報　文

画像解析による編目模様の視覚的特徴の評価

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Estimating Visual Features of Stitch Patterns of Knitted Fabrics Using Image Analysis

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Abstract

Digitized gray level images for 19 kinds of stitch patterns of knitted fabrics are captured by a color scanner. A one-dimensional power spectrum, P(f), is derived from a two-dimensional power spectrum obtained from the frequency analysis of a gray level image. Since there is a good linear relation between log P(f) and log f for all of the stitch patterns used in this study, the slope of a line(α) is estimated for each of them. The angular second moment(ASM), contrast(CON), correlation(COR) and entropy(ENT) which are extracted from the gray level co-occurrence matrix, and the fractal dimension(D) are measured as image information parameters, by using image analysis. The fractal dimension is determined from the fractal analysis of the relief of the curved surface of the gray level image. Complexity(S1), ruggedness(S2), size(S3), roughness(S4)and beauty(S5) of stitch patterns are evaluated by sensory evaluation according to the rating scale method. The relationship between visual feature parameters such as α-values and the image information parameters, and mean sensory values is examined by the factor analysis. The results indicate S1, S2 and S4 to be related to CON, ENT and D; S3 to be related ASM; α-val ue to COR. Beauty of stitch patterns is discussed in relation to the $1/f^{\alpha}$ fluctuation and the principle of beauty proposed by Birkhoff .

(Received January 16, 2010)
(Accepted for Publication February 24, 2010)

Key Word：stitch pattern 編目模様，image analysis 画像解析，$1/f^{\alpha}$ fluctuation $1/f^{\alpha}$ ゆらぎ，visual feature 視覚的特徴，image information parameter 画像情報量，beauty 美しさ