An Inductive Learning in Time Series Modeling : Pattern Recognition Approach

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ABSTRACT

We deal exclusively with an autoregressive-moving average (ARMA) model, that is, ARMA(p,q). Major emphasis of this paper is focused on the specification of p and q, what is called *time series modeling*, with the aid of the concept of pattern recognition. Statistical modeling methods developed so far have following disadvantages in common- 1) they usually relies upon complex statistical derivations and 2) they have no mechanism for accumulating knowledges about input series which will be helpful later in the case of modeling the series of similar properties. We propose an inductive learning process to overcome two drawbacks above. The learning is based on nonparametric and iterative process, in which a conclusion is derived on the basis of learned examples. The approach proposed differs drastically from traditional statistical methods in view of the fact that p and q are specified by matching the pattern of input series with one of ARMA models. Experiments with a prototype system demonstrate that the learning presented shows a satisfactory performance in suggesting a correct model for input series. Conspicuous contributions of this approach can be summarized such that 1) it considerably reduced the possibility of over- or under-identification problem which has been frequently debated in statistical time series modeling methods and 2) its heuristics that the system can be adapted to new patterns could eliminate complexities involved in statistical modeling methods.