Parameter Estimation and State Inference in Hidden Drifting Markov Models

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Abstract

This work explores the application of Hidden Drifting Markov Models (HDMMs) in the context of time series data with hidden structures. We first introduce the theoretical foundations of HMMs, including the components and assumptions that define them. We then present two key algorithms: the expectation minimization algorithm (Em) for parameter estimation and the modified Viterbi algorithm to deduce the least risky hidden state sequence. Finally, we illustrate these methods through numerical experiments on simulated data. This work highlights the efficiency of HDMMs in capturing hidden dynamics in sequential data and the usefulness of Em and modified Viterbi in model training and interpretation.

Keywords: Drifting Markov Models, Hidden Markov Models, Inference, Expectation-Maximization algorithm, Viterbi algorithm

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