LOGICAL ANALYSIS IN MEDICAL DIAGNOSIS

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1. Introduction

As medical data has increased in volume the physician has had difficulty in using the data effectively. One explanation seems to be that the large volume of data makes it a formidable task for the physician to remember the interrelationships among signs, symptoms, and laboratory tests for a wide variety of diseases. Thus, it seems that studies need to be undertaken which will attempt to analyze and synthesize medical data in order to permit a reorganization of the data in a more meaningful, more manageable, and more useful form. The logical analysis procedures which I wish to discuss are presented with this objective in mind. Some of the procedures were developed quite a few years ago and have recently been reinvestigated with renewed interest because of the availability of computers. In this paper I have attempted to summarize and to place in new perspective some studies which I hope will stimulate further research on techniques that will make medical data more manageable for the physician in his efforts to maintain health and treat disease in his patients.

Research projects on logical analysis in medical diagnosis seem to be grouped in two main areas neither of which has a very distinct boundary. One area of research might be called studies on the diagnostic process and a second area has been referred to frequently as computer aided medical diagnosis. These two areas of research are complementary if research on the diagnostic process is defined as an effort to understand and to predict what the human diagnostician can accomplish, and if computer diagnosis studies are defined as attempts to construct mathematical or statistical models of medical diagnosis which will perform the most accurate job possible. The discovery of functional relationships between signs, symptoms, and diagnoses in a computer diagnosis study may give clues to better methods in human diagnosis. Similarly, greater understanding of human judgment processes involved in diagnosis may enable the investigator to produce these processes more exactly on a computer. An interesting group of papers which discusses the diagnostic process will be found in the pro-

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