

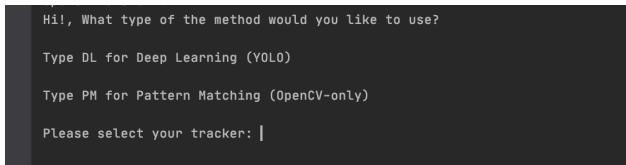
Two Options: Either Pattern Matching or Deep Learning

Object Detection and Tracking

Object Detection and tracking is widely used in various areas, e.i. aviation, military etc.

In the project, this purpose is fulfilled with two different method, first with Deep Learning (a.k.a. YOLO) and OpenCV (a.k.a. Pattern Matching).

First it's asked for a choice to the user, to designate one of these methods and based on the selection, the program is executed.



Deep Learning - YOLO :

By using a pre-trained weights, the model is activated, which includes 80 classes for different objects. Once the live frame is fed to the network, prediction probabilities and classes are listed. The ones that above the threshold is marked with a bounding box and prediction class.

What is YOLO? By simply applying a single neural network to the full image, the image is divided into regions and bounding boxes and probabilities are predicted for each region.

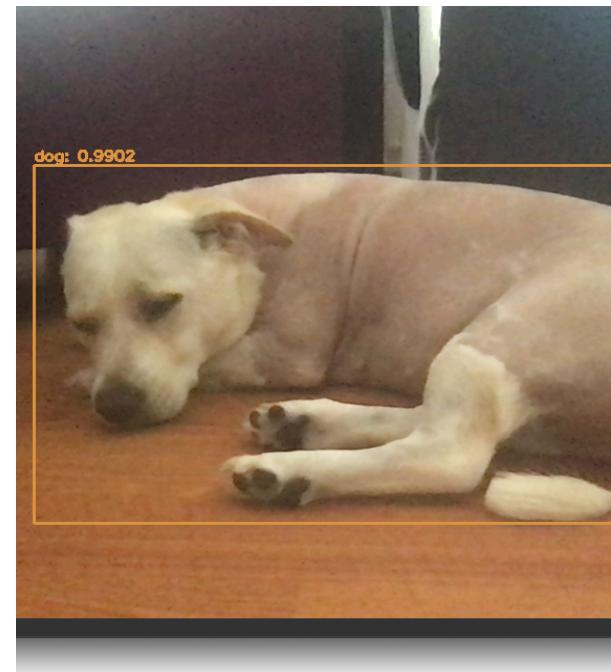
Pattern Matching - OpenCV :

By practically using a background subtractor and contour identifier, any of the objects are detected in a live frame. The principle relies on capturing the changes in consecutive frames.

What are the differences between the methods?

The main difference is that YOLO can be used to extract the information of type of the object, where as pattern matching methods can be used only to track an object.

Also in YOLO, due to the usage of a neural network, execution time of the algorithm takes longer time than the pattern matching methods. Hence in order to use deep learning based methods, a high-end components are essential.



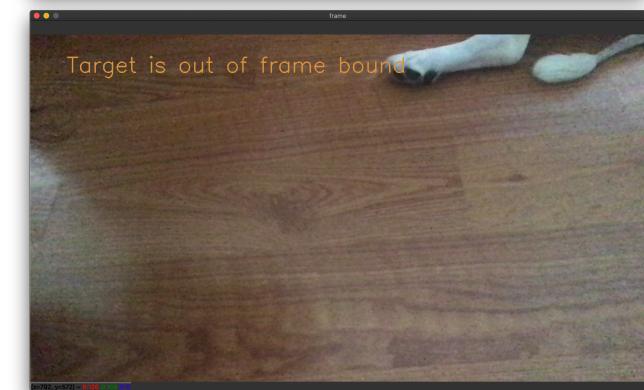
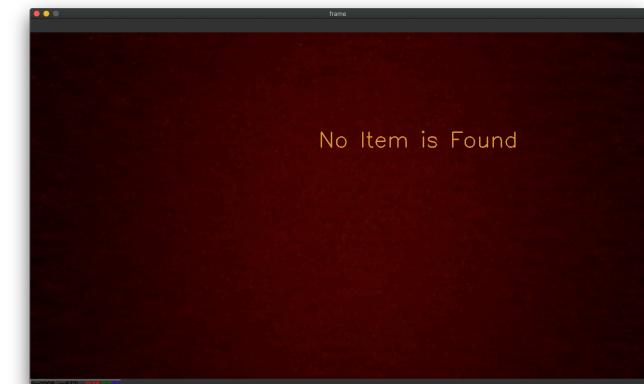
What is additional?

For the cases that any object does not exist.*

Or the cases that the selection is out of the image bound.*

Coordinates of every object detected is recorder.

*Valid for YOLO Option



Project Tree

