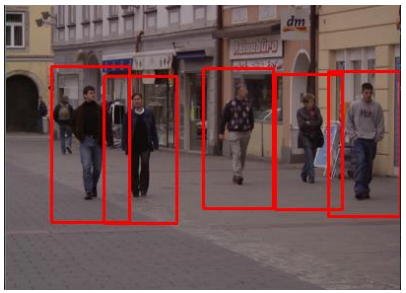
Human Detector & Tracker in C++ which outputs location data in a robot's reference frame

Arunava Basu, Aditi Ramadwar

Overview

- Designing a human detection and tracking module for ACME Robotics' new product.
- The human detector and tracker module will be able to track multiple humans with the help of a monocular camera directly usable in the robot's reference frame.



Technical Design

- Human Detection is performed using a YOLOv3 neural network trained on the COCO dataset.
- A multi-object KCF tracker is used.
- Homogeneous transformations will be used to output the data in the robot's reference frame.
- Unit tests for each module will be performed using Gtest.

Efficient Drift avoidance in Detection

- Bounding box output from the model is fed into the tracker for memory efficient tracking.
- Euclidean distance between centroids of original detection and tracker boxes is checked constantly.
- Once it crosses the threshold, the detection model is run again and the tracker is reinitialized with the new co-ordinates.

Key Milestones & Deliverables

- A high-quality module to perform human detection and tracking.
- Robust unit tests to cover the entire code base.
- Complete documentation including class diagrams and activity diagrams.
- An up-to-date Github repository.