

Elektrotechnik-Elektronik-Informationstechnik

EEI KOLLOQUIUM

Data-Selective Adaptive Filtering

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The current trend of acquiring data pervasively calls for some data-selection strategy, particularly in the case a subset of the data does not bring enough innovation. As a byproduct, in addition to reducing power consumption and some computation, the discarding of data results in more accurate parameter estimation. In many practical situations, it is possible to verify if the acquired set of data qualifies to improve the related statistical inference or if it consists of an outlier or a noninnovative entry. In this presentation we discuss some extensions of the existing adaptive filtering algorithms enabling data selection which also address the censorship of outliers measured through unexpected high estimation errors. The resulting algorithms allow the prescription of how often the acquired data is expected to be incorporated in the learning process based on some a priori assumptions regarding the environment data. A detailed derivation of how to implement the data selection in a computationally efficient way is provided along with the proper choice of the parameters inherent to the data-selective affine projection (DS-AP) algorithms. Similar discussions lead to the proposal of the data-selective least-mean square (DS-LMS) and data-selective recursive least squares (DS-RLS) algorithms. Simulation results show the effectiveness of the proposed algorithms for selecting the innovative data without sacrificing the estimation accuracy, while reducing the computational cost.