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The Influence of Human Texture Recognition and the Spatial Frequency of Textures

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This paper clarifies the relevance between the physical quantity that constitute textures and the human sensibility. In particular, it focuses on the spatial frequency in the physical quantity, and uses onomatopoeias in order to measure the human sensitivity. The spatial frequency is expressed by the reciprocal of the color intensity period, which is a physical quantity necessary for the formation of a texture. Onomatopoeia are used in representing the various sensory expressions such as sound, movement and texture. They have been used as evaluation items of sensitivity.

The purpose of this research is to clarify the relevance of texture perception by analyzing the characteristics of the spatial frequency for each onomatopoeia. I carried out an impression evaluation of 5 out of 6 onomatopoeias with 49 images of various materials.

To analyze the result, I grouped together similar onomatopoeias. Then, I performed two-dimensional Fourier transform and converted them into a spatial frequency space. I found out that people can distinguish texture even with the spatial frequency of textures alone, and that there is a characteristic of spatial frequency for each onomatopoeia.

In conclusion, it is possible to clarify the spatial frequency characteristics of each onomatopoeia. This can be a solution to make things to feel like common texture.