SEARCHING SYSTEM OF WATER BORNE DISEASES BY USING HEURISTICS METHOD

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Abstract

This paper studies Searching Methods. Among the searching methods, this system emphasized the hill climbing. Hill climbing tries to expand the node closet to the goal; it evaluates nodes by using heuristics method. This system will find the efficient data about water borne diseases with the searching methods. Knowledge Base is built by collecting the name of the diseases symptoms, prevention and treatment of water borne diseases. Among the knowledge base, heuristic is used for searching data. A user can learn Knowledge Base and Expert System. A user can learn about Water Borne Diseases at the same place and time. This paper provided prevention, treatment and diseases of Water Borne Diseases

1. Introduction

Today, almost everyone knows that computer can do fantastic things, and widely used in several factors, such as hospitals, offices, business, universities and others. In hospitals, medical instruments are connected with computer and can easily know the kinds of diseases. Moreover, expert system can be used in several cases. This system is intended to develop the Searching System of Water Borne Diseases. There are many kinds of water borne disease.

The disease has symptoms, prevention, treatment and causes. So this paper intends to develop the Water Borne Diseases System by searching symptoms. When a user chooses the symptoms, the relative diseases name, causes, prevention, and treatment are shown.

This paper is structured as follow. It starts with presenting related work in section 2. Section 3, describes system flow of the system and discusses Water Borne Disease in section 4. Finally, section 5 shows experimental result of system and section 6 shows conclusion of this paper.

2. Related work

Informed search is the one that uses problem-specific knowledge beyond the problem definition. It can finds solution more efficiently than the uninformed search. The informed search methods include best-first search, dept-first search, A* search and Simplified memory bounded search (SMA*) search etc [2].

The expert systems and applied artificial intelligence and modern system analysis and design are shown [3] [7] [8].

3. Expert System

This process is implemented as an Expert System. Expert systems are computerized advisory programs that attempt to imitate the reasoning process and knowledge of experts in solving specific types of problems. Expert systems are of great interest to organizations because of their potential to enhance productivity and to augment work forces in many specialty areas where human expert are becoming increasingly difficult to find and retain.

Human experts tend to specialize in relatively narrow problem-solving areas or tasks.

3.1 Knowledge Base

Building the knowledge base of Water Borne Diseases means acquiring knowledge from doctors and/or document sources and representing this knowledge in an appropriate form in the computer.

One the knowledge has been acquired from the expert; it has to be formatted into the knowledge base. Here want to describe the process of organizing that knowledge in such a way that it can be understood and then translated into rules or another form of knowledge representation.

A knowledge base is a special kind of database for knowledge management, providing the means for the computerized collection, organization, and retrieval of knowledge.

Knowledge bases are categorized into two major types:

Machine-readable knowledge bases store knowledge in a computer-readable form, usually for the purpose of having automated deductive reasoning applied to them. They contain a set of data such as causes, prevention, treatment and symptom, often in the form of rules that describe the knowledge in a logically consistent manner. An ontology can define the structure of stored data - what types of entities are recorded and what their relationships are. Logical operators, such as and (conjunction), or (disjunction), material implication and negation may be used to build it up from simpler pieces of information. Consequently, classical deduction can be used to reason about the knowledge in the knowledge base. Some machine-readable knowledge bases are used with artificial intelligence.

Human-readable knowledge bases are designed to allow people to retrieve and use the knowledge they contain. They are commonly used to complement a help desk or for sharing information among employees within an organization. They might store troubleshooting information, articles, white papers, user manuals, or answers to frequently asked questions. Typically, a search engine is used to locate information in the system, or users may browse through a classification scheme.

There are several steps in building the knowledge base:

- Define the potential solutions
- Define the input facts
- Develop an outline
- Draw a decision tree
- Map a matrix
- Develop the software

3.2. Search Approaches

Many approaches and strategies are used to search for an appropriate solution to problems. Formal approaches can be classified into three categories: optimization, blind search, and use of heuristics.

1. Optimization: Optimization attempts to find the best possible solution by using mathematical formulas that model specific situation. The optimization is conducted by using either a one-step formula or an algorithm.

2. Blind Search: In conducting a search, a description of a desired solution is given. This is calling a goal, a goal can be to identify the best location for a plant or to approve or disapprove a request for a loan. Two types of blind search exist. In complete (exhaustive) enumeration all alternatives are considered; therefore an optimal solution is discovered. In incomplete (partial) search, the search continues until a good enough solution is found.

3. Heuristic Search: For many applications, it is possible to find specific information to guide the search process and thus reduce the amount of computation. This is called heuristic search methods. Heuristics are decision rules regarding how a problem should be solved. Heuristics are developed on a basis of solid, rigorous analysis of the problem and sometimes involve designed experimentation. Heuristics problem solving is the implementation of heuristics in problem-solving or in decision-making situations. Problem solving based on heuristics is a very old practice in comparison to science based on reason. Heuristics search is much faster and cheaper than a blind search. The results are considered good enough, and in the case of quantitative analysis they are very close to optimal solutions.

There are many search approaches. They are

- Bean Search
- Best first search
- Breadth first search
- Depth first search
- Depth limited search
- Hill climbing
- Iterative deepening depth first search
- Lexicographic breadth first search
- Uniform cost search

Optimization can be searched by transforming formula.

Blind search can be searched by after knowing the answer.

Heuristic searches depending on the giving facts. So, heuristic is the most suitable for the paper. The name of the diseases can be search by giving disease symptoms of water borne diseases. In turn, the symptoms treatment and prevention of water borne diseases can be searched.

3.2.1 Heuristics. Heuristic (rules of thumb) are included as a key element of Artificial Intelligence. Artificial Intelligence is the branch of computer science that deals with ways of representing knowledge using symbols rather than numbers and with rules-of-thumb, or heuristics, method for processing information" People frequently use heuristics to make decisions. By using heuristics one does not have to rethink completely what to do every time a similar problem is encountered.

3.2.1.1 Heuristic Search methods Generate and Test Algorithm. Generate a possible solution of this paper can be name of the Water Borne Diseases by

giving symptoms. Test to see if this possible solution is a real solution by comparing the state reached with the set of goal states.

Heuristic search method is basically a breath first search as complete solutions must be created before testing. A heuristic is needed to sharpen up the search. There are many symptoms of Water Borne Diseases. The user chooses the symptoms that have given symptoms which are listed as multiple choices. The system takes the symptoms chosen by the user as the fact, and then finds the name of the disease as its goal. There are many possible solutions of the user's input

3.2.1.2. Hill Climbing. Hill climbing is a technique for certain classes of optimization problems. The idea is to start with a sub-optimal solution to a problem (i.e., start at the base of a hill) and then repeatedly improve the solution (walk up the hill) until some condition is maximized (the top of the hill) Hill climbing can be used to solve problems that have many solutions, some of which are better than others. It starts with a random (potentially poor) solution, and iteratively makes small changes to the solution, each time improving it a little. When the algorithm cannot see any improvement anymore, it terminates. Ideally, at that point the current solution is close to optimal, but it is not guaranteed that hill climbing will ever come close to the optimal solution.

Hill climbing is used widely in artificial intelligence, for reaching a goal state from a starting node. Choice of next node and starting node can be varied to give a list of related algorithms.

The idea behind hill climbing is as follows.

- Pick a random point in the search space.
- Consider all the neighbors of the current state.
- Choose the neighbor with the best quality and move to that state.
- Repeat 2 thru 4 until all the neighboring states are of lower quality.
- Return the current state as the solution state.

Function HILL-CLIMBING (Problem) **returns** a solution state

inputs: symptoms, a symptom

static: current, a node

next, a node

current <— MAKE-NODE(lNlTIAL-STATE[problem])

loop do

next— a highest-valued successor of current

if VALUE[next] < VALUE[current] then return current

current *—next

end

4. System flow

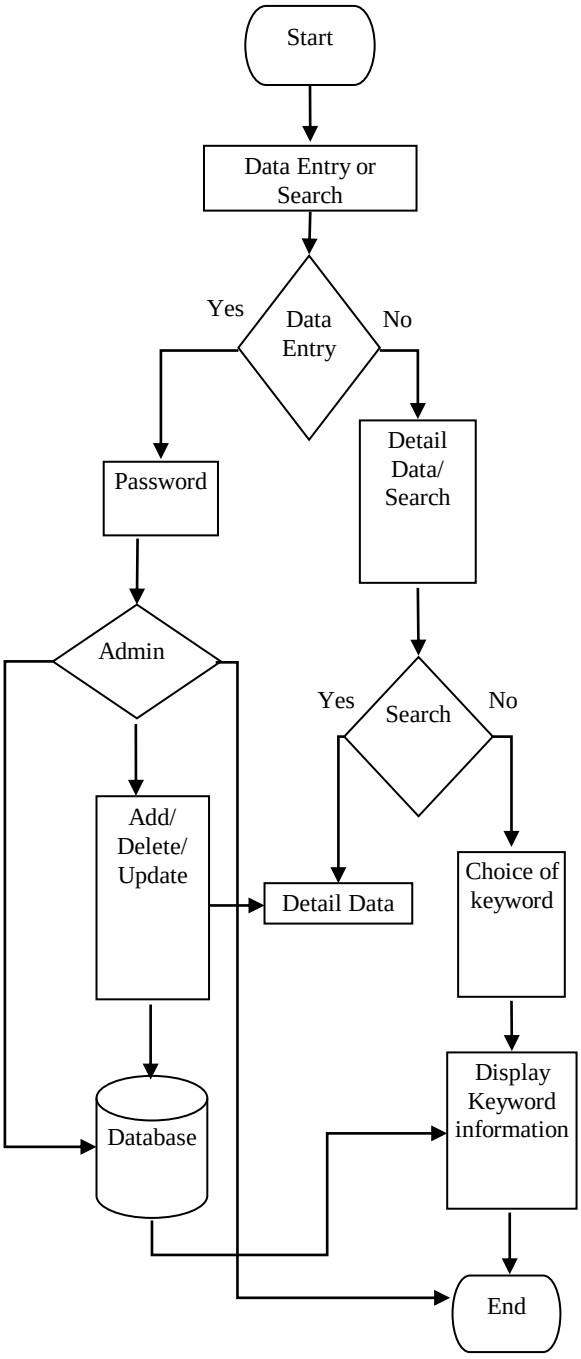

Figure 1. System Flow

There are two main parts in this system: "Admin" and "User". At first, the data entry and search are selected. Admin can add, delete and update the data from the database when admin fill the correct password.. User can choose detail data and search. If user chooses detail data it will show all data of water borne diseases. Users choose search data then it will ask for the keyword and display data from the database.

5. Implementation

System form: As soon as the user opens the system, the system can display the main form, there are four menus such as entry menu, Show menu, Keyword Search menu and About menu.

Entry menu: In this menu, Admin can choose the desired menu such as data entry, keyword entry. Admin can add, delete and update data when fills up the correct password.

Show menu: When the user desires to see the detail information about the water borne diseases, the user can choose from this menu. This menu shows all diseases, detail name, detail symptoms, detail prevention, detail treatment menu.

Keyword Search menu: When the user desires to search by keyword about the water borne diseases, the user can choose from this submenu. This submenu shows all, name, prevention and treatment submenu

About menu: In this menu, user can see about the introduction, history and Kinds of water borne diseases.

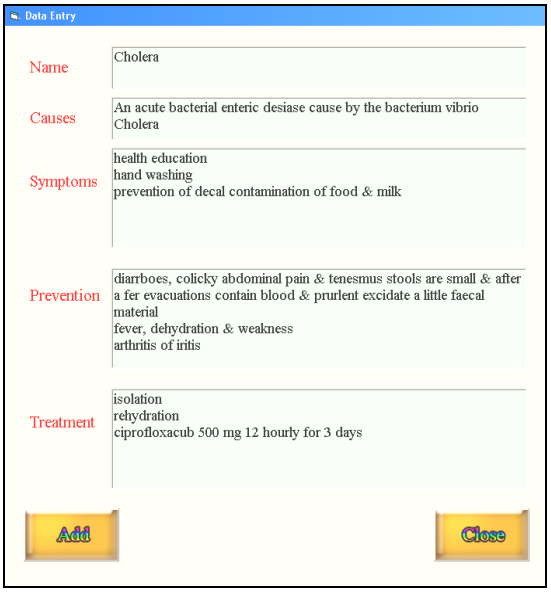

Figure 2. Main Menu

5.1. Experimental result

In this section, the result of the experiment is reported. Figure-5.2 shows the data entry of water borne disease. It includes name, cause, prevention, treatment and symptoms. Figure-5.3 shows the result of disease when the user chooses the symptoms.

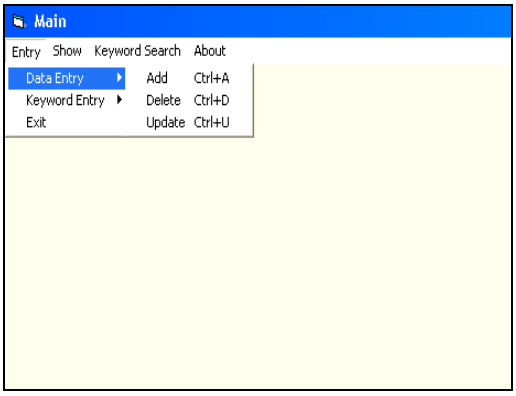

Figure 3. Data Entry

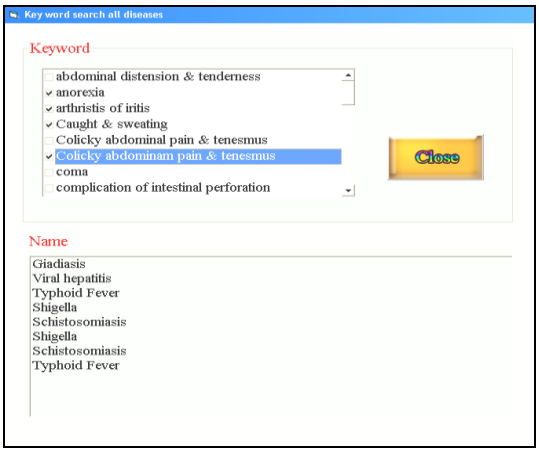

Figure 4. Keyword Search

6. Conclusion

As computer science and technology has progressed, computer is used in various field of science. In this paper, computer investigation of symptoms analysis for the Water Borne Diseases is written by Visual Basic (version.6) programming language. Users can view and study the overall of the Searching System of Water Borne Diseases in this paper. This system becomes a medical advisor for people who have suffered from Water Borne Diseases. In addition; this paper can give the user about the knowledge of Water Borne Diseases. Learner case study of the AI technologies search method.

6.1 Limitation

This paper describes the causes, symptom, prevention and treatment about the Water Borne Diseases. The user can read and search the data but cannot make add, delete and update. The admin can change the data by password. The user can only search the specific symptoms.

6.2 Further Extension

This system has been developed on an IBM PC and compatibles with using Visual Basic Programming language. The paper, heuristic is used to search about the water borne diseases. Those can be searched by using best first search and breadth first search. If the system updates, it can joined with the Internet to study the searching system of water borne diseases on online data.

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