

## MDX AND RELATED MEDICAL DECISION-MAKING SYSTEMS

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### ABSTRACT

MDX is a medical diagnosis system, organized as a hierarchies collection of conceptual specialists, who cooperate to diagnose a case. The current domain of MDX is cholestasis, a syndrome involving the liver. MDX works in conjunction with a conceptually organized data base specialist (PATREC) and radiology consultant (RADEX).

### PROGRAM DESCRIPTION

In the last IJCAI at Tokyo, we presented an approach to knowledge organization and problem solving for diagnostic tasks, and described a prototype system called MDX based on that approach [1]. Several aspects of system design and performance were discussed in (2), and the central theoretical ideas underlying the approach are presented, and further extensions elaborated, in (3).

There are two key aspects to the methodology :

- (1) The diagnostic knowledge is decomposed into a collection of hierarchically organized conceptual specialists: the scope of the specialists varies from more general to more particular as the hierarchy is traversed from top to bottom.
- (2) The problem solving proceeds in a top-down manner; the specialists in the hierarchy establish or reject their relevance to the case at hand, and those who have established their relevance pass the control to their successors, until all relevant specialists have added their explanation of abnormal data which the knowledge in their scope can explain.

The MDX system, which is wholly diagnostic in its knowledge, communicates with two auxiliary systems, PATREC and RADEX. PATREC is a data base

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assistant in the sense it acquires the patient data, organizes them, and answers the queries of MDX concerning the patient data. In all these activities PATREC uses various types of inferential knowledge embedded in an underlying conceptual model of the domain of medical data. RADEX is a radiology consultant to MDX, and it suggests or confirms diagnostic possibilities by reasoning based on its knowledge of imaging procedures and relevant anatomy. See [4] and [5] for further details about these subsystems.

The current domain of MDX is a syndrome called cholestasis, which covers a large number of specific liver diseases. The pilot system was restricted to extra-hepatic diseases only; however, in the last several months, a large number of intrahepatic diseases have been added. The system is continually tested on a number of cases both from journals and hospital records. MDX is written in LISP, and is quite large : it runs in 120K words of DEC-20 memory, in addition to the memory requirements of the LISP system itself.

### REFERENCES

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