



Analysis of Medical Expert system on Human Life

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Abstract: Expert system has being one of the leading trends in technology especially in the aspect of making a computer think like human. Expert system has been used in several areas to achieve a particular or certain objective. Expert system usage is what everybody who is technologically inclined like to use especially in medical aspect. There has been a lot of expert system in medicine especially INTERNIST, MYCIN, and CADUECUES. All have their own ways of contribution to medicine. But living this system freely to be used by people will causes an enormous danger to the community. Although it has its own benefit, this research looks thoroughly into the way in which expert system should be deployed into medicine without posing danger to the community. This research was carried out by contacting many doctors and other medical practioners from two basic federal hospitals in Nigeria (UCH, Ibadan and FMC, Idiaba-Abeokuta). Series of questions were asked and questionnaire was employed as a tool to derived meaningful data which was then synchronized using SPSS for proper analysis.

Keywords: MES (Medical Expert System), Expert System, Mycin, Mycin Effect, Medical Effect.

I. INTRODUCTION

The advent of expert system especially for human treatment started a long time ago during the age of MYCIN and CADUCEUS. Expert system is that kind of a system which emulates the decision ability in human and can decide on its own the best possible answer to a real life situation. This form of abstraction looks dangerous to human health especially by allowing everybody to be able to diagnose themselves (i.e self-medication) through the use of these expert systems. However, it has been raised by so many users/patients that they need to have a system that will attend to them in position of a doctor or medical expert. Also, the government tries to protect her citizens by not allowing them to use this kind of expert especially to treat themselves. The government sees this as an innovation which may bring bad effects to his people thereby instructing the medical bodies not to allow anything of such (Medical expert). However, the usefulness of expert system is not something that can be erased in medical field due to some certain features. Expert system in medicine relief doctors of their work and help them in having the capacity of attending to much important things. Hence, this research focuses on how expert system can fit into any condition without posing danger to the community.

Meanwhile the advantages of medical expert system to human include:

- Giving assistance to people with critical conditions in which their location is far from the hospital.
- Relieving doctors from being over stressed in attending to large patients number
- Reducing the cost rate in term of hospital bills payment
- Enhancing real time diagnosis of patients.

Then some of the effect of employing medical expert system in human may include;

- Wrongly usage of the system by people who are not good with the use of computer.
- Design and developmental error from/by both system designer and programmer.
- Abused if the system is being handled by evil person
- Lead to self-medication which is bad generally on patients health

- Language issues which make the system limited to some particular or major trait.

II. LITERATURE REVIEW

An expert system is a computer program that reasons using knowledge to solve the complex problems [1]. This system exhibits within a specific domain a degree of expertise in problem solving that is comparable to that of a human expert [2]. Expert system also emulates the behavior of a human expert within a well-defined narrow domain of knowledge [3]. There by offering Expert systems offer the possibility of storing and reviving human expertise in a more flexible and adaptable way than the traditional software, using a declarative programming style in which data and prescripts for manipulating the data are gathered in one base [4].

Expert systems consist of two principle parts: the knowledge base and reasoning mechanism (inference engine). The knowledge base part contains both factual and heuristic knowledge: the factual knowledge contains the facts about the domain collected from expert whereas the heuristic knowledge is experiential knowledge, the rule-of-thumb and the knowledge about good judgment [1]. To use the knowledge in the knowledge base effectively and efficiently for solving the problem, proper representation and organization of knowledge is essential. To ascertain this however, human knowledge is represented as if –then rules.

However, DENDRAL was the first expert system developed to interpret the mass spectrum of organic molecules [5]. The earliest and the most successful rule-based expert system was MYCIN, which incorporated about 400 heuristic rules like IF-THEN to diagnose and treat infectious blood disease. After MYCIN, many expert systems are developed [6] among which are CADUECUES and INTERNIST.

III. METHODOLOGICAL CONCEPT

Due to many constraints in the problem identified, a later decision came on getting adequate response from the doctors. Doctors are the only people that can give analysis about what to do and not to do in this case. Important information/questions was gotten from the doctors through the use of questionnaires in order to get their opinions. All the opinions gathered were used for statistical analysis to show the final result and conclusion. This

questionnaire was distributed to two main federal hospitals in Nigeria, West Africa. The two major hospitals that were used are: UCH (University College Hospital), Ibadan. And FMC (Federal Medical Center) Idiaba, Abeokuta.

IV. DATA ANALYSIS

After the data has been collated, it was analyzed using two basic graphs through the use of Microsoft Excel. This graph gives the actual description of what happened during the information gathering, process and from the analysis; the conclusion about the use of expert system was drawn. The analysis was done based on

the way doctors are conversant with the use of computers and third/new age technologies. Generally, 100 questionnaires were distributed to doctors, and the analysis is categorized as below.

The table below shows the analysis done on the doctors based on the way they are willing to make the system (Table I) available to doctors and patients. Three main cases were considered and what actually happened in each case is tabulated below. The cases denote the doctors who are technologically sound, and also who support/do not support the availability of the expert system to the doctors, in conjunction with the availability of the expert system to the ordinary users/patients.

Table I. Doctors Analysis on support/non support on expert system availability

Technological Ability	Case1 Good		Case2 Average		Case 3 Poor	
	Doctors Usage	Patients Usage	Doctors Usage	Patients Usage	Doctors Usage	Patients Usage
	53		31		16	
Support	42	2	19	3	5	0
Non-support	11	51	12	28	11	16

A. Analysis in Percentage

The percentage was drawn from technological ability of the doctors multiply by 100.

Table II. Doctors Analysis on support/non support on expert system availability in percentage

Technological Ability	Case1 Good		Case2 Average		Case 3 Poor	
	Doctors Usage	Patients Usage	Doctors Usage	Patients Usage	Doctors Usage	Patients Usage
	53		31		16	
Support	79.2	3.8	61.3	9.7	31.2	0
Non-support	20.8	96.2	38.7	90.3	68.8	100

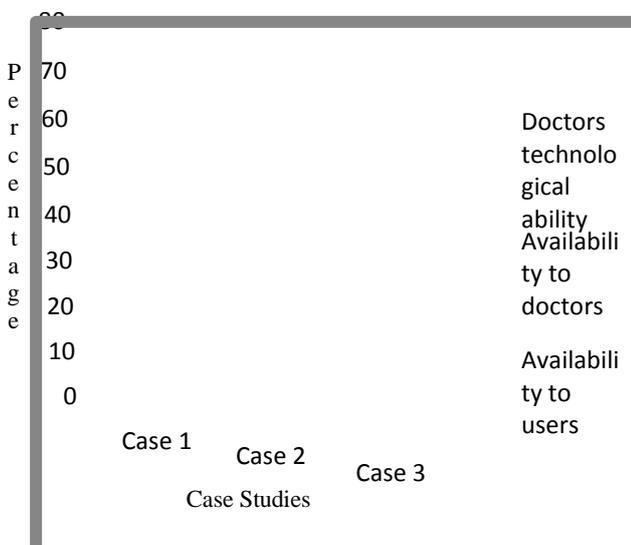


Figure 1. Doctors Analysis on support of the availability of the system to doctors and patients.

them support the idea of making the system available to the doctors and 3.8% of them gave the idea of releasing the system to the public. Also, in case 2 out of the 31% of the doctors who are averagely ok with the use of technologically, 61.3% of them support the idea of making the system available to the doctors and 9.7% of them also gave the idea of releasing the system to the public. Finally, out of the 16% (case 3, Table II) of the doctors who are poor in the use of the system technologically, 31.2% of them support the idea of making the system available to the doctors and non of them gave the idea of releasing the system to the public.

From the below figure (figure 2), likewise, 53% of the doctors are good technologically, 31% are averagely ok, and 16% are poor in technology usage. Out of the 53% (case 1, Table II) of the doctors who are good technologically, 20.8% of them do not support the idea of making the system available to the doctors and 96.2% of them gave the idea of not releasing the system to the public. Also, out of the 31% (case 2, Table II) of the doctors who are averagely ok with the use of technologically, 38.7% of them do not support the idea of making the system available to the doctors and 90.3% of them also deny the idea of releasing the system to the public. Finally, out of the 16% (case 3, Table II) of the doctors who are poor in the use of technologically, 68.8% of them do not support the idea of making the system available to the doctors and 100% of them also deny the idea of releasing the system to the public.

From the above diagram (figure 1), 53% of the doctors are good technologically, 31% are averagely ok in the use of the technology, and the remaining 16% are poor in technology usage. Out of the 53% of the doctors who are good technologically, 79.2% of

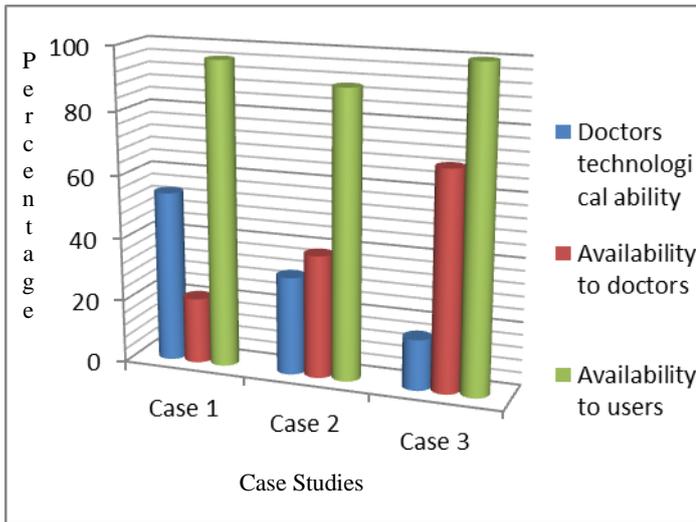


Figure 2. Doctors Analysis on non-support of the availability of the system to doctors and patients.

V. CONCLUSION

From the above analysis, the output shows that doctors are not in support of making expert system available for the users/patients but rather prefer the expert system to be used by them. Due to other

collected fact, it was noted that doctors really need help in the aspect of attending to a large amount of patients through the use expert system technology. Hence, instead of making the help to the patients to relief the doctors, it is best and ideal to make that same help and direct it toward the doctors.

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