

DETECTION OF SEMANTIC OBJECTS USING DESCRIPTION GRAPHS

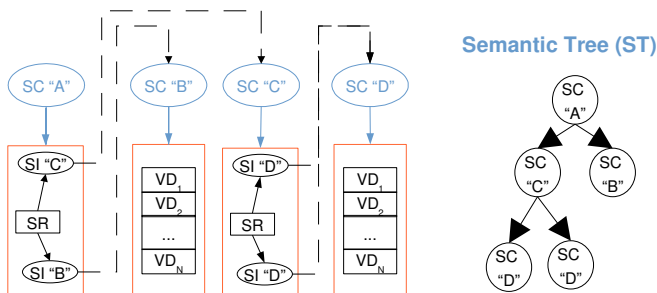
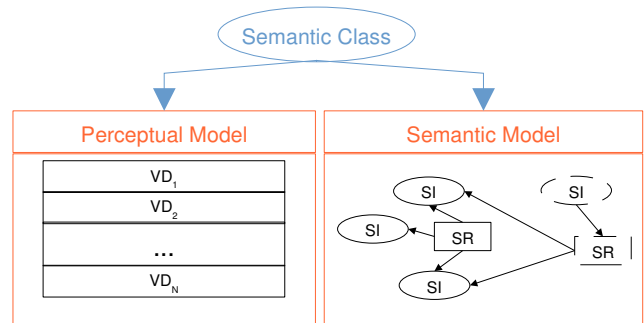
X. Giró
F. Marqués

A **Semantic Class (SC)** can be described by two types of models:

Perceptual model → Visual Descriptors (VD)

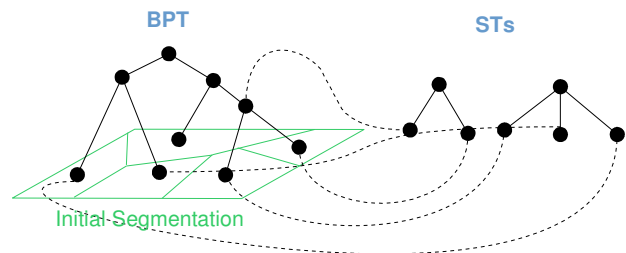
Semantic model → **Description Graph (DG)**

DG vertices refer either to Semantic Relation (SRs) or Instances (SI) of lower level semantic classes.

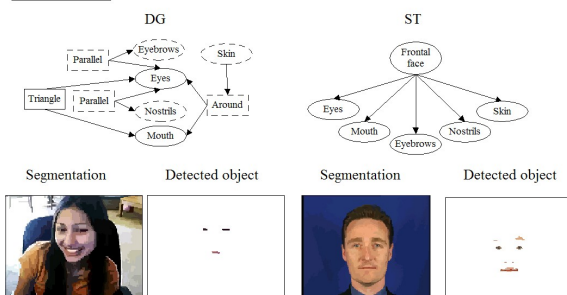


Semantic models can be decomposed iteratively until reaching classes only described by perceptual models. Such expansion can be summarized in a **Semantic Tree (ST)**.

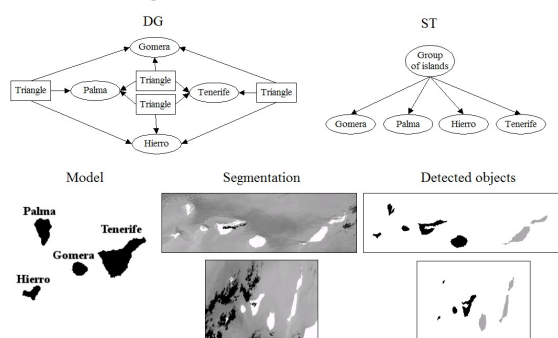
The detection algorithm uses a region-based image representation in the form of a **Binary Partition Tree (BPT)**. Detecting a class is equivalent to growing a ST on the BPT. ST leaves are generated based on perceptual models. Afterwards, the algorithm creates new ST nodes according to the data patterns defined in the DGs.



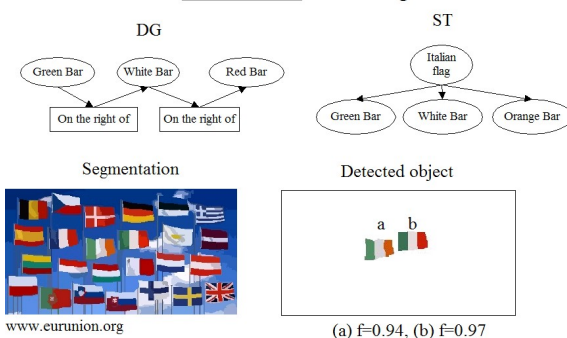
Semantic class: Frontal face



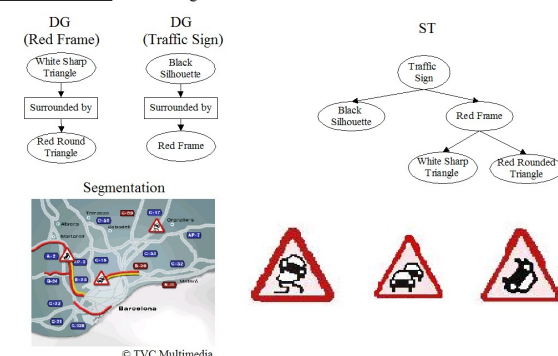
Semantic class: Group of islands

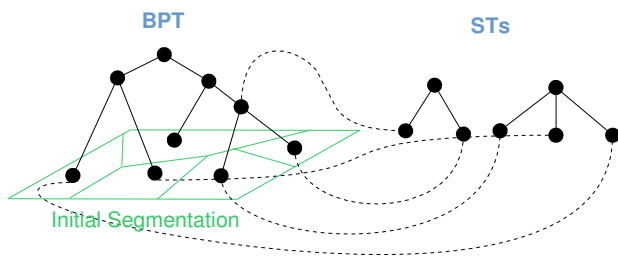
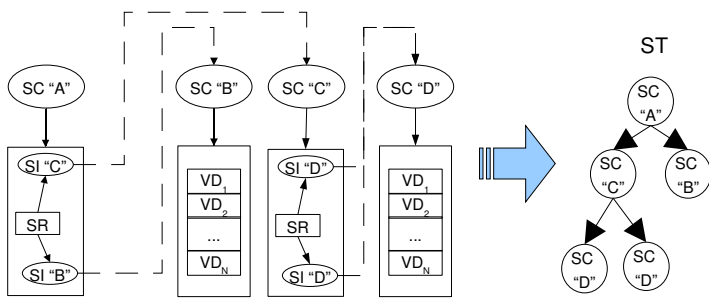


Semantic class: Italian Flag



Semantic classes: Traffic Signs





The proposed approach has been assessed in different applications to show its **flexibility**. A unique detection software has been used in all cases, transferring the accuracy of the results to the goodness of the models.