

# **Hardware Implementation of Road Network Extraction Using Simplified Gabor Wavelet in Field Programmable Gate Array**

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Received 02 November 2017; received in revised form 26 January 2018; accepted 04 February 2018

## **Abstract**

Automatic detection of road networks from the satellite and aerial images is the most demanded research area, and it is used for various remote sensing applications. The Simplified Gabor Wavelet based approaches are used to extract the road network automatically. In this paper, a field programmable gate array architecture designed for automatic extraction of road network using Simplified Gabor Wavelet is proposed. The hardware implementation results are compared with software implementation results. The performance measures such as completeness, correctness and quality are calculated. In the software implementation, the average value of completeness, correctness, and quality of various images are 91%, 98%, and 89% respectively. In the hardware implementation, the average value of completeness, correctness, and quality are 89%, 97%, and 87% respectively. The performance of the proposed algorithm is also proved in noisy images. These measures prove that the proposed work yields road network very resembling to reference road map.

**Keywords:** road network extraction, simplified Gabor wavelet, field programmable gate array, connected component

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