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Applying Artificial Intelligence and Statistics to Big Data: Toward Automatic Analyses of Conversations

Abstract:

As health personnel often discuss problems, solve them, and learn accordingly, automatic analysis of such conversations can help improve them to aid problem solving and learning. Such automatic analyses must successfully traverse the obstacle course of voice transcription, complex categorization, and statistical analysis. Automated transcription creates a database for automatic categorization via computational linguistics. The automated statistical analysis integrates an artificial intelligence expert system and statistical discourse analysis (SDA) to analyze big data. SDA models (a) pivotal actions that radically change subsequent processes and (b) effects of explanatory variables at multiple levels (sequences of turns/messages, time period, individual, group, organization, etc.) on target actions. The expert system translates a theoretical model into a statistical model, tests it on the data, interprets the results, (if needed, rewrites itself to run a revised analysis), and prints a table of results. I showcase automated SDA on 321,867 words in 1,330 messages by 17 student-teachers in 13 weekly discussions.