Variational Conditional Probabilities

Abstract:

Predicting the label Y of an object X is a core task in machine learning. From a probabilistic perspective, this involves reasoning about conditional probabilities \( p(y|x) \). However, it is hard to obtain reliable estimates for these probabilities. Here we show how to obtain lower and upper bounds on \( p(y|x) \) given statistical information, and show how it can be used within various learning setups. We also extend this formulation to the structured case, where \( y \) can be multivariate.