

Project Work Statement

Sponsor

The GeoEye

Extracting Features from Ground-Track Images

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Any apparent association of this work to The GeoEye is fictional one, and the sole purpose of this work is a class exercise

1 Background

GeoEye is a leading source of geospatial information and insight for decision makers and analysts who need a clear understanding of our changing world to protect lives, manage risk, and optimize resources. Each day, organizations in defense and intelligence, public safety, critical infrastructure, energy, and online media rely on GeoEye’s imagery, tools, and expertise to support important missions around the globe. Widely recognized as a pioneer in high-resolution satellite imagery, GeoEye has evolved into a complete provider of geospatial intelligence solutions. GeoEye’s ability to collect, process, and analyze massive amounts of geospatial data allows our customers to quickly see precise changes on the ground and anticipate where events may occur in the future.

2 Problem Statement

Consider the tracks reported in Figure 1 extracted from an “image” taken from a satellite. To simplify our problem, we assume that the track is generated by a

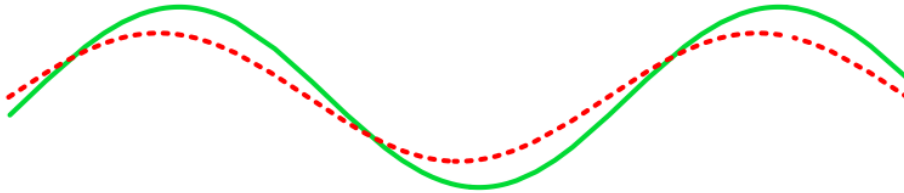


Figure 1: A bicycle track

moving bicycle. It is easy to see that the bicycle is swerving left and right, but the general direction of the movement is not so obvious. Nevertheless, one can also identify the direction of the bicycle.

The sponsor currently has a limited capability to make such inference from a track of moving object from an image, and our task is to provide them with a reasonably large collection of such features and algorithms to detect them.

3 Approach

Given a limited amount of our times, we will assume that extraction of tracts from an image is already completed.

4 Milestones

We have the following major deadlines:

- Work Statement due date, Sep 28, 2012,
- Midterm Presentation due date, Oct 12, 2012,
- Progress Report due date, Oct 26, 2012,
- Final Presentation due date, Nov 6, 2012,
- Final Report due date, Nov 30, 2012.

5 Deliverable

5.1 From Team to Sponsor

The following outputs are expected from this project:

- List of features of ground track useful for determining the target object and disambiguating the objects' moving direction
- Algorithms for detecting the aforementioned features from images
- Numerical experiment results reporting performance of the developed algorithms
- R package with a complete set of documentations along with some test codes that can be used to reproduce our numerical and simulation test results,
- Technical report and presentations summarizing the work.

5.2 From Sponsor to Team

In order for our project to be of successful one, we will need:

- Images for training the numerical algorithms
- Computing resources
- Timely responses to inquiries,
- Symposium attendance travel expenses.