Stony Brook University
The Graduate School

Doctoral Defense Announcement

Abstract

(Title) Robust Object Detection and Localization for Real-Time Autonomous Surveillance Applications

By

(Name) Kyoung-Su Park

(Abstract of 350 words or less, or recital program)

The object detection and localization is particularly useful in autonomous surveillance application. In this dissertation, effective object detection and localization algorithms are proposed for real time application.

At first, this dissertation presents spectral characterization for efficient image detection using hyperspectral processing technique. The hyperspectral processing provides high performance of object detection but requires large computational complexity. For real-time processing, we propose complexity reduction algorithm based on effective band selection and library refinement. The proposed algorithm is suitable for low complexity and real-time applications. Second, we propose a robust human body and face joint detection method through multiple cameras collaboration where the multiple images are obtained from widely used image sensor. Through the additional view point, each camera supports another camera to sufficiently solve the single camera limitation, and possibly enable to make a more reliable detection. Finally, a simplified algorithm for localizing an object using multiple visual images is proposed. The proposed method defines a virtual viewable plane for creating a relationship between an object position and a reference coordinate. The algorithm minimizes localization error through the iterative approach with relatively low computational complexity. Non-linearity distortion of the digital image devices is compensated during the iterative approach. The effectiveness of the proposed object position localization algorithm is illustrated with several trajectory examples.

The proposed technologies provide robust object detection and localization for real-time autonomous surveillance applications.

Date: May 2 2008
Time: 02:00 PM
Place: Light Eng. #250

Program: Electrical Engineering
Dissertation Advisor: Sangjin Hong