

博士论坛

基于FCM与模糊粗糙集理论的交通事件检测模型

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摘要 为准确及时地发现高速公路上的事故隐患, 有效地减少交通延误, 保障道路安全, 提出了一种新的基于模糊C均值(FCM)聚类和模糊粗糙集的交通事件自动检测模型。模型分为离散化、推理规则建立和模糊推理三个步骤。在属性离散化时, 提出用常用的隶属度函数来拟合FCM聚类后的结果, 并用此函数和参数来实现属性数据的离散化, 避免了每次输入数据都必须通过聚类操作来进行离散化; 采用了粗糙集理论建立推理规则, 选择和交通事件密切相关属性并进行规则的约简, 加速了模糊推理的速度; 最后采用Max-Min模糊推理方法对交通事件进行检测。通过多种检测方法对比测试, 结果表明了此模型在总体性能上优于传统的检测方法, 验证了此模型的有效性, 为交通事件的检测提供了一种新的思路。

关键词 [事件检测](#) [模糊C均值聚类](#) [粗糙集](#) [模糊推理](#) [属性离散化](#)

分类号

Traffic incident detection model based on FCM and fuzzy rough sets theory

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Abstract

In order to detect traffic incident accurately, reduce traffic delays and ensure road safety, a new detection model using FCM and fuzzy rough sets is presented. The model is composed by three parts such as discretization, reasoning rules establishment and fuzzy reasoning. A new method is proposed when attribute discretization. Using custom membership function to fit results of the FCM clustering, the membership function and parameters are obtained to discrete the attribute data without clustering when new data come. Then reasoning rules are formed using the rough set theory so as to improve fuzzy reasoning. Finally Max-Min fuzzy reasoning method is adopted to incident detection. By comparative testing, the better performance is achieved using new model and result valid the validity of new model which provides a new idea for automatic incident detection.

Key words [incident detection](#) [fuzzy C mean clustering](#) [rough sets](#) [fuzzy inference](#) [attribute discretization](#)

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