

**The Hong Kong Polytechnic University
Department of Applied Mathematics**

Statistics and Data Science Online Colloquium Series

RaSE: Random Subspace Ensemble Classification

**By
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Abstract

We propose a flexible ensemble classification framework, Random Subspace Ensemble (RaSE), for sparse classification. In the RaSE algorithm, we aggregate many weak learners, where each weak learner is a base classifier trained in a subspace optimally selected from a collection of random subspaces. To conduct subspace selection, we propose a new criterion, ratio information criterion (RIC), based on weighted Kullback-Leibler divergence. The theoretical analysis includes the risk and Monte-Carlo variance of the RaSE classifier, establishing the screening consistency and weak consistency of RIC, and providing an upper bound for the misclassification rate of the RaSE classifier. In addition, we show that in a high-dimensional framework, the number of random subspaces needs to be very large to guarantee that a subspace covering signals is selected. Therefore, we propose an iterative version of the RaSE algorithm and prove that under some specific conditions, a smaller number of generated random subspaces are needed to find a desirable subspace through iteration. An array of simulations under various models and real-data applications demonstrate the effectiveness and robustness of the RaSE classifier and its iterative version in terms of low misclassification rate and accurate feature ranking. The RaSE algorithm is implemented in the R package RaSEn on CRAN.

Date : 23 April 2021 (Friday)

Time : 09:30-10:30 (Hong Kong Standard Time GMT +8)

Venue : Online Talk via Zoom (Meeting ID: 966 6415 6479)

Speaker : Dr. Yang Feng, New York University

Host : Dr. Binyan Jiang, The Hong Kong Polytechnic University

Click to join :

<https://polyu.zoom.us/j/96664156479?pwd=SEM5RzhndmsxbS81L1RYVzdFSytDUT09>



[Click to join \(Zoom\)](#)

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For enrolment, please send your name and email to shuk-wai.ko@polyu.edu.hk on or before 22 April 2021