

3.33 Unsupervised Activity Discovery, Monitoring, and Abnormality Detection

Keywords

Activity Discovery, Domotic, Surveillance, Abnormality detection.

Key contact researcher(s)

Dr. Jean-Marc Odobez
odobez@idiap.ch
Tel.: +41 27 721 77 26

Technology Transfer Office

Dr. Florent Monay
Dr. Hugues Salamin
tto@idiap.ch
Tel.: +41 27 721 77 72

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Software disclosure 11637

Functional description

Idiap had developed methods and software for the unsupervised discovery of recurrent temporal pattern in multivariate time series, where observed values are caused by the superposition of multiple phenomena. This typical situation occurs when multiple sensors records the activities of multiple objects/people, like multimodal sensors (proximity, water, light sensors, etc) in domotics, multiple cameras -or even microphone-arrays- in indoor/outdoor complex scenes.

Discovered patterns correspond to recurrent activities like trajectories of different object classes in cameras, or sequences of activated sensors in domotics. In addition, the method allows the identification of abnormal situations, and can be exploited to select streams to be displayed in control rooms of large public spaces (to direct the attention of operators towards relevant information).

Innovative aspects

- Capture sub-activities temporal ordering
- No Prior on scene needed
- Small number of parameter to set
- Estimate automatically the number of activities

Commercial application examples

- Activity discovery from large multi-sensor datasets
- Surveillance (anomaly detection, stream selection)
- Video content filtering (summary generation)
- Adaptation to user's behaviors (heating,...)

More information

R. Emonet, J. Varadarajan and J.-M. Odobez. Temporal Analysis of Motif Mixtures using Dirichlet Processes. *IEEE Trans. Pattern Analysis and Machine Intelligence (PAMI)*, 36(1):140-156, Jan. 2014.

R. Emonet and J.-M. Odobez. Unsupervised Methods for Activity Analysis and Detection of Abnormal Events. in *Intelligent Video Surveillance Systems (ISTE)*. Wiley 2013.

Software status

- Recurrent pattern learning <http://www.idiap.ch/resource/research/probomod-v1/>
- More complete prototype for surveillance videos