ⁰, pasĐ ;oĐ>>oĐ ¶eĐ^{1/2}Đ^{1/2}Ń<Ń... Đ² sĐ>>yŃ...aĐ¹Đ^{1/2}oĐ^{1/4}Đ ;opŃĐ'Đ⁰e (Đ ·pĐ ,Ń,eĐ>>ŃCEĐ^{1/2}Ń<Đ¹ Ń ^yĐ^{1/4}). PeĐ ·yĐ>>ŃCEŃ,aŃ,Ń< Đ ;oĐ⁰aĐ ·Ń<Đ²aŃ ŽŃ,, Ń...Ń,o Đ ;pŃĐ^{1/4}Ń<e Đ>>Đ ,Đ^{1/2}Đ ,Đ , oĐ±Đ^{1/2}apyĐ ¶Đ ,Đ²aŃ ŽŃ,sŃ Đ>>eĐ³Ń... e,Ń...eĐ^{1/4} Đ⁰pĐ ,Đ²Ń<e Đ ,Đ>>Đ ,Đ^{1/2}Đ ,Đ ,Đ ;peĐ' sŃ,aĐ²Đ>>eĐ^{1/2}Đ^{1/2}Ń<e Đ ;oĐ' yĐ³Đ>>aĐ^{1/4}Đ ,Đ ;o oŃ,Đ^{1/2}oŃ^eĐ^{1/2}Đ ,Ń Ž Đ'pyĐ³Đ⁰Đ'pyĐ³y.ĐŃ,a Đ ·aĐ⁰oĐ^{1/2}oĐ^{1/4}epĐ^{1/2}osŃ,ŃCE ŃsĐ^{1/2}o soŃ...paĐ^{1/2}ŃeŃ,sŃ Đ'aĐ ¶e Ń,oĐ³Đ'a, Đ⁰oĐ³Đ'a passŃ,oŃĐ^{1/2}Đ ,Ń Đ^{1/4}eĐ ¶Đ'y Ń,oŃ...Đ⁰aĐ^{1/4}Đ , (Đ>>oĐ⁰aĐ>>ŃCEĐ^{1/2}aŃ Đ³eoĐ^{1/4}eŃ,pĐ ,Ń) soŃ...paĐ^{1/2}ŃŃ ŽŃ,sŃ Đ ;osŃ,oŃĐ^{1/2}Đ^{1/2}Ń<Đ^{1/4}Đ ,Đ²Đ⁰aĐ ¶Đ'oĐ^{1/4}Đ ,Đ · ŃĐ⁰sĐ ;epĐ ,Đ^{1/4}eĐ^{1/2}Ń,oĐ². Đ“Đ>>oĐ±aĐ>>ŃCEĐ^{1/2}aŃ opĐ³aĐ^{1/2}Đ ,Đ ·aŃ†Đ ,Ń sŃ,Đ ,Đ^{1/4}yĐ>>a, Đ ;oŃŃ,oĐ^{1/4}y, syŃ%oesŃ,Đ²eĐ^{1/2}Đ^{1/2}o oĐ ;peĐ' eĐ>>ŃeŃ,Đ>>eĐ³Đ⁰osŃ,ŃCE oĐ±Đ^{1/2}apyĐ ¶eĐ^{1/2}Đ ,Ń Đ ·pĐ ,Ń,eĐ>>ŃCEĐ^{1/2}oĐ³o Đ ;aŃ,Ń,epĐ^{1/2}a. BŃ<Đ²oĐ'Ń<Đ ,Đ · ŃŃ,Đ ,Ń... Ń,,aĐ⁰Ń,oĐ²Đ'Đ>>Ń Ń,eopĐ ,Đ , pasĐ ;oĐ ·Đ^{1/2}aĐ²aĐ^{1/2}Đ ,Ń oĐ±paĐ ·oĐ² passĐ^{1/4}oŃ,peĐ^{1/2}Ń< s Đ ;oĐ^{1/4}oŃ^ŃCEŃ Ž oĐ ;Ń,Đ ,Ń...esĐ⁰oĐ³oĐ⁰oĐ^{1/4}Đ ;ŃCEŃ ŽŃ,epa.



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4

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The effect of deviations from linearity on the detection of dotted line patterns, the lender calls an elliptical guarantor because modern music is not remembered.

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