

MediExpert: An Expert System based on Differential Diagnosis focusing on Educational Purposes

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Abstract

The early and accurate identification of a disease is important for its effective treatment. However, medical errors represent a serious problem and pose a threat to patient safety. To this direction, appropriate and continuous education of the medical personnel has been widely recognized as an important mean to reduce medical errors and increase the quality of the health system. In this paper, we present MediExpert, an expert system targeting on continuous education of health personnel, providing also guidelines to persons that either cannot easily move due to age related comorbidities, or because they are away from healthcare units, further recommending users to talk with their doctors. It is based on differential diagnosis, employs ontologies for effective classification of health related problems and intelligent algorithms to enhance continuous education. We present the various components of the system and we elaborate on the benefits gained when using it for education.

Keywords: Expert Systems, Differential Diagnosis, Educational Expert Systems.

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1. Introduction

Diagnosis is one of the most important tasks performed by health providers and the impact of diagnostic errors on patient safety has been highly recognized [10]. However, although quantifiable (for example in the Harvard Medical Practice Study, diagnostic errors accounted for 17% of preventable errors [6]) limited attention has been shown at improving diagnostic errors and thousands of patients die or suffer every year due to them.

To this direction, expert systems could benefit both the diagnostic procedure and the education of health providers. An expert system is a computer system that emulates the decision-making ability of a human expert. The development of such a system requires the relevant knowledge to be extracted from an expert and then to be represented in knowledge base for reasoning. Based on this knowledge, it emulates the decision-making ability of

a human expert and can aid human experts in decision making and in education.

In this paper, we present MediExpert, an expert system for enabling decision support and education on diagnosis. The final objective of MediExpert is primarily to provide remotely, preliminary medical diagnosis in remote areas, away from healthcare units mainly in rural areas, or in cases that aged people cannot easily move, further recommending users to talk with their doctors. In addition, it can be used to enhance physicians in decision support without being limited to a specific medical specialty. To this direction, students of medical schools can use it for educational purposes. The students can practice diagnosis on several hypothetical scenarios by presenting a set of symptoms and asking them to find potential diseases associated with the specific set of symptoms and vice versa. The novelty of the system lies in the fact that it can be widely deployed independently of the specific domain, it is simple to be understood and be

