Improving disease diagnosis by a new hybrid model

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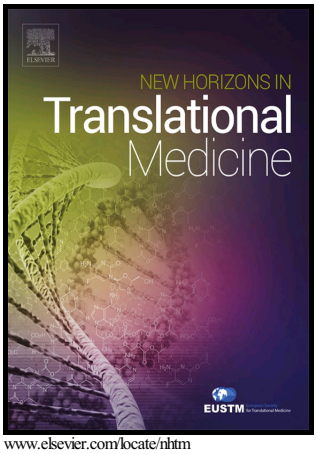

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Improving disease diagnosis by a new hybrid model

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ABSTRACT

Knowledge extraction is an important part of e-Health system. However, datasets in health domain are highly *imbalanced*, *voluminous*, *conflicting* and *complex* in nature, and these can lead to erroneous diagnosis of diseases. So, designing accurate and robust clinical diagnosis models for such datasets is a challenging task in data mining. In literature, numerous standard intelligent models have been proposed for this purpose but they usually suffer from several drawbacks like lack of *understandability*, incapability of operating *rare cases*, inefficiency in making *quick* and *correct* decision, etc. In fact, specific health application using standard intelligent methods may not satisfy multiple criteria. However, recent research indicates that hybrid intelligent methods (integrating several standard ones, can achieve better performance for health applications. Addressing the limitations of the existing approaches, the present research introduces a new hybrid predictive model (integrating C4.5 and PRISM learners) for diagnosing effectively the diseases (instead of any specific disease) in comprehensible way by the practitioners with better prediction results in comparison to the traditional approaches. The empirical results (in terms of *accuracy*, *sensitivity* and *false positive rate*) obtained over fourteen benchmark datasets demonstrate that the model outperforms the base learners in almost all cases. The performance of the model also claims that it can be good alternative to the specialized learners (each designed for specific disease) published in the literature. After all, the presented intelligent system is effective in undertaking medical data classification task.

Keywords: classifier; C4.5; PRISM; hybrid-model; disease-prediction; accurate