Artificial Intelligence for Medical Diagnosis

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Abstract— Diagnosis of disease is the technique of converting observed symptom into the 6 senses of name of diseases. Essential to the effective delivery of medication by the Doctor of the Church is the complex skill. The truth is crucial for well being of his/her patients. The efficiency with which it is applied is of great important. Applying Artificial Intelligence (AI) techniques in medical subject field may help not only in improving the accuracy performance of categorisation but also in saving diagnostics' time, cost, and the annoyance accompanying pathologies' tests. This newspaper publisher introduces an organic evolution of AI techniques that have been used in medical diagnosis. Then, it introduces the author's experimentation using Machine Acquisition (ML) algorithmic rule on Thyroid Disease Datasets with and without Feature Subset Selection (FSS). The experiments' motivation is to determine the usefulness and the feasibility of FSS to decision devising under risk of infection (Medical checkup field as an example.

Key words: Artificial Intelligence (AI), Machine Learning (ML), Neural Networks, Feature Subset Selection (FSS), Medical Diagnosis, Thyroid Disease, Decision Making, MLC++, ID3, IB, Const, Naive-Bayes

I. INTRODUCTION

The development in computing device applied science has permitted the software developers and domain knowledge expert s to material body more intelligent tools for assist ing checkup practitioner in devising their determination. In medicine, the human relationship between disease and symptom is hardly ever one to one. It's inherently difficult for physician to diagnose and differentiate same symptoms for different outcomes. An intelligent system is capable of resolving real world problem using human knowledge and following human reasoning acquisition. Artificial intelligence information is to emulate human intelligence into computer technology and its potential in medicine has been expressed by many researchers. Fuzzy logic is one of the artificial intelligence proficiency. It works with doubt in knowledge that simulates human reasoning in incomplete or fuzzy data. Fuzzy logic is an important subject field of report with a wide spread of lotion in diversified theater of operations including medical checkup diagnosing. To accurately and quickly diagnose a patient, there is a critical need in employing computerized technologies to assist in diagnosis and memory access the related information. The complexity of medical Diagnosis shuffle traditional approaches of analysis inappropriate. Most medical diagnosis is full of uncertainty and imprecision. Fuzzy logic is one of the calculation techniques can render precise from what is imprecise. Fuzzy logic provides the opportunity for modeling condition that are imprecisely defined. Fuzzy techniques in the form of reasoning provide decision support and expert systems with great reasoning capabilities. This composition presents the lotion potential of artificial intelligence in medical diagnosis and fuzzy expert system developed for the diagnosis of various diseases pertaining to various human organs. An illustrative example has been presented specific to liver disease diagnosis.

II. INSPIRATION

In the field of medical diagnosis, there are numerous factors that affect the decision process thereby causing the differences in the opinions of the doctor. There are many uncertain risk, so sometimes diagnosis is hard for experts. Having so many factors to diagnose the disease of a patient makes the doctor's job difficult. So an efficient tool with great accuracy will be of a great help for an expert to consider all these risk factors and show useful results in uncertain terms. Inspired by the need of such an efficient tool, the professional form of artificial intelligence that is based on fuzzy logic for the diagnosis of the diseases.

III. SURVEY

The field of study reported on fuzzy expert scheme in checkup diagnosing covers wide spectrum including the need, importance , potential and approaches for designing of the expert arrangement for medical examination diagnosing covering s. Computer assisted applications for affected role 's diagnosis and intervention seems to be the more Recent epoch region of involvement . The Fuzzy Expert Organization has proved its usefulness significantly in the medical diagnosis for the quantitative and qualitative evaluation of medical data, consequently achieving the correctness of results. The literature survey sheds light that, the commercially available expert system shells are used to write the application specific rules. It has been found that the frameworks are developed for genesis of fuzzy expert system with respect to specific diseases, general aim diagnostic system as well as for counseling of personal health. Excogitation of expert system frameworks for medical treatment and prevention of high risks involved with the human health widened the scope for implementation of fuzzy concept in medical field. Suitability of computer arrangement using fuzzy methods and computerized monitoring and medical decision devising systems have been reported. The object oriented frameworks(OOF) to construct the FES are proposed. It has been notified that,21% reported research is devoted towards the exploitation of methodological analysis and models. The studies conducted at architectural development level International Journal of Applied Engineering Research, ISSN 0973-4562 Vol.7 No.11 (2012) © Research India

IV. FUZZY EXPERT SYSTEM

Fuzzy logic is the science of, thinking and inference that recognizes and uses the real world phenomenon – that everything is a matter of degree. Instead of assuming

everything is blackness and white (conventional logic), fuzzy logic recognizes that in reality most thing would fall somewhere in between, that is varying shades of grey. It was popularized by Lofti Zadeh (1965) an applied scientist from the University of California. It uses continuous solidification membership from 0 to 1 in line to Boolean or conventional logic which uses sharp distinctions, i.e. 0 for false and 1 for true. Medicine is essentially a continuous domain and most medical information is inherently imprecise. Fuzzy logic is a data handling methodological analysis that licence ambiguity and hence is particularly suited to medical Lotion. It gaining dominance and uses the concept of fuzziness in a computationally effective personal manner. Zadeh wrote in 1969 that: 'the most likely area of applications programmed for this theory lies in Medical checkup diagnostics and, to a lesser extent, in the verbal description of biological arrangement '. Fuzzy expert systems have the social structure of a series of 'if – then' dominion for molding the techniques of fuzzy logic have been explored in many medical applications. Schneider etal. Showed that fuzzy logic performed better than multiple logistic infantile fixation analysis in diagnosing lung cancer using tumor marker profiles. Similarly, the application of fuzzy logic has been explored in the diagnosis of acute accent leukemia, and breast and pancreatic cancer. They have also been applied to characterize ultrasound picture of the breast, ultrasound and CT scan images of liver wound and Magnetic resonance imaging images of brain tumors. Fuzzy logic has also been used to predict survival in patients with breast cancer. Fuzzy controllers have been designed for the governance of vasodilators to control blood insistence in the peri-intelligence officer point.

V. Evolutionary Computation

Evolutionary computation is the general term for several computational proficiency based on cancel evolution operation that imitates the chemical mechanism of natural choice and survival of the fittest in solving real-world trouble. The most widely used form of evolutionary computation for medical checkup exam applications are 'Genetic Algorithmic program '.Proposed by John Holland (1975), they are a family of stochastic search and optimization algorithmic program based on natural biological evolution. They work by creating many random solutions to the problem at bridge player. This population of many solutions will then evolve from one generation to the next, ultimately arriving at a satisfactory solution to the problem. The best solutions are added to the population while the inferior ones are eliminated. By repeating this process among the better element, repeated improvements will occur in the population, survive and generate new solutions. Most medical determination can be formulated as a search in a very large and building complex space. For example: a cytologist analyzing a cytological specimen to decide whether they are malignant or not, is searching in the space of all possible cell features for a set of features Permitting him to provide a clear diagnosing . Genetic algorithms exploit the mechanism of natural evolution to search efficiently in a given space. They are applied to perform several type of undertaking like diagnosis and ARTIFICIAL INTELLIGENCE IN MEDICINE RAMESH Ann R Coll Surg Engl 2004; 86 Public figure 2 A typical fuzzy rule system. Prognosis, medical imaging and signal processing, and plan and scheduling. The principles of Genetic algorithms have been used to predict outcome in critically ill patient role, lung Cancer the Crab, melanoma and response to warfare. They have also been used in computerized psychoanalysis of mammographic micro calcification, MRI partitioning of brain neoplasm to measure the efficacy of treatment strategies and for analyzing computerized 2-D images to diagnose malignant melanomas.

VI. Conclusion

There are many different AI techniques available which are capable of solving a variety of clinical problems. However, in spite of earlier optimism, medical AI technology has not been embraced with enthusiasm. One reason for this is the attitude of the clinicians towards technology being used in the decision-making process. Paradoxically, there is no qualm in accepting the biochemical results generated from an auto-analyzer or images produced by magnetic resonance imaging. However, it is the obligation of researchers active in this field to produce evidence that these techniques work on a practical level. The need to undertake more randomized controlled studies to prove the efficacy of AI systems in medicine is, therefore, vital. There is compelling evidence that medical AI can play a vital role in assisting the clinician to deliver health care efficiently in the 21st century. There is little doubt that these techniques will serve to enhance and complement the 'medical intelligence' of the future clinician.

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