Spot the Ant!

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Goals

Long-term: use computer vision on a mobile robot to identify and track ants in their natural habitat

This semester: evaluate the accuracy of existing object tracking methods on videos of ants from a fixed camera

Methods

Object tracking methods start with a bounding box around the object, then predict the object's location in each subsequent video frame.

We evaluated six object trackers (boosting, CSRT, KCF, MedianFlow, MIL, and MOSSE) on three different videos of ants on a concrete path.

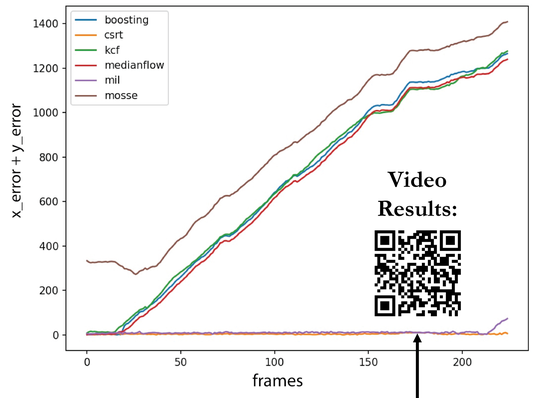
We measured each tracker's accuracy: the distance in pixels from predicted location to actual location in each frame.

Results: Video with No Occlusions

Example Frame

CSRT tracking: Actual Location Predicted Location

Error Over Time



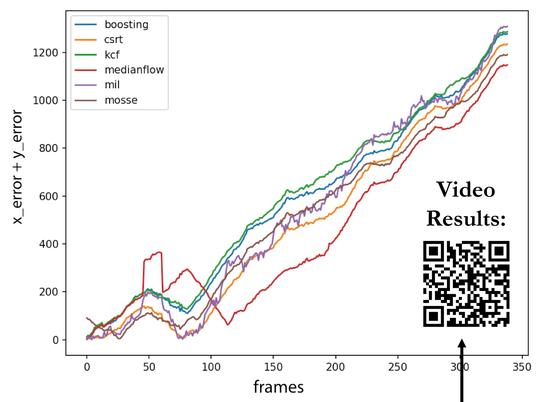
CSRT and MIL successfully track the ant

Results: Video with Occlusions

Example Frame

MedianFlow tracking: Actual Location Predicted Location

Error Over Time



Occlusions prevent successful tracking

Summary

- Tested boosting, CSRT, KCF, MedianFlow, MIL, and MOSSE tracking algorithms
- MIL and CSRT were successful at tracking the ant in certain videos
- Future work: optimize MIL and explore algorithms to handle camera motion and occlusions