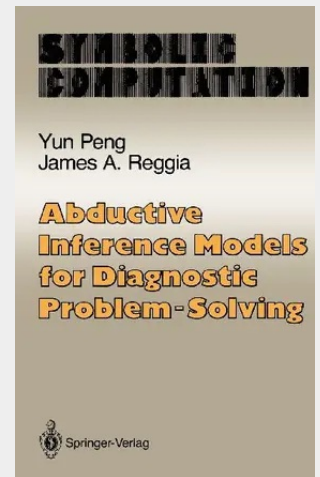


Abductive Inference Models for Diagnostic Problem-Solving

Making a diagnosis when something goes wrong with a natural or man-made system can be difficult. In many fields, such as medicine or electronics, a long training period and apprenticeship are required to become a skilled diagnostician. During this time a novice diagnostician is asked to assimilate a large amount of knowledge about the class of systems to be diagnosed. In contrast, the novice is not really taught how to reason with this knowledge in arriving at a conclusion or a diagnosis, except perhaps implicitly through case examples. This would seem to indicate that many of the essential aspects of diagnostic reasoning are a type of intuition-based, common sense reasoning. More precisely, diagnostic reasoning can be classified as a type of inference known as abductive reasoning or abduction. Abduction is defined to be a process of generating a plausible explanation for a given set of observations or facts. Although mentioned in Aristotle's work, the study of formal aspects of abduction did not really start until about a century ago.

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