

Machine Learning applied to Graph Matching

Abstract:

In this talk, we show how we have combined **machine learning models** and **graph matching algorithms** to define useful models to be applied in structural pattern recognition. This research has been carried out in the **SSAI research group** (Sensorial Systems Applied to the Industry) at the Universitat Rovira i Virgili, Tarragona, Catalonia.

The talk is divided in three theoretical parts and a practical part in which we show the application of the models commented on.

- First, we explain two different algorithms that solve the **error-tolerant graph-matching problem**. Specifically, given a pair of attributed graphs that represent two objects, these algorithms deduce a distance between them and also the node-to-node mapping.
- Second, we explain our contributions on **graph prototyping**. Three different models have been presented, FDGs, SORGs and Median Graphs. The main aim of graph prototyping is to represent the set of attributed graphs that form a class with a single structure.
- And third, we explain how **machine-learning techniques** have been applied to graph matching. In this part, we comment on three different aspects. a) Learning the graph-matching **parameters** to increase the quality of the final node-to-node mapping. b) Adding human **interactivity** in the process of matching two attributed graphs. c) Finding the **consensus** of several node-to-node mappings.

This methods and algorithms have been **applied to robotics** and now it is time to explore other industrial, commercial or social fields.

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