

Assignment 2 - Participation in a balloon flowering experiment

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Experiment subject:

Tracking moving objects is a known problem in computer vision, in this task we would like to implement an object tracking software that would be able to identify and track one or more objects that appear in a frame.

After a specific object has been found and selected, the software will be able to track him and keep him in the center of the frame by manoeuvring the telescope lens.

If the object is about to leave the frame, the software would manoeuvre the lens in order to keep the object in the line of sight of the lens.

Participants:

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Experiment

The target can be an airplane or satellite small light point moving in the sky or a drone.

Course of the experiment:

Capturing live video of the balloon using the camera.

Enable to identify and track the balloon and get the correct movement direction to maneuver the telescope to keep the balloon in the center of the frame.

Goal of the experiment:

- Check the distance of which the software is able to keep tracking the balloon.
- Check the correctness of the maneuvers of the telescope and the right sensitivity of the maneuver affects the image blur.

Background material:

- implementation of software for object tracking:
[Article 1](#)
- target tracking:
<https://iopscience.iop.org/article/10.1088/1742-6596/1454/1/012007/pdf>
- Open source for object tracking:
https://github.com/shaanchandra/Multi_Object_Tracking/tree/master/results
- Controlling DC motors using python: (will be added after telescope provided to research).

Requirements:

- Camera (can be pc camera)
- Telescope.
- Telescope tripod with DC motors.
- (Optional) Microprocessor - for controlling the tripod DC motors.

Experimental results:

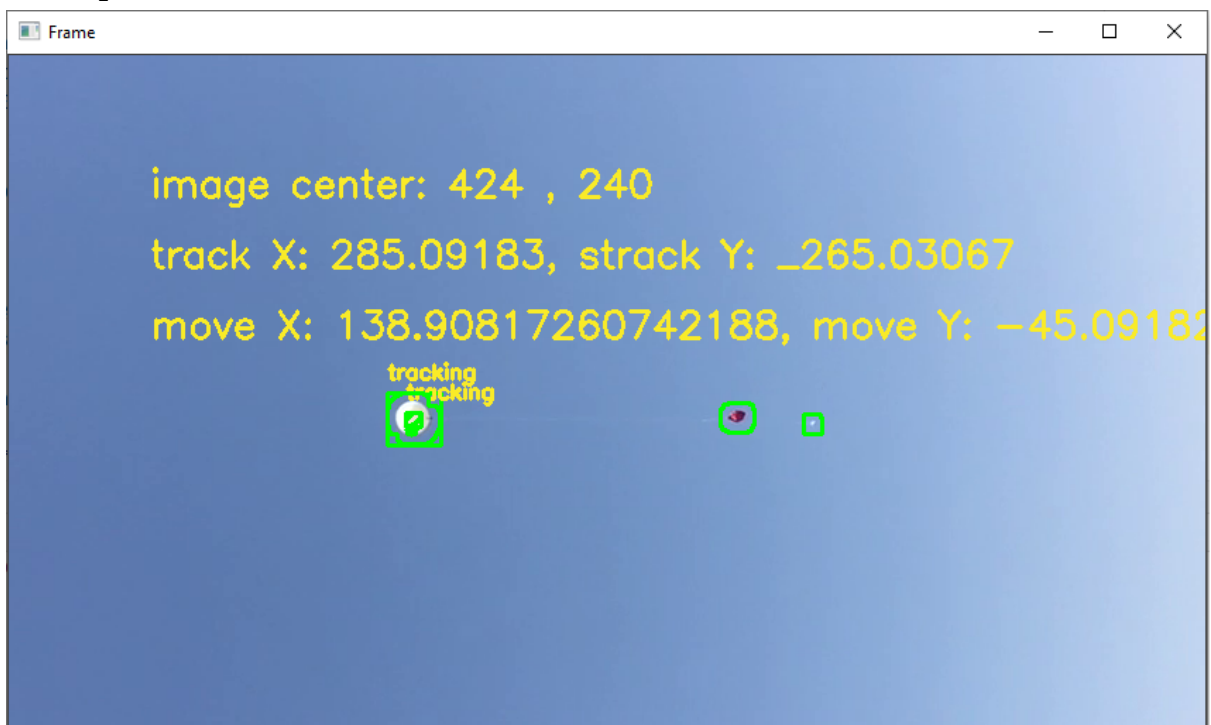
- The movement object detection worked as expected and was able to detect the balloon even when it was just a dot in the sky.
- The tracking and locking target mechanism was able to keep on tracking the balloon and give position in the frame as expected.
- There was no interface to the telescope during the experiment as it was done in a hybrid manner. (in the final experiment it will be connected) .

Photos:

We can see in image [1] that the software detects the movement of the balloon in the sky and also (which was surprising) detects the payload and the landing balloon.



In picture [2] we can see that the software is locking on the balloon and give the balloon coordinates within the camera frame which later help to maneuver the telescope.



Github:

< <https://github.com/DorGetter/Space-engineering-.git> >

Video from the experiment:

< <https://youtu.be/7Gz7oxCqhMI> >

Example:

using python with opencv

