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RESEARCH ARTICLE

Application of the Fuzzy Logic in Content Based Image Retrieval using Color Feature

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ABSTRACT

Content Based Image Retrieval (CBIR) is a set of techniques for retrieving semantically-relevant images from an image database based on automatically-derived image features. Generally, in CBIR systems, the visual features (color, texture, and shape) are represented at low-level. They are just rigid mathematical measures that cannot deal with the inherent subjectivity and fuzziness of people understandings and perceptions (different people would have different understandings and descriptions of the same visual content). As a result, there is a gap between low-level features and high-level semantics.

To overcome this problem, we introduce a new system of visual features extraction and matching using Fuzzy Logic (FL) which is a powerful tool that deals with reasoning algorithms used to emulate human thinking and decision making in machines.

Specifically, color feature is widely used in content-based image retrieval because of its low computational cost and invariance to scaling, translation, and rotation. The classic system of color histogram creation results in very large 3-D histograms with large variations between neighboring bins. Thus, small changes in the image might result in great changes in the histogram. Manipulating and comparing 3-D histograms is a complicated and computationally expensive procedure. To overcome these problems, a new fuzzy system of color histogram creation, based on the L*a*b* color space, is applied, which links the three components of L*a*b* color space using fuzzy inference system and provides one-dimensional histogram which contains only 15 bins.

Keywords: *Content Based Image Retrieval; Fuzzy Logic; Color Feature, Fuzzy Color Histogram; Fuzzy Colored Image.*

Full Text: <http://www.ijcsmc.com/docs/papers/February2014/V3I2201444.pdf>