Conference abstract

Knowledge discovery from data as a framework to decision support in medical domains

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Abstract

Introduction: Knowledge discovery from data (KDD) is a multidisciplinary discipline which appeared in 1996 for "non trivial identifying of valid, novel, potentially useful, ultimately understandable patterns in data". Pre-treatment of data and post-processing is as important as the data exploitation (Data Mining) itself. Different analysis techniques can be properly combined to produce explicit knowledge from data.

Methods: Hybrid KDD methodologies combining Artificial Intelligence with Statistics and visualization have been used to identify patterns in complex medical phenomena: experts provide prior knowledge (pK); it biases the search of distinguishable groups of homogeneous objects; support-interpretation tools (CPG) assisted experts in conceptualization and labelling of discovered patterns, consistently with pK.

Results: Patterns of dependency in mental disabilities supported decision-making on legislation of the Spanish Dependency Law in Catalonia. Relationships between type of neurorehabilitation treatment and patterns of response for brain damage are assessed. Patterns of the perceived QOL along time are used in spinal cord lesion to improve social inclusion.

Conclusion: Reality is more and more complex and classical data analyses are not powerful enough to model it. New methodologies are required including multidisciplinarity and stressing on production of understandable models. Interaction with the experts is critical to generate meaningful results which can really support decision-making, particularly convenient transferring the pK to the system, as well as interpreting results in close interaction with experts. KDD is a valuable paradigm, particularly when facing very complex domains, not well understood yet, like many medical phenomena.

Keywords

knowledge discovery from data, decision support, medical domain

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1