

ASSOSA UNIVERSITY



COLLEGE OF INFORMATICS AND COMPUTING
DEPARTMENT OF COMPUTER SCIENCE
GROUP PROJECT ON MEDICAL DIAGNOSIS SYSTEM
ON
TYPHIOD CONSULTING AND TREATING

Prepared by: group 5

NAME:-

Bulche Abdi

Agerie wudu

Abebew Atnafu

Abadi Aberha

Hail Tiruhe

Ademe meumede

Submitted to instructor: Getneh.B

Submitted date Dec 24/2016

Contents

Abstract	iv
Chapter one	1
1 Introduction.....	1
1.1 Statement of the problem	2
1.2 Objectives of the study.....	2
1.2.1 General objective	2
1.2.2 Specific objectives	2
1.3 Significance of study.....	3
1.4 Scope of the study	3
1.5 Limitations of the study	4
1.6 Literature review	4
1.6.1 Knowledge-based system approach	4
1.6.2. Structure of knowledge-based system.....	4
1.6.3. Types of knowledge based systems	5
1.6. 4.Symptoms of typhoid.....	6
1.6.5.How to transmit typhoid	6
1.6.6. What is the prevention of typhoid.....	6
1.6.7. What is the treatment for typhoid?.....	7
1.7. Methodology of data gathering	7
1.7.1 Primary source:	7
1.7.2 Secondary source:	8
1.8 Method of system development	8
1.9 Project development tool	8
1.10 Knowledge acquisition method.....	8
1.11 Knowledge modeling	9
1.12 Knowledge representation	10
1.13. Findings and implementation.....	11
1.14 Conclusion	12

1.15 Recommendation	12
References.....	13

LISTE OF FIGURE

Figure1. 1 Structure of Knowledge-Based System.....	5
Figure1. 2 Decision tree for level I case	10

ABSTRACT

Expert system on Typhoid Diagnosis, is a software system tailored for use in the diagnosis of typhoid diseases. The software is an expert system with a database containing an expert knowledge. The user only uses it to determine whether he or she has any of the diseases within its domain. The software has been designed to be interactive with audio capability eliciting from the user if they have symptoms of the diseases. The user response helps the expert system to determine the level at which the disease is present. The user is further advised on what next to do. This software is prolog programming environment, Health care facility should be accessible by all at all time. But some of the people that should access these facilities are far removed from these facilities. It would be of great necessity to provide a computerized system that will provide a complementary medical service, such as medical disease diagnosis in places where accessibility is a problem as well as health care facilities where qualified experts are lacking, hence this topic, Expert System on typhoid fever Diagnose.

CHAPTER ONE

1 INTRODUCTION

Medical diagnosis, (often simply termed diagnosis) refers both to the process of attempting to determine or identifying a possible disease or disorder to the opinion reached by this process. A diagnosis in the sense of diagnostic procedure can be regarded as an attempt at classifying an individual's health condition into separate and distinct categories that allow medical decisions about treatment and prognosis to be made. Subsequently, a diagnostic opinion is often described in terms of a disease or other conditions.

In the medical diagnostic system procedures, elucidation of the etiology of the disease or conditions of interest, that is, what caused the disease or condition and its origin is not entirely necessary. Such elucidation can be useful to optimize treatment, further specify the prognosis or prevent recurrence of the disease or condition in the future.

Computer-Aided Diagnosis (CAD), defined as a diagnosis made by a physician who uses the output from a computerized analysis of medical data as a second opinion in detecting lesions, assessing disease severity, and making diagnostic decisions, is expected to enhance the diagnostic capabilities of physicians and reduce the time required for accurate diagnosis. With CAD, the final diagnosis is made by the physician.

The first CAD systems were developed in the early 1950s and were based on production rules (Shortliffe, 1976) and decision frames (Engelmore & Morgan, 1988). More complex systems were later developed, including blackboard systems (Engelmore & Morgan, 1988) to extract a decision, Bayes models (Spiegelhalter, Myles, Jones, & Abrams, 1999) and artificial neural networks (ANNs) (Haykin, 1999). Recently, a number of CAD systems have been implemented to address a number of diagnostic problems. CAD systems are usually based on bio signals, including the electrocardiogram (ECG), electroencephalogram (EEG), and so on or medical images from a number of modalities, including radiography, computed tomography, magnetic resonance imaging, ultrasound imaging, and so on.

1.1 STATEMENT OF THE PROBLEM

Disease diagnosis and treatment constitute the major work of physicians. Some of the time, diagnosis is wrongly done leading to error in drug prescription and further complications in the patient's health. It has also been noticed that much time is spent in physical examination and interview of patients before treatment commences. The clinical decision support system (CDSS) shall address these problems by effectively providing quality diagnosis in real-time.

As we know the disease is impact on one country development, and in many purpose the disease is affect human being, after the disease is affect our body how to diagnosis or before the disease affect our body how to stop it is the question.






Now a day in our country many problem is there specially at the health center, no enough health center, not enough doctor or nurse because of these clinical decision support system(CDSS) is very necessary to help people.

1.2 OBJECTIVES OF THE STUDY

1.2.1 General objective

The general objective for this project is to develop on expert system diagnosis on typhoid diseases.

1.2.2 Specific objectives

-  To acquire the required knowledge from the human expert, document and observation.
-  Analyzing modeling and representing the knowledge in suitable way for knowledge based expert system implementation.
-  To Design and implementing the prototype of the system.
-  Testing the performance of the designed expert system.
-  Deploy the proposed expert system.

1.3 SIGNIFICANCE OF STUDY

Advances in the areas of computer science and artificial intelligence have allowed for development of computer systems that support clinical diagnostic or therapeutic decisions based on individualized patient data. Clinical decision support (CDS) systems aim to codify and strategically manage biomedical knowledge to handle challenges in clinical practice using mathematical modeling tools, medical data processing techniques and artificial intelligence (A.I.) methods.

Its significance is also seen in its ability to:

- ✚ Provide diagnostic support and model the possibility of occurrence of various diseases or the efficiency of alternative therapeutic schemes.
- ✚ Reduce the potential for harmful drug interactions, prescription errors and adverse drug reactions.
- ✚ Enable clinicians report adverse drug reactions to the relevant authorities.
- ✚ Promote better patient care by enhancing collaboration between physicians and pharmacists.

1.4 SCOPE OF THE STUDY

Due to the fact that it is difficult to develop an expert system for diagnosing all diseases at a time, financial and time constraints, this research is limited to medical diagnosis and treatment for typhoid fever.

The therapy covers severe and uncomplicated cases of the treatment of extreme or severe associated cases in patients such as cerebral malaria which causes insanity, blindness, asthma, tuberculosis and so on.

The study will also involve method(s) of diagnosis especially the patient history, physical examination and request for clinical laboratory test but will not go into how these tests are carried out. Rather, it will only make use of the laboratory and treatment.

1.5 LIMITATIONS OF THE STUDY

In the course of this study, a major constraint experienced was that of time factor and insufficient finance. Others include the inevitability of human error and bias as some information were obtained via interpersonal interactions, interviews and research, making some inconsistent with existing realities or out rightly incorrect.

Great pains were however taken to ensure that these limitations are at their very minimum and less impactful on the outcome of the work.

1.6 LITERATURE REVIEW

1.6.1 Knowledge-Based System approach

A Knowledge-Based System (KBS) has interdisciplinary approach of various disciplines like computer science, cognitive science, hardware field etc. The society and industry are becoming knowledge-oriented and rely on different experts' decision-making abilities depending on the information available. When expertise is unavailable, a KBS can act as an expert on demand to save time. KBS can save money by leveraging expert, allowing users to function at higher level and promoting consistency

1.6.2. Structure of Knowledge-Based System

The overall process structure of KBS for medical diagnosis. The basic components of the system are the knowledgebase, inference engine, and a workspace. The knowledge base of the system plays a key role in the procedure of decision-making by efficiently storing the domain knowledge and patients history. Temporary results can be stored in workspace. The inference engine is a program, which infers the knowledge available in the knowledge base.

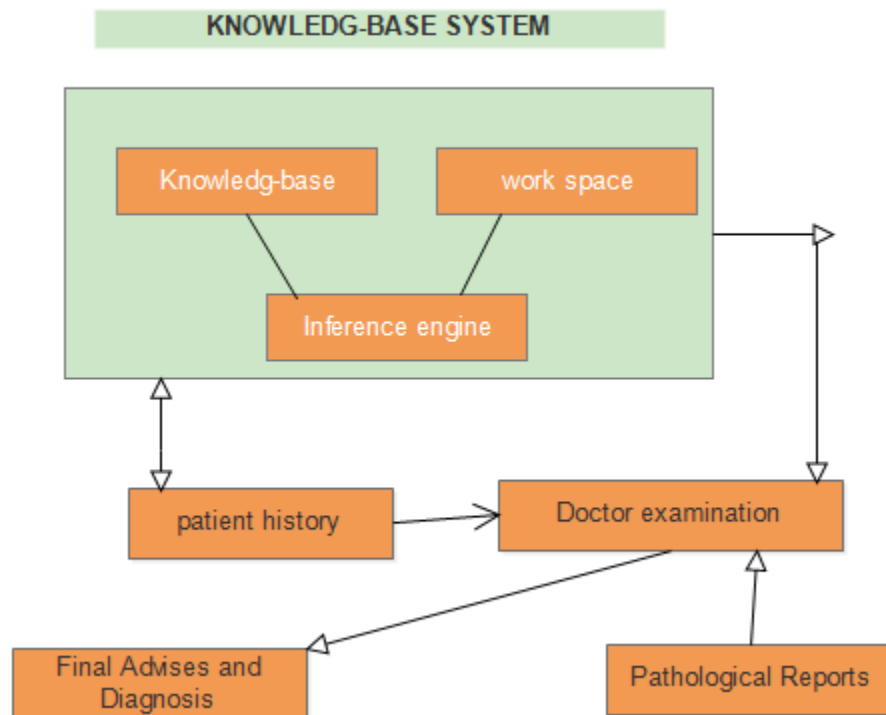


Figure1. 1 Structure of Knowledge-Based System

1.6.3. Types of Knowledge Based Systems

1.6.3.1 Fuzzy Logic Rule Based

Fuzzy logic is one of the artificial intelligence techniques. It deals with uncertainty in knowledge that simulates human reasoning in incomplete or fuzzy data. Fuzzy logic has become an important field of study with a wide spread of applications in diversified fields including medical diagnosis. To quickly and accurately diagnose a patient, there is a critical need in employing computerized technologies to assist in diagnosis and access the related information. The complexity of medical practice makes traditional approaches of analysis inappropriate. Most medical diagnosis is full of uncertainty and imprecision. Fuzzy logic which is one of the soft computing techniques can render precise from what is imprecise. Fuzzy logic provides the opportunity for modeling conditions that are imprecisely defined. Fuzzy techniques in the form of approximate reasoning provide decision support and expert systems with powerful reasoning

capabilities. This paper presents the application potential of artificial intelligence in medical diagnosis and fuzzy expert system developed for the diagnosis of various diseases pertaining to various human organs.

1.6. 4.Symptoms of typhoid

Symptoms normally begin 6-30 days after exposure to the bacteria. The two major symptoms of typhoid are fever and rash. Typhoid fever is particularly high, gradually increasing over several days up to 104 degrees Fahrenheit.

The rash, which does not affect every patient, consists of rose-colored spots, particularly on the neck and abdomen.

Other symptoms can include weakness, abdominal pain, constipation, and headaches; rarely, symptoms might include confusion, diarrhea, and vomiting (but not normally severe).

1.6.5. How to transmit typhoid

The bacterium that causes typhoid fever may be spread through poor hygiene habits and public sanitation conditions, contaminated food and water, direct contact with infected person and sometimes also by flying insects feeding on feces. Public education campaigns encouraging people to wash their hands after defecating and before handling food are an important component in controlling spread of the disease. According to statistics from the United States Centers for Disease Control and Prevention (CDC), the chlorination of drinking water has led to dramatic decreases in the transmission of typhoid fever.

1.6.6. What is the prevention of typhoid

The public health goals that can help prevent and control typhoid — safe drinking water, improved sanitation and adequate medical care — may be difficult to achieve.

- **Wash your hands.** Frequent hand-washing in hot, soapy water is the best way to control infection. Wash before eating or preparing food and after using the toilet. Carry an alcohol-based hand sanitizer for times when water isn't available.
- **Safe drinking water.** Contaminated drinking water is a particular problem in areas where typhoid fever is endemic. For that reason, drink only bottled water or canned or bottled

carbonated beverages, wine and beer. Carbonated bottled water is safer than un carbonated bottled water is.

- **Avoid handling food.** Avoid preparing food for others until your doctor says you're no longer contagious. If you work in the food service industry or a health care facility, you won't be allowed to return to work until tests show that you're no longer shedding typhoid bacteria.

1.6.7. What is the treatment for typhoid?

The only effective treatment for typhoid is antibiotics. The most commonly used are ciprofloxacin (for non-pregnant adults) and ceftriaxone. Other than antibiotics, it is sensible to rehydrate by drinking adequate water, chloramphenicol, trimethoprim-sulfamethoxazole
ceftriaxone:- used only to treat or prevent infections that are proven or strongly suspected to be caused by bacteria.

Chloramphenicol:-is an antibiotic. It works by killing or slowing the growth of sensitive bacteria.

Amoxicillin:-They keep unwanted substances from entering their cells and stop the contents of their cells from leaking out. Amoxicillin impairs the bonds that hold the bacterial cell wall together. This allows holes to appear in the cell walls and kills the bacteria.

1.7. METHDOLOGY OF DATA GATHERING

During the research work, data collection was carried out in many places. In gathering and collecting necessary data and information needed for system analysis, two major fact-finding techniques were used in this work and they are:

- a. Primary source
- b. Secondary source

1.7.1 Primary source:

Primary source refers to the sources of collecting original data in which the researcher made use of empirical approach such as personal interview.

This involved series of orally conducted interviews with select clinicians in public and private healthcare practice on the diagnostic procedures they adopt. Also, some patients were interviewed with a view to getting information about their opinion on how medical diagnoses affected them.

1.7.2 Secondary Source:

Perusals through online journals and e-books as well as visits to relevant websites, medical dictionaries and other research materials increased my knowledge and aided my comprehension of diagnostic processes.

1.8 Method of system development

Prototyping is preferred from other methods, because it is a common way of developing an expert system and it enables better management of the system in times of implementation. The rule-based knowledge representation method is employed. Because;

1. It makes decision based on the knowledge base stored.
2. It is easy to understand and also communicable because its communication is using natural language processing

1. 9 Project Development Tool

Prolog is used for developing the expert system. Prolog has debugging tool that used to code the facts and rules that is necessary for our project. Moreover, the code is readable and easier to update and maintain

1.10 KNOWLEDGE ACQUISITION METHOD

Acquiring expert knowledge is a crucial component of knowledge engineering. This phase is difficult and time consuming. It is the process of gathering the relevant information about a domain, usually from an expert. A number of knowledge

acquisition techniques have been developed. Knowledge acquisition involves the acquisition of knowledge from human experts, books, documents, sensors or computer files. The knowledge may be specific to the problem domain and the problem solving procedures, or it may be general knowledge. The process of seeking out the knowledge required by an expert system is referred to as knowledge acquisition. Therefore, In order to develop the diagnosis of typhoid diseases expert system knowledge acquisition process of this project work is based on domain expert interviewing of and reviewing of related documents.

1.11 KNOWLEDGE MODELING

- In order to model the knowledge of the domain area decision tree is used. Decision tree is structure that can be used to divide up a large collection of records into successively smaller sets of records by applying a sequence of simple decision rules.

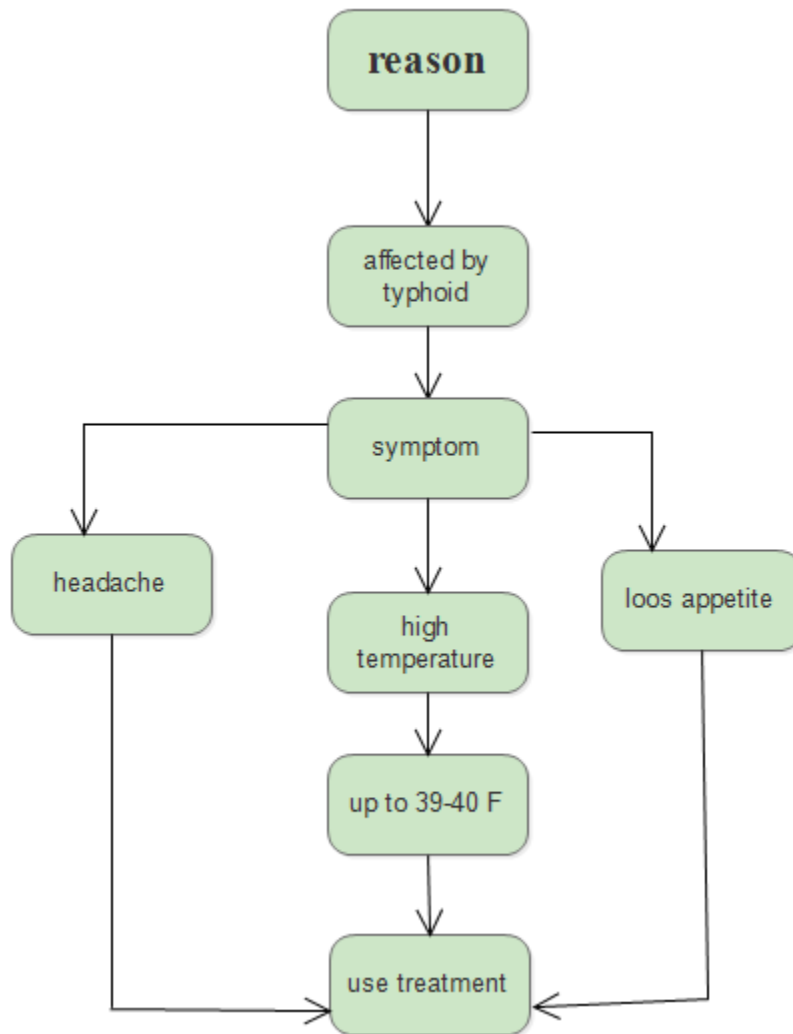


Figure1. 2 Decision tree for level I case

1.12 KNOWLEDGE REPRESENTATION

Knowledge representation is the systematic means of encoding knowledge of human expert in an appropriate medium.

Knowledge can be represented as:

- Predicate calculus or formal logic
- Business applications in the form of production rules

- Semantic network, which organize knowledge through nodes in a graph rather than data structure and represent relationships between the facts by links between the nodes, and
- Frames or structured objects that use data structures to store all structural knowledge of a specific object in one place.

Rule 1 if the infections caused by bacteria then treated by ceftriaxone.

Rule 2 if the person is less than two month age then not tack chloramphenicol.

Rule 3 if unwanted substances entering to their cells then tack amoxicillin.

1.13. FINDINGS AND IMPLEMENTATION

When the user runs the system initially it looks like:-

```
1 ?- start.
*****
                        WELL COME TO TYPHIOD CONSULTING AND TREATING !!!
*****
=====
***if you know the symptom of typhoid it have also cause and solution for typhoid ***
*** 1 cause for typhoid ***
*** 2 Symptom for typhoid ***
*** 3 Transmision for typhoid ***
*** 4 Treatment for typhoid ***
*** 5 prevention of typhoid ***
*** 6 Test typhoid ***
*** 7 To close the system ***
***
*****
Select your chooice from Menu 1-5
|: 1
*****
WELL COME TO CAUSE OF TYPHOID PAGE
=====
1 drinking untreated water
2 by the bacteria salmonella typhimurium
3 eating at street food stand
4 not wash your hand
5 public sanitation condition
=====
*****
Select your chooice from sub Menu 1-5 to view...
|: 3
food that stored or served at room temperature cool and althougny there guarantee that meals served at the finest restaurants are not safe.
handling food increasing the risk of typodie.steaming cool food are very bade.
*****
Do you went to contenu ? y/n
|: y.
*****
Select your chooice from Menu 1-5
|: █
```


1.14 Conclusion

The major challenge for such counseling services becomes satisfactory is shortage of skilled health professionals, the number of typhoid patients and health professionals are disproportionate too. Generally, the applicability of knowledge based system is proved as useful approach for preventing and treating typhoid patients properly, and preventing others by giving essential information about typhoid.

1.15 RECOMMENDATION

The study achieves its objectives by demonstrating the applicability of rule based system by developing a knowledge based system that can advise and assist typhoid. This study is the promising study for further research works to fully implement the knowledge based system in the domain area. As a result, the following recommendations are given based on the observed opportunities and uncover areas by this study.

- Counseling typhoid patients is somewhat complex when compared to other disease. Therefore, further investigation should be done to integrate an intelligent agent that has the capability to perform physical examination and observation of facial expressions of a patient.
- To enhance the performance of the prototype knowledge based systems, the hybrid strategy approaches should be investigated which combines case-based reasoning..

REFERENCES

1. Autonomy, I. (2009). *Autonomy Technology Overview*. U.S.A: Macmillan Press.
2. Bassingthwaite, J. B. (2000). —Strategies for the physical project. *Ann Biomed Eng* 28(8): 1043-1058 Biomed
3. Berner, E. S. (2007). *Clinical decision support systems: Theory and Practice*. New York: Springer Inc.
4. Bohanec, M., Zupan, B., & Rajkovič, V. (2000). Applications of qualitative multi-attribute decision models in health care. *Int J Med Inform*, 58-59, (2000) 191 – 205.
5. Burke, J. P., & Classen, D. C. (1991). "The HELP system and its application to infection control." *J Hosp Infect* 18 Suppl A: 424-431.