

## Combining an Optimized Closed Principal Curve-Based Method and Evolutionary Neural Network for Ultrasound Prostate Segmentation

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**Abstract :** Due to missing/ambiguous boundaries between the prostate and neighboring structures, the presence of shadow artifacts, as well as the large variability in prostate shapes, ultrasound prostate segmentation is challenging. To handle these issues, this paper develops a hybrid method for ultrasound prostate segmentation by combining an optimized closed principal curve-based method and the evolutionary neural network; the former can fit curves with great curvature and generate a contour composed of line segments connected by sorted vertices, and the latter is used to express an appropriate map function (represented by parameters of evolutionary neural network) for generating the smooth prostate contour to match the ground truth contour. Both qualitative and quantitative experimental results showed that our proposed method obtains accurate and robust performances.

**Keywords :** ultrasound prostate segmentation, optimized closed polygonal segment method, evolutionary neural network, smooth mathematical model, principal curve

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