Tracking in Persistent Surveillance

Adam Mounts
TJHSST Computer Systems Lab 2009-2010

Abstract

The development of a program that can track targets is a crucial development in security and/or surveillance systems. A tracker can be used in the event of a crisis situation to follow potential suspects or targets from the scene of a crime, or to find where these targets originated from, all based on aerial imagery. By using a program to do this, quick, real-time analysis is feasible rather than having humans toil over movies at a later time.

Introduction

The goal of this project is to create a tracker that can follow a certain object, whether it be a human, a vehicle, or some other moving target, and trace its path through a series of images. The extent of this project is quite variable, due to that there is no apparent limit to how detailed it can become. By adding more and more noise, the problem will increase in complexity and become harder and harder.

Procedure and Methodology

I will be working mostly in Python, because it has sufficient image processing capabilities for my project. I will be able to evaluate the efficacy of my program in a qualitative manner; the line tracing the object's movement can be evaluated simply by watching it and seeing if it follows the same path.

http://www.stdb-seesamples.com/seesamples_pdfs/Aerial%20Image.jpg
Example Aerial Imagery

Expected Results

The final result should be able to follow a target or multiple targets through both simulated terrain images as well as real world aerial imagery. I will provide the results most likely in a series of images showing my tracker tracing the path of target(s). I could run the program multiple times, and check if the tracker follows the target throughout its entire path, and graph the percent accuracies depending on the complexity of the image. This project has no apparent end, as the algorithm for tracing and the complexity of the image can always be increased.