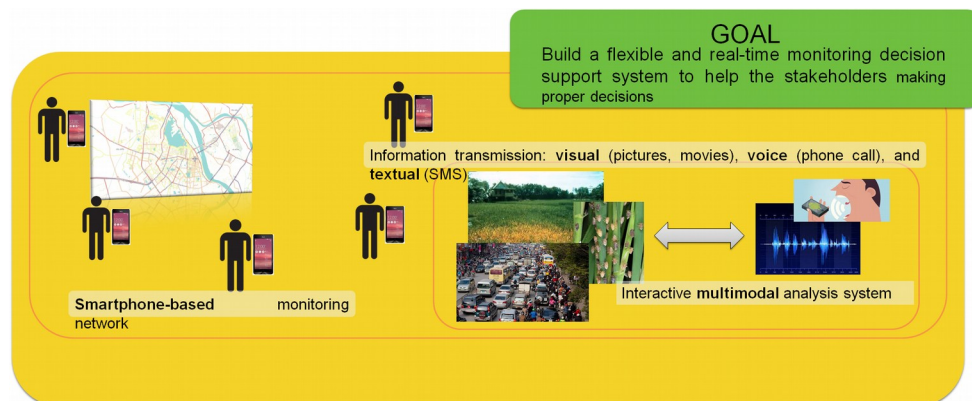## Topic 2: Nonparametric method for image analysis

Description:

In the context of SWARMS research project of our ICTLab (see the figure), advanced image analysis methods need to be taken into account in order to extract useful features for image recognition. Image clustering is an important step to meet this need. The goal is to cluster images into similar groups for feature extraction. K-Means is one of the most popular clustering algorithms for image clustering. However, K-Means is a parametric method which requires the prior knowledge of the number of clusters.

Project goal:

In this internship project, we prefer students to study a nonparametric method for image clustering, called Mean-shift clustering proposed by Cheng, 1995 [1]. The goal is to clearly understand the principle of the Mean-shift algorithm and implement it to cluster images. A general comparison with K-Means clustering technique is also preferred.

Expected outcomes:

- Implementation of Mean-shift algorithm to cluster images
- Research and technical documentation

Supervisors:

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Pre-requisites:

- Motivations in research and innovation
- Good skills in programming
- Knowledge in image processing and data mining

References:

Academic paper to read: [1] Cheng, Y. (1995). Mean Shift, Mode Seeking, and Clustering. IEEE Transactions on Pattern Analysis and Machine Intelligence, 17(8):790–799.