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Tracing Chains–of–Thought Fuzzy Methods in Cognitive Diagnosis

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The development of the fuzzy set theory was prevailably motivated by the demand for adequate mathematical models of some phenomena existing in non-classical applied sciences, e. g., in human or social ones. The literature oriented to the applications of fuzzy sets published in late years is evidently increasing in accordance with the applicational motivation mentioned above. Nevertheless, the monographs on the use of fuzzy sets in cognitive diagnoses are very rare and in this sense the referred book fills up an alarming gap in the existing works.

The book is oriented to the phenomenon of the cognitive state of a person and its relation to its desired or target state. Investigating these problems the authors aim to design and develop intelligent tutoring systems which would be able to diagnose the student's problem-solving performance. The observation of the cognitive process cannot be direct but only in connection with the actions resulting from it. Mutual connection between these two areas is necessarily vague, and it can be naturally modelled by means of the fuzzy sets. The main formal tools for the methods presented in the referred book are fuzzy cognitive maps as representation of the knowledge states. The book introduces various measures and operations on fuzzy relations as formal apparatus for handling the maps.

The book is divided into 10 chapters which are grouped in 4 main sections titled *"The Search for Chains–of–Thought"*, *"On Using Fuzzy Cognitive Maps"*, *"Investigations and Applications"* and *"What Have we Learned from all These?"*. The last, fifth, section includes 6 appendices mostly devoted to special approaches or techniques related to the subject of the book.

The referred work brings undoubtedly original ideas and opens a new area of research index. Its contribution to the mathematical modelling in human and social sciences is highly qualified and perspective. Moreover, the entire book is written in a lucid and illustrative style well understandable for any reader who is familiar with elementary mathematical notations. The theoretical explanations are illustrated by well chosen examples, the formal mathematical results are heuristically discussed and interpreted.

It is possible to recommend the book to anybody who is interested in the artificial intelligence and models of human thinking and who is not afraid of a bit of well readable and illustrative mathematics.

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