



# Fraunhofer

## PORTUGAL



Fig1. Example of MOTrack application.

## MOTrack

### MOBILE OBJECT TRACKER

The main objective of this project is to analyze video streams and track people or objects across frames through an Android application.

### Context

Nowadays, most of the surveillance systems available are operated under a static environment and do not provide solutions for dynamic cameras.

This current situation motivates the necessity of developing tracking systems capable of running under dynamic environment to aid security forces during their daily tasks.

### Project Goals

The project consists of a mobile application capable of detecting and tracking people from video streams.

More specific, the goals of the project include:

- Implementation of tracking algorithms capable of following visually objects of interest, determined by the user in a wide array of dynamic scenarios;
- Implementation of a people detector to automatize the process of detection and give the person a region of interest as an input for the tracking algorithm;
- Development of an Android application which allows the users to visually track objects of interest or automatically track people present in the background of the scenario being recorded.

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## TLD (Tracking Learning Detection)

The TLD algorithm relies on online learning of the templates retrieved from the object of interest to update the detector and improve the tracking process.

## CMT (Consensus-based Matching and Tracking)

The CMT algorithm is based on the detection of the object's key points (edges and corners) and finding the consensus between the key points from the object and the image.

## Equipment

- Android Smartphone

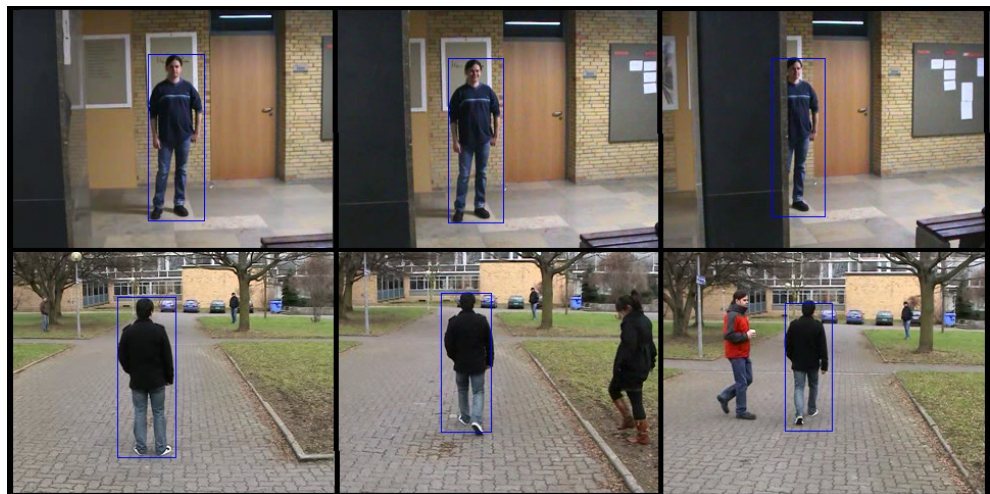


Fig2. Results obtained from MOTrack application.

## Architecture

The MOTrack application architecture consists of the following steps:

- Video capture;
- Define region of interest (ROI);
- Compute tracking algorithm;
- Visualization of the algorithmic output.

The method of defining the region of interest can rely on two different methods:

- People detector enabling an automatic application;
- ROI selection using the user interface of the application.

## Tracking algorithms

The development of the tracking component of the system relies in the implementation of two tracking algorithms:

- TLD;
- CMT.

## Results

In order to evaluate this application, a dataset and a quantitative evaluation method based in the overlap between the algorithmic output and the dataset ground truth were used, allowing the calculation of the recall and precision of the algorithm.

The application was performed over a wide array of scenarios and the results were satisfying for most of the cases, while obtaining values over 70% for recall and precision parameters.

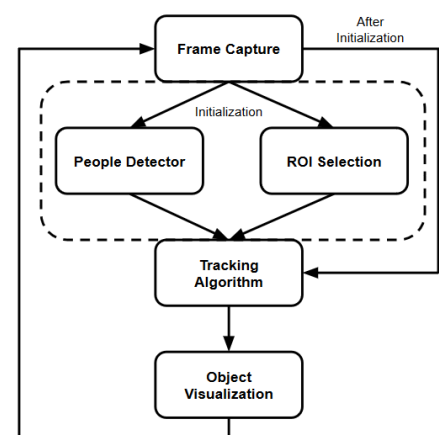


Fig3. System Framework Diagram.