Detecting Change Intervalswith Isolation Distributional Kernel (Abstract Reprint)

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Abstract

Detecting abrupt changes in data distribution is one of the most significant tasks in streaming data analysis. Although many unsupervised Change-Point Detection (CPD)methods have been proposed recently to identify those changes, they still suffer from missing subtle changes, poor scalability, or/and sensitivity to outliers. To meet these challenges,we are the first to generalise the CPD problem as a special case of the Change-Interval Detection (CID) problem. Then we propose a CID method, named iCID, based on are cent Isolation Distributional Kernel (IDK). iCID identifies the change interval if there is a high dissimilarity score between two non-homogeneous temporal adjacent intervals. The data-dependent property and finite feature map of IDK enabled iCID to efficiently identify various types of change-points in data streams with the tolerance of outliers. Moreover,the proposed online and offline versions of iCID have the ability to optimise key parameter settings. The effectiveness and efficiency of iCID have been systematically verified on both synthetic and real-world datasets

References

[Cao *et al.*, 2024] Yang Cao, Ye Zhu, Kai Ming Ting, Flora D. Salim, Hong Xian Li, Luxing Yang, and Gang Li. Detecting change intervals with isolation distributional kernel. *J. Artif. Intell. Res.*, 79:273–306, 2024.