stryker

Surgical Machine Vision

Progress Report

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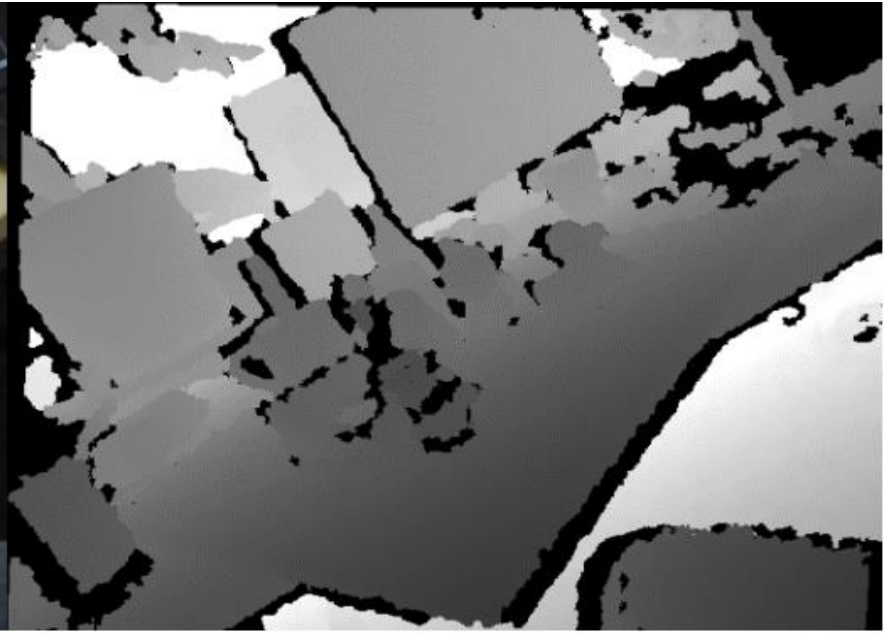
Research Title

Integrating Online Learning and Random Forest Methods for Temporal Tracking in Surgical Machine Vision Applications

How Does Tracking Work?

Input Method? RGB-D Images

(a) RGB



(b) Depth

How Does Tracking Work?
Temporal Tracking

- Temporal means tracking an image's changes over time.
- Frame by Frame

How Does Tracking Work?
Using Random Forests

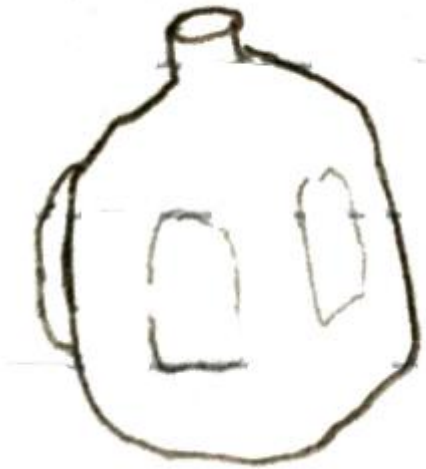
- We compute differences between frames and pass them to a random forest.

How Does Tracking Work?
Using Random Forests

- The random forest estimates the transformation between frames

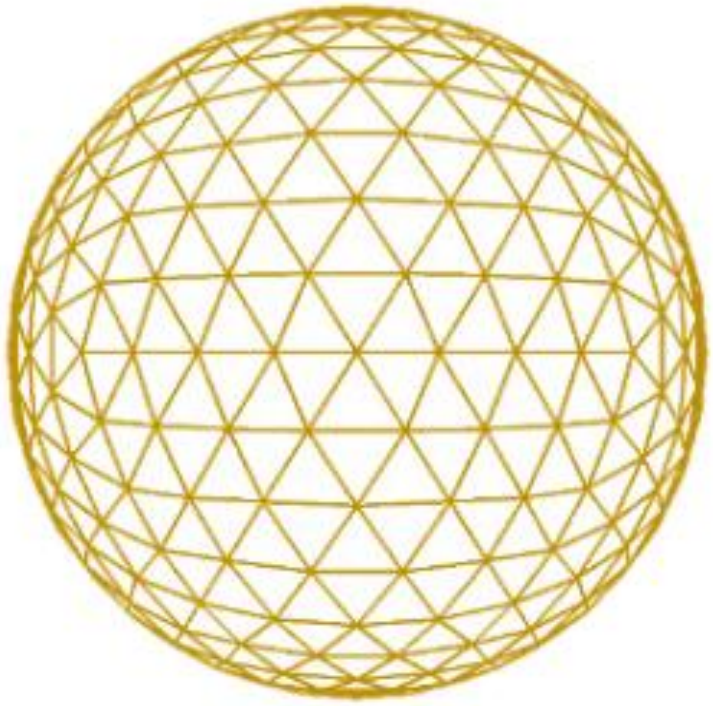
How Does Tracking Work?
Using Random Forests

- The estimate is used to update the known location



How Does Tracking Work?
Using Random Forests

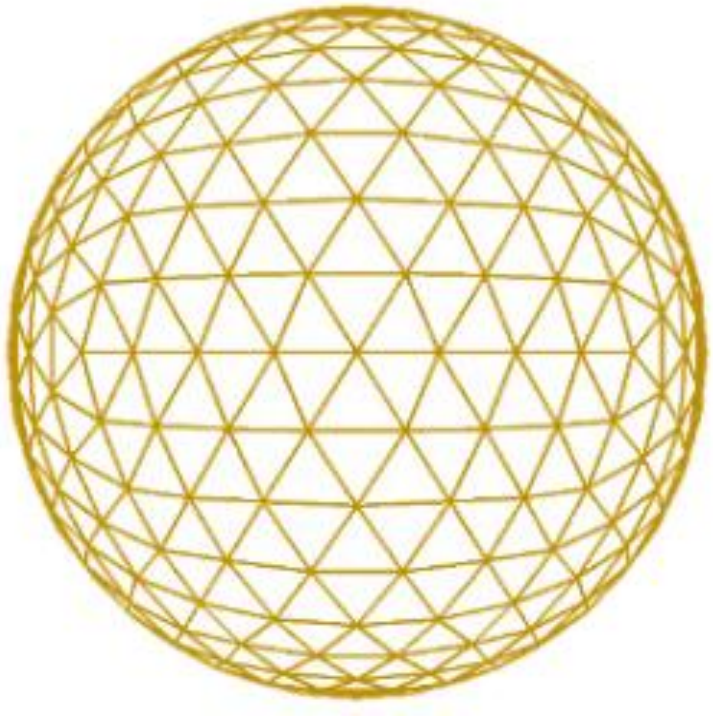
- One decision tree for each view
- A forest is the collection of the trees at each view



What Does Online Learning Do?

Online Learning

- It makes the step of learning decision trees an on-the-fly operation



Where am I at?
Update

- Understand the process at a much more technical level
- Know how to train and generate decision trees

What's Left?
Looking Forward

- Implement, test, and revise online learning method

Questions