

**Zheng, Jing; Yu, Dongjie; Zhu, Bin; Tong, Changqing**

**Learning hidden Markov models with unknown number of states.** (English) Zbl 07491730  
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Summary: This paper proposes a novel method for learning hidden Markov models (HMMs) with an unknown number of states based on a valuable feature set. The feature set is built using the hitting times of HMMs. Based on the feature set, we obtain a parameter estimation for HMMs by SVD and the clustering algorithm. The advantages of the proposed method are that it can accurately and automatically identify the number of hidden states, it is robust to misspecified emission distributions, it is less sensitive to initialization, and is asymptotically consistent. Numerical experiments show that the proposed method performs better than other methods when the observed time series is long enough.

**MSC:**

**82-XX** Statistical mechanics, structure of matter

**Keywords:**

hidden Markov model; spectral clustering algorithm; first hitting time

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