Cellular Automa for edge detection

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Cellular Automata proved to be useful in some image processing tasks such as edge detection and image segmentation. When it comes to edge detection, simple Cellular Automata could be used to solve this task or the Cellular Automata's rules could be trained to optimize the edge detection. The first part of this paper presents a short survey on Cellular Automata based methods applied to edge detection. The second part of the paper presents an edge detection method based on Cellular Automata where the rules were trained to optimize the edge detection in binary images. This method divides the edge detection problem into two sub–problems: on the one hand it trains the rules to detect the edge pixels, on the other hand it trains the rules to detect non–edge (background) pixels. The presented method is implemented based on three other methods [1], [2], [3], so the chromosomes keep the same representation, as packets of rules, while the fitness function changes. Two best packets of rules are obtained from the training process. The way these packets of rules are applied makes the difference between the obtained images in which the edge were detected. Based on the experiments shown in this paper, it can be said that the proposed method performs better than other methods that exist in the literature.

References

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