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 bölütlenmenin 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 değişirilginin ve kenar bilgisinin ayrırt edici rol oynamadığı çeşitli durumlar vardır. Diğer özüniciklerin ayrırt edici rol oynamadığı durumlarda desen iyi bir ayrırt edici özünicik olabilir. Fakat desen analizi ve desen bölütleme hala çözülmesi zor olan problemlerdir. Henüz bütün desen türlerini birbirinden ayrırt edebilen ve tanımlayabilen bir yöntem bulunamamıştır. Özellikle düzensiz yapıtı desenlerin tanımlanması ve ayrırt edilmesi hala çözülmesi zor desen analizi problemlerindendir. Bundan dolayı desen bölütleme yaklaşımları tanımin edici bölütleme sonuçları vermeyebilir. Örneğin hatalı desen tanımlanması sonucunda objelerin sınırlarında
bozulmalar veya kayıplar gözlenebilir. Fakat bölütleyeceğimiz desen yapılı bölgenin şekil bilgisi hakkından bir ön bilgimiz olması bize daha iyi bölütleme sonuçlarına ulaşmamızda yardımcı olabilir. Aynı zamanda şekil bilgisi kapatılma problemlerinde bölütlemede bize çözüm sağlayabilir.

Bu tezde, yerel ikili örtü (LBP) kullanarak şekil ve veriye dayalı desen bölütleme metodu sunuyoruz. Kısaca, LBP tabanlı desen filtremizi bölütlemek istediğimiz bölgeye ait desen ile eğittiğimiz test imgemizi desensel yapıdan kurtarmak için desenfiltremizi 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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# TABLE OF CONTENTS

ABSTRACT ......................................................................................................................... II

ACKNOWLEDGEMENTS ................................................................................................. V

LIST OF FIGURES ........................................................................................................ IV

1 INTRODUCTION ........................................................................................................ 1

1.1 Contributions ........................................................................................................ 2

1.2 Organization ......................................................................................................... 3

2 BACKGROUND .......................................................................................................... 4

2.1 Image Segmentation .............................................................................................. 4

2.1.1 Active Contours .............................................................................................. 5

2.1.2 Level Set Methods .......................................................................................... 10

2.2 Texture Analysis .................................................................................................... 13

2.2.1 What is Texture .............................................................................................. 14

2.2.2 Texture Analysis Approaches .......................................................................... 16

2.3 Texture Segmentation ............................................................................................ 18

2.3.1 Local Binary Pattern(LBP) Method .................................................................. 19

2.4 Shape Analysis ..................................................................................................... 22

2.5 Nonparametric Density Estimation ....................................................................... 24

2.5.1 Parzen Density Estimator ............................................................................... 25

2.5.2 Entropy Estimation .......................................................................................... 27

3 SHAPE AND DATA DRIVEN TEXTURE SEGMENTATION USING LOCAL
BINARY PATTERNS ........................................................................................................ 28

3.1 Local Binary Partition Based Texture Filtering .................................................... 31

3.2 Data Term For Energy Functional ........................................................................ 41

3.3 Shape Priors ......................................................................................................... 46

3.4 Gradient Flows for Data and Shape Terms for Segmentation ............................... 48

3.5 Experimental Results .......................................................................................... 49

3.5.1 Experimental Results with Synthetic Images .................................................. 49

3.5.2 Experimental Results with Occluded Textured Shapes ................................. 57
3.5.3 Experimental Results with Natural Textured Images………………..59

4 CONCLUSION………………………………………………………………………………..63
4.1 Summary……………………………………………………………………………………63
4.2 Future Work………………………………………………………………………………..64

REFERENCES…………………………………………………………………………………..65
LIST OF FIGURES

Figure 2.1: Lady with flower textured dress.................................................................15
Figure 2.2: Graphical view of the LBP procedure....................................................20
Figure 2.3: Circular binary string and 0 to 1 and 1 to 0 transition calculation. (T=transition).........20
Figure 2.4: 8-bit binary representation with 2 pixel radius and 16-bit binary representation with 2 pixel radius of LBP........................................................................................................21
Figure (2.5): True density which is mixture of Gaussians p(x) = 0.7N(x; -5, 2^2) + 0.3N(x; 5, 2^2)........26
Figure (2.6): Parzen density estimate. Circles are the drawn samples, dashed lines are contribution of each kernel and the solid line represents the density estimate........................26
Figure 3.1: The schematic representation of our approach............................................30
Figure 3.2: Synthetic textured image with same first order pixel intensity pdfs in two regions..........31
Figure 3.3: Textured image...........................................................................................32
Figure 3.4: 8-bit binary representation with 2 pixel radius...........................................32
Figure 3.5: (a) Training image (b) Training image in the LBP domain (c) LBP histogram of training image in LBP domain...........................................................33
Figure 3.6: (a) Test image (b) Test image in the LBP domain........................................34
Figure 3.7: Filtered image............................................................................................34
Figure 3.8: Window of a pixel at the boundary............................................................36
Figure 3.9: (a) Test image consists of two uniform textured regions Figure 3.10(a)(b) (b)LBP representation of (a).................................................................................................................36
Figure 3.10: (a) Uniform texture of the square in the test image. (b) Uniform texture of the background in the test image. (c) LBP representation of texture (a). (d) LBP representation of texture (b) (e) LBP histogram of (a) (f) LBP histogram of (b)............................................37
Figure 3.11: (a) The likelihood based filtering result with respect to texture in Figure 3.10(a) (b) The likelihood based filtering result with respect to texture in Figure 3.10(b). (c) Histogram of (a) (d) Histogram of (b).................................................................38
Figure 3.12: (a) Our filtering result with respect to texture in Figure 3.10(a) (b) Our filtering result with respect to texture in Figure 3.10(b). (c) Histogram of (a) (d) Histogram of (b).................................................................39
Figure 3.13: (a) Test image (b) Nonuniform texture. (c) Uniform texture........................40
Figure 3.14: (a) Likelihood based filtering result according to texture in Figure 3.13(c) (b) Likelihood based filtering result according to texture in Figure 3.13(b) (c) Our filtering result according to texture in Figure 3.13(c) (d) Our filtering
result according to texture in Figure 3.13(b).................................................................40

Figure 3.15: (a) Test image (b) Gabor filtering result (c) Our filtering result.................................41
Figure 3.16: a) Textured Fighter Image b) Filtered Fighter Image..............................................41
Figure 3.17: Segmentation result of Kim, et al.’s method at textures with different first order pdf’s........42
Figure 3.18: a)Initial position of the curve b) Segmentation result of Kim et al.’s method at textures with
close first order pdf’s without our texture filtering process..................................................43
Figure 3.19: Our segmentation result by using our LBP based texture filter......................................43
Figure 3.20: (a) Curve evolution based segmentation result with respect to figure 3.10(a)
(b) Curve evolution based segmentation result with respect to 3.10(b) (c) Curve evolution
based segmentation result with respect to figure 3.10(a) by our approach
(d) Curve evolution based segmentation result with respect to figure 3.10 (b) by our approach............44
Figure 3.21: (a) Segmentation result by using likelihood based filtering according to
texture in figure 3.13(c) (b) Our segmentation result according to texture in Figure 3.13(c)..................45
Figure 3.22: Aligned shapes for our nonparametric shape prior space...........................................49
Figure 3.23: (a) Test image (b) Initial curve (c) Filtered image
(d) Segmentation result (e) Kim’s segmentation result without our filtering process......................50
Figure 3.24 (a) Textured image with fighter shaped region (b) Textured image
with hand shaped region (c) Filtering result of (a) (d) Filtering result of (b)
(e) Segmentation result of (a) (f) Filtering result of (b)..........................................................51
Figure 3.25: (a) Textured image with fighter shaped region (b) Filtering result of (a)
(c) Segmentation result of (a) (d) Kim’s segmentation result without our filtering process................52
Figure 3.26: (a) Textured image with fighter shaped region (b) Initial curve
(c) Filtering result of (a) (d) Segmentation result of (a)............................................................53
Figure 3.27: (a) Test image with nonuniform textured background (b) Initial curve
(c) Filtering result (d) Segmentation result.............................................................................54
Figure 3.28: (a) Test image with nonuniform textured background and foreground
(b) Filtering result (c) Segmentation result (d) Kim’s segmentation result without our
texture filtering process........................................................................................................55
Figure 3.29: (a) Test image with nonuniform textured background and foreground
(b) Filtering result (c) Segmentation result .............................................................................56
Figure 3.30: (a) Test image with nonuniform textured background and foreground
(b) Filtering result (c) Segmentation result (d) Kim’s segmentation result without our
texture filtering process........................................................................................................57
Figure 3.31: (a) Textured image with occluded fighter shaped region
(b) Textured image with occluded fighter wing shaped region (e) Filtering result of (a)
(d) Filtering result of (b) (e) Segmentation result of (a) (f) Filtering result of (b)..........................58
Figure 3.32: (a) Test image with hand on a fabric (b) Initial curve (c) Texture filtering result
(d) Segmentation result.............................................................................................................59

IX
Figure 3.33: (a) Textured image with glove shaped region on a texture of a jumper (b) Filtering result of (a) (c) Segmentation result of (a) (d) Kim’s segmentation result without our texture filtering process ........................................ 60

Figure 3.34: (a) Test image with hand on a wooden surface (b) The initial Curve (c) Texture Filtering Result (d) Segmentation Result ........................................................................................................ 61

Figure 3.35: (a) Test image with hand on a carpet (b) The initial Curve (c) Texture Filtering Result (d) Segmentation Result ........................................................................................................ 62