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This MATLAB code package implements the quantification on the dynamical mutual information for data of time series. It used either time-inhomogeneous Markov model or hidden Markov model to learn the dynamical patterns of the set of time series. Then, it can reproduce the path ensemble by sampling a same amount of time series, and quantify the similarity between data and sampling. It further calculates the trajectory probability for each time series, and the dynamical mutual information.

A detailed example on the methods is given in the main text.

A guideline for the package is on the website: the website link will be generated after the manuscript is accepted.

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System requirements:

All simulations were done using MATLAB® version R2019a.

We have used the toolbox “Hidden Markov Models (HMM)” in MATLAB.

Third-party packages:

(1) We have used the package of NFkB signaling model on

https://github.com/biomystery/tnf_ikbd_nfkb_model.git.

(2) The package to generate the data of NFkB on <https://github.com/Adewunmi91/MACKtrack>.

(3) We thank Roy Wollman's group for sharing the code of vector method.

(4) The decoding-based method was not included here, because it can be separately implemented by the user-friendly package (<https://github.com/swainlab/mi-by-decoding>).

Expected run time: all the expected run time below is evaluated based on a personal desktop with intel(R) core(tm) i7-8700 CPU @ 3.7GHz.

Download & Installation

Github link: the Github link will be generated after the manuscript is accepted.

A step-by-step guideline is on the website of the package: the website link will be generated after the manuscript is accepted.