Tuberculosis–Diagnostic Expert System: An architecture for translating patients information from the web for use in tuberculosis diagnosis

Abstract

Over 1.5–2 million tuberculosis deaths occur annually. Medical professionals are faced with a lot of challenges in delivering good health-care with unassisted automation in hospitals where there are several patients who need the doctor's attention.

To automate the pre-laboratory screening process against tuberculosis infection to aid diagnosis and make it fast and accessible to the public via the Internet. The expert system we have built is designed to also take care of people who do not have access to medical experts, but would want to check their medical status. A rule-based approach has been used, and unified modeling language and the client–server architecture technique were applied to model the system and to develop it as a web-based expert system for tuberculosis diagnosis. Algorithmic rules in the Tuberculosis–Diagnosis Expert System necessitate decision coverage where tuberculosis is either suspected or not suspected. The architecture consists of a rule base, knowledge base, and patient database. These units interact with the inference engine, which receives patient' data through the Internet via a user interface. We present the architecture of the Tuberculosis–Diagnosis Expert System and its implementation. We evaluated it for usability to determine the level of effectiveness, efficiency and user satisfaction. The result of the usability evaluation reveals that the system has a usability of 4.08 out of a scale of 5. This is an indication of a more-than-average system performance. Several existing expert systems have been developed for the purpose of supporting different medical diagnoses, but none is designed to translate tuberculosis patients' symptomatic data for online pre-laboratory screening. Our Tuberculosis–Diagnosis Expert System is an effective solution for the implementation of the needed web-based expert system diagnosis.