

1. Title

Weakly and Partially Supervised Learning Frameworks for Action Recognition

2. Supervision

Hugo Pedro Proença (UBI-DI)

3. Description

The development of automated methods for surveillance applications has been concentrating growing research efforts and, due to current concerns about security and safety of modern societies, considerable amounts of economic and human resources are being putted on this type of tasks.

In the scope of automated surveillance systems, one of the emerging areas is the so-called "*behavioral biometrics*" that aims on recognizing actions and intends on a group of subjects. Hence, the main goal of this research work is to plan and develop a computer vision system able to detect specific actions (e.g., "*fighting*" or "*robbery*") in surveillance data. Moreover, to avoid the exhaustive manual annotation at the frame level for supervised classification, the idea is to use a subset of weakly supervised data, along with an unsupervised set of videos.

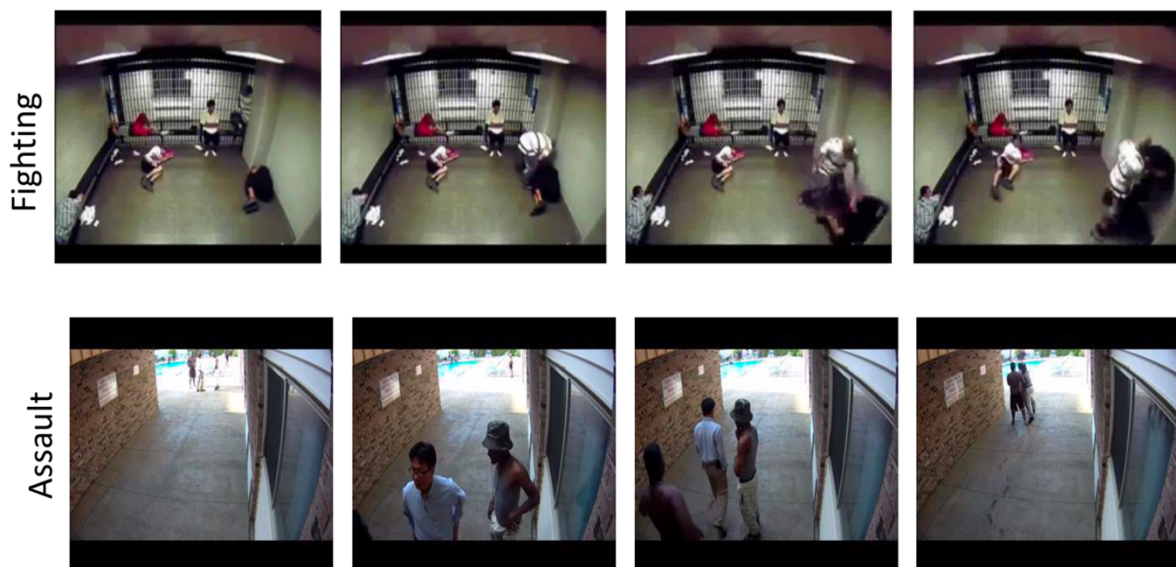


Figure 1: Example of "fighting" (upper row) and "assault" (bottom row) actions in video sequences

Hence, the main objectives of this Master Dissertation are:

- Study the state-of-the-art in action recognition automated frameworks;
- Research novel adaptable computer vision algorithms for behavioral analysis/action recognition;
- Deploy and test the developed prototype;
- Publish results in a high-impact scientific journal or international conference.

4. Workplan

- 1- Comparative study of the behavioral analysis/action recognition methods previously published;
- 2- Development, implementation and test of an iterative weakly and partially supervised framework to detect a specific action in real-world conditions;
- 3- Publication of the proposed approach in an ISI-indexed International journal or conference.

5. Chronogram

	J	J	A	S	O	N	D	J	F	M	A	M	J	J
Gutierrez "PatternAnalysis"														
Matlab (OCR)														
Estado-da-Arte														
Resumo comparativo / crítico														
Abordagens propostas (T)														
Implementação														
Testes / Validação / Refinamento														
Elaboração publicação														
Tese (Redacção)														
Tese (Revisão)														

6. Prerequisites

- Basic skills in English writing/reading;
- Ability to use programming languages, specifically Python;
- Previous knowledge about machine learning and artificial intelligence.

7. References

- [1] W. Sultani, C. Chen, M. Shah. Real-world Anomaly Detection in Surveillance Videos. In proceedings of the CVPR'18 conference, doi: [10.1109/CVPR.2018.00678](https://doi.org/10.1109/CVPR.2018.00678), 2018.