

Outdoor Video-Surveillance Using UAVs I: Detection of ROIs

Proposta de Projeto

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1 Objectives

The use of Unmanned Aerial Vehicles (UAVs) has been massified in recent years, due to the low cost of these devices and their data acquisition and processing capabilities. One interesting possibility is to use teams of UAVs to find persons based on their soft biometric features. In this sense, it might be possible to answer to queries such as “Find a blonde girl with red skirt and white blouse”, or “Find a black man carrying a blue bag”.

The first step of this kind of system comprises the automatic understanding of the scene and the detection of the objects (ROIs, human silhouettes in this case) that will be subject of further analysis.

This kind of project falls in an arising research domain, which difficulties are mainly due to the fact of having non-stationary data acquisition sensors.

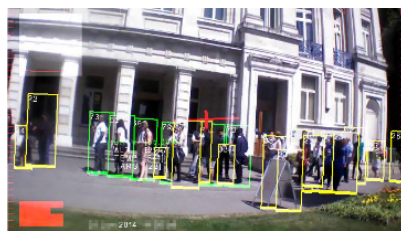
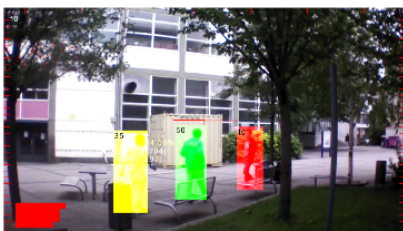


Figura 1: Exemples of outdoor images acquired by UAVs, and the detected human silhouettes in the scenes (image taken from <http://www.eecs.qmul.ac.uk/~rlayne/hosted/layne2014eccvws.pdf>).

In this context, the main goal in this project is to develop one method/system able to detect/segment the human silhouettes in crowded urban environments. For such, it is expected that techniques based in deep learning frameworks (e.g., Faster-R-CNN) are used. This kind of frameworks is composed of two networks: 1) one region proposal network (RPN) that generates region candidates; and 2) a network that filters such proposals to detect objects.

2 Workplan

T1: Study of deep learning-based methods for human silhouettes detection in outdoor environments.

T2: Implementation of the solution designed/chosen.

T3: Tests, debugging and optimization;

T4: Report writing

3 Academic Prerequisites

- Interest about Artificial Intelligence, Machine Learning and Data Science domains;
- Interest about Python/TensorFlow

4 Expected Results

- 1 computational prorotype
- 1 project report

5 Contacts

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