

光电工程

## 基于FPGA的实时中值滤波器设计

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**摘要** 在图像生成和采集过程中引入的各种噪声会使图像质量变差。为了实现对图像的实时预处理, 首先介绍中值滤波器的基本原理和算法, 然后在现场可编程门阵列 (FPGA) 上根据中值滤波的根基数算法, 采用流水技术设计一种快速实时中值滤波器, 给出按行输出的图像处理过程中存储前2行图像数据的方法。仿真结果表明: 该中值滤波器可实时完成CCD输出图像的预处理, 达到了抑制噪声及保持图像细节的目的。

**关键词** [图像预处理](#) [中值滤波器](#) [现场可编程门阵列](#) [实时性](#)

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## Design of real-time median filter based on FPGA

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**Abstract** Since all kinds of noises introduced in the process of the video forming and sampling inevitably lead to a bad quality of video images, the basic principle and algorithm of the median filter are presented to realize the real-time image pre-processing for succeeding processing. The rapid real-time median filter was designed with "flowing technology" according to an algorithm in the field programmable gate array (FPGA). The method to store the first two lines of the image data in the line output based image processing is given. The simulation result shows that the median filter can implement the real-time pre-processing of CCD output images, and achieve the goal of noise suppression and image details keeping.

**Key words** [image pre-processing](#) [median filter](#) [FPGA](#) [real-time median filtering](#)

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