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Using multi-relational data mining to discriminate blended therapy efficiency on patients based on log data

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Abstract

Introduction: Clinical trials of blended Internet-based treatments deliver a wealth of data from various sources, such as self-report questionnaires, diagnostic interviews, treatment platform log files and Ecological Momentary Assessments (EMA). Mining these complex data for clinically relevant patterns is a daunting task for which no definitive best method exists. In this paper, we explore the expressive power of the multi-relational Inductive Logic Programming (ILP) data mining approach, using combined trial data of the EU E-COMPARED depression trial.

Methods: We explored the capability of ILP to handle and combine (implicit) multiple relationships in the E-COMPARED data. This data set has the following features that favor ILP analysis: 1) Time reasoning is involved; 2) there is a reasonable amount of explicit useful relations to be analyzed; 3) ILP is capable of building comprehensible models that might be perceived as putative explanations by domain experts; 4) both numerical and statistical models may coexist within ILP models if necessary. In our analyses, we focused on scores of the PHQ-8 self-report questionnaire (which taps depressive symptom severity), and on EMA of mood and various other clinically relevant factors. Both measures were administered during treatment, which lasted between 9 to 16 weeks.

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