

Accepted Manuscript

Segmentation of embryonic and fetal 3D ultrasound images based on pixel intensity distributions and shape priors

Sonia Dahdouh, Elsa D. Angelini, Gilles Grangé, Isabelle Bloch

PII: S1361-8415(14)00189-3
DOI: <http://dx.doi.org/10.1016/j.media.2014.12.005>
Reference: MEDIMA 960

To appear in: *Medical Image Analysis*

Received Date: 10 June 2014
Revised Date: 16 December 2014
Accepted Date: 18 December 2014

Please cite this article as: Dahdouh, S., Angelini, E.D., Grangé, G., Bloch, I., Segmentation of embryonic and fetal 3D ultrasound images based on pixel intensity distributions and shape priors, *Medical Image Analysis* (2015), doi: <http://dx.doi.org/10.1016/j.media.2014.12.005>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



Segmentation of embryonic and fetal 3D ultrasound images based on pixel intensity distributions and shape priors

Sonia Dahdouh^{a,*}, Elsa D. Angelini^a, Gilles Grangé^b, Isabelle Bloch^a

^a*Institut Mines-Telecom, Telecom ParisTech, CNRS LTCI, 46 rue Barrault, 75013 Paris, France*

^b*Maternité Port Royal AP-HP, Groupe Hospitalier Cochin Saint Vincent de Paul, 53 Avenue de l'Observatoire, 75014 Paris, France*

Abstract

This paper presents a novel variational segmentation framework combining shape priors and parametric intensity distribution modeling for extracting the fetal envelope on 3D obstetric ultrasound images. To overcome issues related to poor image quality and missing boundaries, we inject three types of information in the segmentation process: tissue-specific parametric modeling of pixel intensities, a shape prior for the fetal envelope and a shape model of the fetus' back. The shape prior is encoded with Legendre moments and used to constraint the evolution of a level-set function. The back model is used to post-process the segmented fetal envelope. Results are presented on 3D ultrasound data and compared to a set of manual segmentations. The robustness of the algorithm is studied, and both visual and quantitative comparisons show satisfactory results obtained by the proposed method on the tested dataset.

Keywords: 3D ultrasound, obstetric imaging, multi-phase level-set segmentation, Legendre moments, shape prior, anatomical models, statistical shape priors

*phone : +33 1 45 81 72 55

Email address: dahdouh@telecom-paristech.fr (Sonia Dahdouh)

Download English Version:

<https://daneshyari.com/en/article/10337373>

Download Persian Version:

<https://daneshyari.com/article/10337373>

[Daneshyari.com](https://daneshyari.com)