Problem Statement

- Dynamic Adaptive Systems (DAS) are software systems which have to dynamically adapt their behavior in order to cope with a changing environment.
- Issues:
  - Large number of software configurations
  - Large number of contexts

Video Surveillance Case Study

Variants
- SPL of Segmentation
- SPL of Classification
- SPL of Frame to Frame Analysis
- SPL of Task Dependent

Base
- Acquisition
- Segmentation
- Classification
- Frame to Frame Analysis
- Task Dependent

DSML Approach

- Consider DAS as a Software Product Line (SPL)
- From common assets, different programs of a domain can be assembled
- Model also the context as an SPL

Revisiting the Approach with Feature Models

Modeling Software Variants

Modeling Context

Modeling Adaptation

Night and HeadLight implies HeadLightDetection (AR0)
ArtificialLight implies Region (AR1)
LightingNoise implies Edge (AR2)
ArtificialLight implies DetectRapidChanges (AR3)
Flashes or HeadLight implies Contour (AR4)

Results

- The concept of configuration is naturally present and defined by the semantics of FM.
- Uniform representation of the context model and the software system makes possible to express relations between the two models.
- DSM and FM-based approaches can complement each other.

Future Work

- Leverage the expressiveness of FM (e.g. attributes).
- Achieve an automatic translation between DSM and FMs.
- Update automatically contextual information.
- Connect state-of-the-art adaption engines to our models.