

算法研究

基于阴影流和3D MAP-MRF 的运动阴影消除

李波, 袁保宗

北京交通大学信息科学研究所; 现代信息科学与网络技术北京市重点实验室

摘要:

阴影消除是运动检测中的一个重要问题。本文提出一种用阴影流和三维马尔可夫随机场后验概率最大化方法运动阴影消除算法。首先对每个像素建立混合高斯模型, 通过阴影弱分类器, 将可疑的阴影像素分离出来送到阴影流模型中。在线学习候选阴影像素, 得到置信度高的阴影流模型。然后用混合高斯模型, 阴影流和当前图像一起构建一个三维的马尔可夫随机场模型, 将运动目标检测转化为标号组后验概率最大化/能量函数最小化。最后, 构建一个与三维MRF对应的三维网络流图, 通过动态图切算法, 求出图的最小切, 即求得MRF标号组的最大后验概率, 从而给每个像素分配“前景”或“非前景”标号, 达到消除阴影分割运动物体的目的。实验表明本方法在实际视频中取得了较好的效果。

关键词: 阴影消除; 阴影流; 马尔可夫随机场后验概率最大化; 图切; 混合高斯模型; 运动目标检测

Moving Shadow Elimination Based on Shadow Flow and 3D MAP-MRF

LI Bo, YUAN Bao-Zong

Institute of Information Science, Beijing Jiaotong University; Beijing Key Laboratory of Advanced Information Science and Network Technology

Abstract:

Elimination of shadow is an important issue in moving object detection. In this paper, we present a novel approach of moving shadow elimination based on Shadow Flow and maximum a posteriori probability of 3D Markov Random Field (3D MAP-MRF). Firstly, Gaussian Mixture Model (GMM) is built as background model of per pixel. By comparing current pixel and GMM, we classify candidate shadow pixel through a shadow weak classifier and send it to Shadow Flow Model. Through on-line learning the candidate shadow which comes from weak classifier, our method get high confidence shadow model. Then, 3D MRF is constructed of GMM, Shadow Flow and current images. MAP-MRF/min energy is deviated from moving object detection. Finally 3D graph is constructed according 3D MRF. A dynamic graph cuts algorithm is used to find min-cut/max-flow, which is equal to a maximum posteriori probability of label. Each pixel is assigned by “foreground” and “non-foreground” label, and moving object detection with shadow elimination is completed. Experiments show that our approach achieves excellent performance.

Keywords: shadow elimination Shadow Flow maximum posteriori of Markov Random Field graph cuts Gaussian Mixture Model moving object detection

收稿日期 2011-04-01 修回日期 2011-05-30 网络版发布日期 2011-07-25

DOI:

基金项目:

北京市优博项目(YB20081000401); 国家973计划(2006CB303105, 2004CB318110); 国家自然科学基金项目(NO.60673109)

通讯作者:

作者简介:

作者Email: liboupc@gmail.com

参考文献:

本刊中的类似文章

扩展功能

本文信息

- ▶ Supporting info
- ▶ PDF(1951KB)
- ▶ [HTML全文]
- ▶ 参考文献[PDF]
- ▶ 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
- ▶ 引用本文
- ▶ Email Alert
- ▶ 文章反馈
- ▶ 浏览反馈信息

本文关键词相关文章

- ▶ 阴影消除; 阴影流; 马尔可夫随机场后验概率最大化; 图切; 混合高斯模型; 运动目标检测

本文作者相关文章

- ▶ 李波
- ▶ 袁保宗

PubMed

- ▶ Article by Li, B.
- ▶ Article by Yuan, B. Z.

反馈人	<input type="text"/>	邮箱地址	<input type="text"/>
反馈标题	<input type="text"/>	验证码	<input type="text" value="1468"/>