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Perceived task-difficulty recognition from log-file information for the use in adaptive intelligent tutoring systems.

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Summary: Recognising students' emotion, affect or cognition is a relatively young field and still a challenging task in the area of intelligent tutoring systems. There are several ways to use the output of these recognition tasks within the system. The approach most often mentioned in the literature is using it for giving feedback to the students. The features used for that approach can be high-level features like linguistics features which are words related to emotions or affects, taken e.g. from written or spoken inputs, or low-level features like log-file features which are created from information contained in the log-files. In this work we aim at supporting task sequencing by perceived task-difficulty recognition on low-level features easily extracted from the log-file. We analyse these features by statistical tests showing that there are statistically significant feature combinations and hence the presented features are able to describe students' perceived task-difficulty in intelligent tutoring systems. Furthermore, we apply different classification methods to the log-file features for perceived task-difficulty recognition and present a kind of higher ensemble method for improving the classification performance on the features extracted from a real data set. The presented approach outperforms classical ensemble methods and is able to improve the classification performance substantially, enabling a perceived task-difficulty recognition satisfactory enough for employing its output for components of a real system like task independent support or task sequencing.

Classification: U50 D50 F40

Keywords: adaptive intelligent tutoring systems; task sequencing; perceived task-difficulty recognition; classification; classification performance improvement; feature analysis; log-file features

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