Ph.D. student

Learning when High and Low Accuracy Observations are Available.

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The problem studied is the prediction of an output given an input by learning from different types of observations produced by an experiment with adjustable precision.

Each level of precision and the difference between two consecutive levels are modeled by Gaussian Processes with free parameters. The predictor is built by making an assumption about the relationship between two consecutive levels and by integrating the estimations of the parameters by using a plug-in method. This allows for a flexible and easy to use method that integrates different types of observations.

The relationship between two consecutive levels of precision is studied. A linear and a non-parametric method for building the relationship are proposed. In the linear model case when the observations of two consecutive levels are nested, all the parameters estimators and the form of the predictor and error of prediction are fully described.

An E.M. algorithm is proposed to extend the linear model to the case when the observations of two consecutive levels are not nested.

An alternative method to study the problem based on adaptive wavelets is presented. For each level of precision, we consider the wavelet transform of the experiment response to determine where to make further explorations in order to improve the prediction. This alternative does not relies on Gaussian hypothesis.

References:

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