

知识迁移极大熵聚类算法

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Knowledge transfer based maximum entropy clustering

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摘要

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摘要

为解决数据不足或失真等环境下传统聚类技术效果不佳的问题, 基于历史类中心和历史隶属度提出两种知识迁移机制, 并与极大熵聚类方法融合提出知识迁移极大熵聚类算法KT-MEC. KT-MEC的优点是: 利用历史知识, KT-MEC 聚类有效性和实用性明显增强; 内嵌迁移机制均不暴露源域数据, 从而拥有源域隐私保护能力; KT-MEC 基于的“参数寻优+ 聚类有效性度量”机制理论上保证其性能不差于经典极大熵聚类法, 避免了负迁移问题.

关键词: 知识迁移, 极大熵聚类, 隐私保护, 负迁移

Abstract:

Classical clustering methods tend to be less effective in such situation where the data are insufficient or impure. Therefore, two knowledge transfer mechanisms for fuzzy partition clustering are devised in terms of historical cluster centers and fuzzy memberships regarding historical class centers respectively. And combining these two transfer mechanisms with the classical maximum entropy clustering(MEC) approach, the particular knowledge transfer based maximum entropy clustering(KT-MEC) algorithm is proposed. The major merits of KT-MEC lie in following three aspects. Benefiting from the auxiliary guidance of historical knowledge, the clustering effectiveness and practicability of KT-MEC are enhanced distinctly. As the couple of built-in transfer mechanisms both don't expose the raw data in the source domain, KT-MEC is of good capability of privacy protection for the source domain. Owing to the "searching for best parameters + validity indices" mechanism, the clustering effectiveness of KT-MEC is not worse than that of MEC in theory, which avoids reliably the negative transfer risk.

Key words: knowledge transfer maximum entropy clustering privacy protection negative transfer learning

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