

夜视技术

## 循环侧抑制网络的红外图像预处理FPGA实现研究

贺明,王新赛,李坚,李志军

防空兵指挥学院 红外与射频技术研究中心, 河南郑州450052

收稿日期 修回日期 网络版发布日期 2008-6-5 接受日期

**摘要** 在红外成像预处理中,循环侧抑制网络具有很好的增强图像边缘反差、突出边框的功能。由于循环侧抑制网络处理运算的复杂性,如何实时实现循环侧抑制网络的红外图像预处理成为关键问题。根据简化的循环侧抑制网络处理算法,并结合硬件计算特点,提出一种适合于硬件实现循环侧抑制网络的并行处理结构,采用流水线设计方式在FPGA中实时实现。试验证明:该算法在FPGA内具有与视频流同步的实时性,达到了增强反差、突出边框的效果。用于图像目标实时跟踪系统时,极大地提高了目标的跟踪精度和稳定性。

**关键词** [循环侧抑制网络](#) [红外图像](#) [并行处理](#) [FPGA](#)

**分类号** [TN219-34](#)

## FPGA implementation of infrared image preprocessing with cyclic lateral inhibition network

HE Ming,WANG Xin-sai,LI Jian,LI Zhi-jun

Infrared & Radio-frequency Technology Center, Air Defence Command College, Zhengzhou 450052, China

**Abstract** The cyclic lateral inhibition network has the functions of enhancing the contrast of image edge and highlighting the image frame in infrared imaging preprocessing. Since the processing computation complexity of the cyclic lateral inhibition network, it is important to realize the real-time preprocessing of infrared video images with cyclic lateral inhibition network. The parallel processing structure suitable for the implementation of the lateral inhibition network by hardware is proposed based on the simplified processing algorithm of the lateral inhibition network and the characteristics of hardware calculation. It is realized in FPGA by the pipeline design. The results show that the algorithm has the real-time characteristic and is synchronized with the video stream in the FPGA, and the effect of enhancing the contrast of image edge and highlighting the image frame is achieved. When it is used in real time target tracking system, the target tracking accuracy and stability are greatly increased.

**Key words** [cyclic lateral inhibition network](#) [infrared image](#) [parallel processing](#) [FPGA](#)

DOI:

通讯作者 贺明 [ming8797@gmail.com](mailto:ming8797@gmail.com)

### 扩展功能

#### 本文信息

- ▶ [Supporting info](#)
- ▶ [PDF\(1735KB\)](#)
- ▶ [\[HTML全文\]\(0KB\)](#)
- ▶ [参考文献](#)

#### 服务与反馈

- ▶ [把本文推荐给朋友](#)
- ▶ [加入我的书架](#)
- ▶ [加入引用管理器](#)
- ▶ [复制索引](#)
- ▶ [Email Alert](#)
- ▶ [文章反馈](#)
- ▶ [浏览反馈信息](#)

#### 相关信息

- ▶ [本刊中 包含“循环侧抑制网络”的相关文章](#)
- ▶ [本文作者相关文章](#)

- [贺明](#)
- [王新赛](#)
- [李坚](#)
- [李志军](#)