Bayesian Dynamic Mode Decomposition

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Dynamic mode decomposition (DMD) is a data-driven deterministic method that has substantially contributed to our understanding of dynamical systems. In this work, a Bayesian formulation of DMD is proposed. It first determines the subspace of observables, and then compute the modes on that subspace. Variational matrix factorization makes it possible to realize a fully-Bayesian scheme of DMD. The proposed Bayesian DMD is capable of dealing with incomplete or missing data, which demonstrates the advantage of probabilistic modeling. Finally, both nonlinear simulated and real-world datasets are used to illustrate the potential of the proposed method. This is joint work with Mr. Takahiro Kawashima and Dr. Hayaru Shouno.

Keywords: Bayesian modeling, mode decomposition

