
PhD proposal 2010 : Video description

- **Domain** : Video description and retrieval, Computer Vision, Multimedia
- **Institution** : INRIA Rennes - Bretagne Atlantique
- **Location** : Rennes, France
- **Supervisors** : Hervé Jégou and Patrick Gros (Firstname.Lastname@inria.fr)
- **Environment** : The thesis will stand in the TEXMEX project-team. The candidate will be integrated in a comfortable and stimulating environment. Rennes is a dynamic middle-sized town with a student population rate above 30%.
- **Description** : We address the problem of video representation and recognition. This problem receives increasing interest, due to the emergence of personal capture devices such as digital cameras and video-cameras, resulting in the production of huge personal and corporate multimedia databases.

The objective of this thesis is to improve the representation of videos, in order to obtain the maximum retrieval accuracy with respect to different applications, in particular copy detection and video interpretation. Another (contradictory) requirement is a reduced indexing and search complexity. This requires to design compact but discriminative video representations.

For this purpose, the student will consider different steps of the video description and indexing pipeline. First, how to convert the signal into a vector representation, or into a set or sequence of vectors? Many approaches exist [1,2,3,4], in particular the so-called bag-of-features representation and its derivatives [1,3,4]. However, they mainly consider videos as sequences of images, and the existing extensions (e.g., [4]) are not satisfactory. Second, following a recent PhD thesis in the TEXMEX project-team, the student will investigate how to efficiently compare such representations, by taking into account, in particular, the specificity of the temporal axis.

- **Profile** : The outstanding candidate should be proficient in C and have some knowledge in matlab. He must be familiar with image or video processing.

- **References** :

- [1] "Video Google : A Text Retrieval Approach to Object Matching in Videos"
J. Sivic and A. Zisserman
International Conference on Computer Vision, 2003
- [2] "Content-Based Copy Detection using Distortion-Based Probabilistic Similarity Search"
A. Joly, O. Buisson and C. Frelicot
IEEE Transactions on Multimedia, 2007
- [3] "An image-based approach to video copy detection with spatio-temporal filtering"
M. Douze, H. Jegou and C. Schmid
to appear in IEEE Transactions on Multimedia
- [4] "On Space-Time Interest Points"
I. Laptev
International Journal on Computer Vision, 2005