Deteção de Actos de Vandalismo a Partir de Sequências de Video-vigilância

Proposta de Projeto

Orientador: Hugo Proença

1 Objetives

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 of a group of subjects. Under this paradigm, the main goal of this project is to plan and develop a computer vision system able to detect vandalism actions based in surveillance data. Moreover, to avoid the exhaustive manual annotation at the frame level for supervised classification, we are interested in develoing models that avoid the traditional dense annotation of positive/negative samples.

Figure 1: Still image from a video surveillance camera, a suspect is shown during the vandalizing of a mosque near Colorado State University in Fort Collins, Colo. (Fort Collins Police Department via AP).

Typically, most many classification problems attempt to solve the two or multi-class situation, where the goal of the machine learning application is to distinguish test data between a number of classes, using the training data.

However, in this project we are interested in analysing the effectiveness of "**One Class**" methods, by just providing to the model access to normal data during the learning phase. The idea is to create a (representational) model of this data, and later – during test - if any newly encountered data is too different (i.e., it is an outlier), according to some measurement, from this model, it is labeled as out-of-class (i.e., assumed to be a vandalism action).

2 Plano de Trabalho

T1: Estudo das arquitecturas de aprendizagem profunda para a construção de modelos de classificação baseados em classe única (one class models).

T2: Implementação da(s) abordagem(s) selecionada(s);

T3: Testes e otimização;

T4: Escrita de relatório.

3 Requisitos Académicos

• Interesse nas áreas de Inteligência Artificial e Aprendizagem Automática

• Conhecimentos de Programação, e interesse em aprender *Python*, Keras e *Tensorflow*.

4 Resultados Expectáveis

- Um protótipo computacional
- Um relatório

5 Contactos

Hugo Proença (hugomcp@di.ubi.pt)