Subject: Semantic AV segmentation and clustering by means of film grammar and stochastic/statistical AV content analysis

Problem Area:
Multimedia Content Analysis (MCA) refers to computerized understanding of semantic meaning of an audiovisual document. In particular, MCA, as an enabler of Content Based Retrieval (CBR), has become an important topic for consumer networks and video search services. In the past a broad range of audio and video analysis features have been developed and combined into state-of-the-art audiovisual content management solutions. In the next step the knowledge of film grammar will be used in combination with information derived from stochastic/statistical-based content analysis methods based on various AV descriptors and features (color, shape, motion, texture, audio, speech, subject/object/faces). The aim is to research methods to cluster and segment AV content into its logical and semantic meaningful units and to classify them accordingly.

Work Assignment:
The student is expected to conduct research into the development of audiovisual content analysis techniques under the supervision of senior project members. Specifically the following set of tasks is part of the assignment:

- Study of film grammar rules and a literature review of related stochastic/statistical audiovisual content analysis techniques relevant for AV content clustering and segmentation.
- Research and development of novel film-grammar-related stochastic/statistic-based content analysis techniques and/or augmentation of the existing methods developed under related projects (e.g. CASSANDRA, www.extra.research.philips.com/cassandra).
- Develop stochastic/statistic (e.g. neural-network-based) techniques to improve audiovisual clustering, segmentation and classification algorithms for semantic meaningful AV segmentation.
- Implement a prototype (e.g. in software) and produce a final report of the work done.

The student is expected to have (reasonable) working knowledge and strong affinity for the following topics:

- Programming in C, C++ and MatLab
- Signal Processing, with application to Audio/Video Signal Analysis
- Knowledge about AudioVisual standards (optional)
- Pattern Recognition (optional)

It is expected that the student will work in Philips Research, NatLab, Eindhoven, The Netherlands for a minimum of 9-10 months and would begin January 2005. If the student desires, the work could be used as part of his/her Master’s thesis/project. In case the student has no prior knowledge about audio signal analysis, Machine Learning, MPEG2, it is expected that he/she will study literature about this topic before coming to the Netherlands and/or the student is eager to learn about them. Suitable URL links and literature will be provided.

Documents required:

- A short CV (1-2 pages)
- A short accompanying letter providing us with a brief description of why you are interested in the topic and would like to work at Philips Research – not more than 10 lines.
- A list of courses completed in the past 3 years including marks achieved at the exams.
- Optional extra: A short recommendation from your professor – preferably the Philips contact person.