Detection and classification of moving objects from compressed surveillance videos based on Machine learning

Project context

Automated artificial vision technologies are becoming widely adopted for monitoring and surveillance applications to reduce the need for physical resources and human intervention. One way to help police investigators during the monitoring task is to perform a preselection of sequences having the best characteristics for detection, recognition and identification (DRI) tasks. This selection relies on several criteria related to visual quality, camera features, embedded metadata, usefulness of the content for DRI, and so on.

Description

The aim of this internship is to study moving object detection and classification from compressed surveillance videos. For compressed domain video content analysis, the features, such as motion vectors and block coding modes and DCT coefficients using a partially decoded data, are extracted directly from the bitstream. The major advantage of compressed-domain approaches lies in the low computational complexity since the full-scale decoding and reconstruction of pixels are skipped. Objects present in the scene will be classified using convolutional networks and deep learning [1, 2]. Based on this classification, the task of utility estimation will be conducted in order to accelerate the negative filtering of the video database.
Keywords: Moving objects detection, Machine learning, Deep learning, Compressed-domain, Utility.

Candidate profile

We are looking for MS student in computer vision and pattern recognition, machine learning, Image processing, or close fields. The candidate should have a strong skills in one or more of the following:
- Image processing and computer vision.
- Programming languages: Matlab, C, C++, and/or Python.
- Machine learning (deep learning appreciated).

Application

Applications should include the following:
- Letter of interest and Curriculum Vitae.
- Official transcripts of the Master (or equivalent).
- Name & contact information of 1-2 Referees.

Other information

Duration: 5-6 months.
Location: XLIM Laboratory, Poitiers, France.
Benefits: *approx.* 550 Euro monthly.

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References

[1] Chadha, A., Abbas, A., Andreopoulos, Y.: Compressed-domain video classification with deep neural networks:"there's way too much information to decode the matrix". In: IEEE International Conference on Image Processing. pp. 1832–1836 (2017)

[2] Zhao, L., Zhao, D., Fan, X., He, Z.: HEVC compressed domain moving object detection and classfication. In: Circuits and Systems (ISCAS), 2016 IEEE International Symposium on. pp. 1990–1993. IEEE (2016)