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Chapter VIII

Diabetes Mellitus — Evaluating the Diagnostic Probabilities

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The article examines the behavior of the human decision-maker. It surveys research in which about 90 physicians specializing in various fields and with different degrees of seniority participated. It tackles the question of whether it is possible to found the majority of the knowledge bases of the expert systems on the Bayesian theory. We will discuss the way of decision making conforming to the probabilities evaluated according to the Bayesian theory.

The logical conclusion, therefore, is that the development of a knowledge base for an expert system founded on probabilities calculated in accordance with the Bayesian theory must be carried out in a controlled manner and depend on the parameters mentioned above.

INTRODUCTION

In light of the many studies dealing with the representation of the knowledge in the knowledge bases of expert systems, and different methods of its operation, not enough attention has been paid to the difficulties involved in the elicitation of the knowledge required from the human expert. This applies particularly to the knowledge that is not strictly factual, but is mainly based on the experience and judgment of the human expert. From studies of this subject, it has become

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clear that the limitations of the decision-maker in dealing with uncertain information hurt the accuracy, quality, reliability, and consistency of his decisions (Armoni, 1995; Fischhoff 1982; Aase et al., 1996).

Until now the expert systems were based entirely on the evaluations of the human expert. They did not give further opportunity to test them by changing the acquisition direction and crossing the results received in contrast with the direct evaluations of the human expert (Fischoff and Beyth-Marom, 1983).

The classic model of development knowledge bases is based on the location of "THE" expert, identification of his expertise and elicitation of his knowledge.

DEFINITIONS

Probability Groups Evaluated

1) A priori probability—the prevalence of event K, hereby P(K), the evidence E hereby P(E), or the positive results in the testing X, hereby P(X).
2) Posterior diagnostic probability—the probability of the existence of the event K, when given evidence E, hereby P(K/E).
3) The conditional probabilities of evidence—the probability of existence of evidence E, given the occurrence of the event K, hereby P(E/K)
4) Posterior diagnostic probabilities of the test - the probability of the occurrence of event K when given positive results of test X. hereby P(K/X).
5) Conditional probability of the test—the probability of receiving positive results in test X, when given fact of occurrence of event K. hereby P(X/K).

Objective Probability

The values of the probability for which there is agreement in the professional literature (Thomas, Watkins and Ward, 1996; Martin and Hopper, 1998; Jensen et al., 1997; Jeffrey and Lisa, 1993; Ginsberg et al., 1985).

Consistency of Estimated Probabilities

The distance between the probabilities that were elicited directly

Physicians' User Experiences of Mobile Pharmacopoeias and Evidence-Based Medical Guidelines