

Paper #: 2588-62

Modelization of fetal cranial contour from ultrasound axial slices, pp.528-537

Author(s): E.Duquenoy, Univ. du Littoral, Calais cedex, France;

A.Taleb-Ahmed, Univ. du Littoral, Calais cedex, France;

Serge Reboul, Univ. du Littoral, Calais Cedex, France;

Y.Beral, Univ. du Littoral, Calais Cedex, France;

Jean P. Dubus, Univ. du Littoral, Villeneuve d'Ascq Cedex, France.

Abstract: The problem of the choice of slices angles, at the time of diagnosis of brain fetal malformations, is linked to the position of the fetus inside the uterus. The 3D reconstruction of intern parts of the brain and especially the callosus corpus can help to detect some malformations. This kind of reconstruction pass by several steps that depend all on the initial segmentation step. The main difficulties of the segmentation are linked on the one hand to the inherent noise of ultrasound imaging and on the other hand to the matching of views of the 2D sequence to process.

The 3D reconstruction stage require the definition of a marker in the sequence of process. In agreement with physicians, we have used the cranial contour as reference on the one hand because it is considered as invariable and fixed and on the other hand because of its more pronounced contrast (due to the fact of its cartilaginous nature) than the other structures. Nevertheless, the classic techniques of segmentations have remained without effect (open contour, too noisy).

Therefore, we have developed an algorithm allowing to define automatically the ellipse. This method is based on a parametrically deformable model using elliptic FOURIER decomposition.