COMPUTER-AIDED MEDICAL DIAGNOSIS USING BAYESIAN CLASSIFIER - DECISION SUPPORT SYSTEM FOR MEDICAL DIAGNOSIS

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ABSTRACT

This study employs a Bayesian framework to construct a Web-based decision support system for medical diagnosis. The purpose is to help users (patients and physicians) with issues pertinent to medical diagnosis decisions and to detect diseases with highest probability through the Bayesian framework. Users could perform a more accurate diagnosis with the prior/conditional probabilities obtained from selected data sets and compute the posterior probability using the Bayes theorem. The proposed system identifies diseases by analyzing symptoms or by analyzing medical test results. Currently the system detects different types of diseases that people suffer in their day-today lives (general diseases) with an average detection accuracy of 92.59% & the data used to perform these calculations were collected over several medical centers in western province, Sri Lanka with relevant permissions from doctors and patients. System also detects complex diseases (e.g.: heart disease - 83.67%, breast cancer - 80.98%, liver disorders - 79.43%, lung cancer - 71%, primary tumor - 78%, etc.) based on the analysis of the medical test results. Data used for the category complex diseases were collected over an online source 'UCI Machine Learning Repository: Data sets'. Independency of all the possible inputs/ data/ measurements were checked mathematically by obtaining the reduced row echelon form of the data matrix as Bayes theorem requires independent measurements. The proposed system enhances the quality, accuracy and efficiency of decisions in medical diagnosis since the use of Bayesian theorem allows this system to offer more accurate platform than the conventional systems. Other than that this web-based program offers a set-of service that can engage in medical diagnosis and deliver more accurate value-added services in conjunction with CAD (Computer-Aided diagnosis) system, such as; eChat & e-Channeling. More importantly, the targeted user group will be able to access the system as a software element freely and quickly. In this way the goal of this study – which is to provide a web-based medical diagnosis system is effectively achieved.

Keywords: Bayesian framework, Medical decision support systems, Computer-aided Medical Diagnosis, probability distributions, diseases