

## The (il)logic way to signal classification

by **Luca Bortolussi**.

### Abstract

In many applications there is the need to monitor signals, produced for instance by sensors measuring some physical quantity of interest, and classify them into two - or more - classes, e.g. good or bad. Most of the more successful classifiers used in practice are statistical models trained from available data. While this can give good performances, it lacks explanatory power: what makes a signal good or bad? A way to address this problem is to try to describe properties of signals in a logic-based setting, for instance using temporal logic. Unfortunately, we typically do not know what are the relevant temporal patterns. This calls into play the necessity of learning formulae from a set of observed trajectories. We will discuss an approach to learn formulae that discriminate between good and bad trajectories, combining temporal logic verification with statistical modelling, Bayesian optimisation, and evolutionary algorithms.