

SHAPE AND DATA DRIVEN TEXTURE SEGMENTATION USING LOCAL BINARY PATTERNS

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ABSTRACT

Image segmentation is a fundamental step in image analysis. Segmentation can be done by isolating homogeneous regions within an image or finding the boundaries between such regions. There are several cases that intensity values, color, mean or variance of image intensity distributions and edge information cannot play a discriminative role in image segmentation. While other features are not sufficient to discriminate regions, texture might be a good feature to handle the segmentation problem. Texture analysis and texture segmentation are still challenging problems; there is no method which can clearly identify and discriminate all kind of textures. Especially identifying nonuniform textures and discriminating from other textures are still difficult problems in texture analysis. For this reason texture segmentation approaches may give unsatisfactory segmentation results with

missing data or with corrupted boundaries of regions. Using prior information about the shape of the object can aid segmentation which can also obtain a solution to occlusion problems.

In this thesis, we propose a shape and data driven texture segmentation method using local binary pattern (LBP). In particular, we train our LBP based texture filter with the texture which belongs to the region that we want to segment. We input the textured image into our filter to produce a “filtered image” which has been eluded from the structural properties of texture. Then by an energy functional, which combines the data term produced from the filtered image and shape prior term under a Bayesian framework, we evolve our level set based active contour for segmentation.

YEREL İKİLİ ÖRÜNTÜ(LBP) KULLANARAK ŞEKİL VE VERİYE DAYALI DESEN BÖLÜTLEME

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ÖZET

İmge bölütleme, imge analizinde temel bir adımdır. İmge bölütlemenin amacı basit olarak imgeyi anlamlı (homojen) bölümlere ayırmak olarak tanımlanabilir. Bölütleme imgedeki homojen bölgelerin izole edilmesi veya bu bölgeler arasındaki sınırların bulunması ile yapılabilir. İmge bölütleme problemlerinde piksel değerlerinin, rengin, piksel değerlerinin istatistiksel dağılımlarının ortalaması veya değişirliğinin ve kenar bilgisinin ayırt edici rol oynayamadığı çeşitli durumlar vardır. Diğer özniteliklerin ayırt edici rol oynayamadığı durumlarda desen iyi bir ayırt edici öznitelik olabilir. Fakat desen analizi ve desen bölütleme hala çözülmesi zor olan problemlerdir. Henüz bütün desen türlerini birbirinden ayırt edebilen ve tanımlayabilen bir yöntem bulunamamıştır. Özellikle düzensiz yapılı desenlerin tanımlanması ve ayırt edilmesi hala çözülmesi zor desen analizi problemlerindedir. Bundan dolayı desen bölütleme yaklaşımları tatmin edici bölütleme sonuçları vermeyebilir. Örneğin hatalı desen tanımlanması sonucunda objelerin sınırlarında

bozulmalar veya kayıplar gözlenebilir. Fakat bölütleyeceğimiz desen yapılı bölgenin şekil bilgisi hakkında bir ön bilgimiz olması bize daha iyi bölütleme sonuçlarına ulaşmamızda yardımcı olabilir. Aynı zamanda şekil bilgisi kapatılma problemlerinde bölütlemeye bize çözüm sağlayabilir.

Bu tezde, yerel ikili örüntü (LBP) kullanarak şekil ve veriye dayalı desen bölütleme metodu sunuyoruz. Kısaca, LBP tabanlı desen filtremizi bölütlemek istediğimiz bölgeye ait desen ile eğittikten sonra test imgemizi desensel yapıdan kurtarmak için desen filtremiz ile filtreliyoruz. Daha sonra bölütleme için veri ve önsel şekil bilgisi terimlerini Bayes metodu bünyesinde birleştiren bir enerji denklemi kullanarak aktif konturumuzu hareket ettiriyoruz.

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