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Design of an expert system for diagnosis of thyroid cancer

Mehdi KHOSRAVİ [1*], Mohammad YAZDANSHENAS[1], Mohammad Hossein NEMATİ[1]

[1]*Department of Computer Science, Abadeh Branch, Islamic Azad University, Abadeh, Iran*

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Abstract. Expert systems has designed for the non-specialist people with the aim of make available of skills of specialist people.these plans simulation of throught pattern and the method of human performance, and make a relation ship between an expert system's function and human performance or a specialist person. Up to now different expert systems has provided in medical science ground and of this regard,it\s one of the pioneer sciences.Promptitude has effect sn diagnose and cure of thyroid cancer and recovery of patient condition,but sometimes access to specialiste is not available for patients.so design of a system with the knowledge of specialist provides an appropriate diagnosis to sicks. Method:this research provides an expert system for diagnosis of thyroid cancer, using C# and necessary knowledge for diagnose for diagnosis reserves in the form of rules in knowledge unit of system. system with due attention to user's answers shows the probability of cancer. Finding:Using intelligent software, if there are no experties, we can diagnose and show the way of treatment, to the reliable extent.

Resulting: The use of intelligent and half-intelligent of systems such as expert systems, can provides for users in the form of companion's decision.However at present it can replace of experties, by no means.

Keywords: An expert system. Thyroid cancer. Diagnosis of disease. Pro-type.

1. INTODUCTION

Developing the information technology the decision making systems or in total the decision making based on computer has become important. in this regard expert systems have a basic role as one of ascribe parts to artificial intelligence. in expert system all kinds of decision has adopted with computer. expert systems are on the basis of knowledge and in fact, they are the most important part of them. in this systems, knowledge moved from expertise of any science to computer. use of expertise systems due to dendral has been admitted to medical word, in 1965.

The express and details of molecular structure plan has provided. In 1976,sofware has shown for diagnosis of mycin disease for PUFF's cordial. some software are: Xbone software for diagnosis of pulmonary disease, software for diagnose of bone disease software for control sicks that need intensive care, VM for diagnosis of codcuceus disease and blue box, related to internal medicine, treatment of depression, expert systems for diagnosis of electrolyte and acid materials, training for management of unconscious, diagnose of diseases related to internal medicine. the purpose of this research is provide an expert system for diagnosis of thyroid cancer. then the statement of problem has studies and after shown subjects about thyroid cancer, the build of system's steps and it's component has state and finally the steps of designed system has describe with applied example. the expert medical system is a computer plan that when it was appropriately, provides effective helps in decision making about diseases and suggestion about way of treatment. this information, usually is transfer from patient to doctor. The expert

*Corresponding author. *Email address*: *mehdikhosravi10421@gmail.com*

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systems have some features that distinct them from other modual softwares. one aspect of this distinction is these systems imitate from reasons of expertise for access to complete results. in most cases specialists are aware of these consecution reasons. the expert systems need same of rules and pacts of medical science about disease and condition of them in order to provide exact results. thyroid cancer is a kind of cancer that the cancerous cells multiply inside thyroid tissue. although it's the most common cancer/because of improvement of screen methods/number of new cases of this disease and death has decreased remarkably. this disease appears in all ages but incidence is higher in 50 years -old. use of software systems have some advantages such as: expertise of people in mortal. person may change his/her job become sick for example. but expertise of computer in permanent. transfer of person's expertise in difficult. one can't be in one time in two place, but expertise of computer is transferable. for example/an expertise system that has been installed in computer can copy in another computer in another place or even receipt of it through network is possible. The expertise of person usually is expensive. personnel's salary is much higher than cost of software and hardware. also expert systems have ability of promotion. another advantage are: high performance complete and quick responder high reliable comprehensible flexible decrease of risk survival and durability multiple expertise .the purpose of project's performance leads to show this research uses of software system for access to all advantage of expert system for diagnosis of thyroid cancer. thyroid cancer is a from of cancer that takes roof from tissue of thyroid gland .thyroid gland is in front of throat and below cartilage. thyroid gland produce several hormone such as thyroid hormone that can control the degree of body's temperature, weight, energy, palpitation. this gland, also produce calcitonin that helps the body to use calcium. in America about 26000 people suffering from thyroid cancer. in comparison with another common cancer/thyroid cancer is more between youth. About 80 of this disease is below 65 years old. women suffer 3 times more than men from this disease.

2. types of thyroid gland cancer: there are different type of thyroid cancer that based on similarity of cancerous cells to safe cells under microscope and also based on type of cells that this cancer cell create from them. papillary cancer: it's the most common of thyroid cancer about 80/of this case has slow growth/distinct cancers that are create from follicular cells and can contagion to one or both parts of thyroid gland. it can contagion to lymphatic glands near to throat but if diagnose correctly/it can be wired. follicular cancer: second prevalent cancer of thyroid gland, from every 10 thyroid cancer/one of them is follicular cancer. it's more common in countries that their nutrient has no enough iodinc. this cancer is differ from another thyroid cancer. however is more aggressive than papillary cancer. it doesn't contagion to lymphatic gland but it's more likely to contagion to bones and langs. hurthle cancer :also acidic cell/it's minor kind of follicular cancer and contains about 3 of thyroid cancer. medullary cancer: it's come from C cells in thyroid gland and in more aggressive than follicular and papillary cancers, but the diagnosis is low. almost 4% of thyroid cancers is medullary cancer. in comparison with another kinds of thyroid cancer, this cancer is more probable to contagion to lymphatic glands and another parts of today. these cancers release many carcinoembryonic and calcitanin antigens that define with blood test. anaplasti cancer: it's the most indiscernible thyroid cancer, i.e it seems like natural cells of thyroid gland. so it's more aggressive that rapidly contagion to throat and another parts of body.

2. METHOD OF REVIEW

Steps of make of system: one of the most common methods of design, that used by expert system's maker, is design of an expert system for diagnosis. In this method Prototype systems that not yet ready for formal delivery, show to the users in order to obtain necessary feedback and perform necessary reforms on system. This method includes three steps:

- Analysis
- design
- Performance

That they repeat together. The method of this research is prototype.

So first purpose of expert system introduce, the related researches and Identification of software and hardware, related experiences has studied. Than the environment of expert system has described, the system analyze and design. In the next step, the components of expert system has identified. The software study and specify that can support the component of system. Finally the system has made.

3. COMPONENTS

An expert system of diagnosis and recommendation about thyroid cancer has 3 main components: 1-sub-system of conclusion. Schematic diagram of parts of expert system has showed in figure1. In order to design of system, use c# software as a user agent.

3.1. Sub system of knowledge unit

For access to knowledge system we are Blocky and Moukler diagrams. Blocky diagrams are diagrams that the main features has identified and they are appropriate for show the relation between factors and purpose. Blocky diagrams related to diagnosis of thyroid cancer in first level include blood test, WBC, H.C.T, P.L.T, include 7 sub-parts with sexuality of lymph, hemoglobin, RBC. These diagrams don't help for writing at rules because they don't have specific details for this purpose. In this regard it should be some diagrams that specify the relation between main factors on purpose with identify the problems, rules, recommendation. Moukler or relationship diagrams are diagrams that are suitable for this purpose. Moukler diagrams is one of useful method for description of relations between factors and purpose that identify purpose through entrance problems and shows rules and description made by original sample. variables in Moukler diagrams are indirect lines and related decisions are inside the triangle in order to performs the final decision that is diagnosis of disease. Moukler diagram made by produced Blocky diagrams. first level of Moukler diagram for diagnosis of thyroid cancer has shown in figure1.

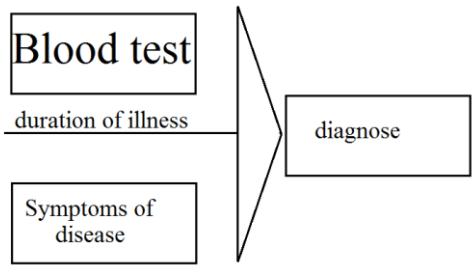

Figure 1. Moukler diagram.

As specified, duration of disease is on direct line and related choices of problem are below that line. Problems related to blood test and symptoms of disease are in the next level that for receive the user's answer in variable of blocky diagram. since problems and options that user

should identify to answer each question, specify with drawing Moukler diagrams, we can determine different results and situations that maybe user uses for answer to each question.

3.2. Sub system of conclusion

In systems based on rules, conclusion motor selects one rule for test and study that wether it's condition is true or not. This situation maybe study through interview. When situation related to situation of rule is true, then the result of that rule is true. Therefore this rule activated and the result add to knowledge unit.

3.3. Sub system of user connection

User connection of expert system should have high power's interchange in order to structure of information interchange performs in the form of conversation between an expert person and applicant. For ease in interchange of information, user connection provides with compiler c# that on the basis of rules, asks some questions of user and answers of the questions, conclusion has done and provides suitable answer to user. In the next level the steps of expert system describe with one applied example.

4. DISCUSSION AND RESULTING

The purpose of this research is to provide an expert system for diagnosis and suggestion of treatment for thyroid cancer. So the aim and purpose of expert system has defines, then the related studies and identification of software and hardware and related experiences has studied and the environment has described. After that we analyze and design the conceptual's system. In the next level the parts of system has determined and user connection produces with compiler c#. It should be provided systems that can simulation of behavior of specialists but this problem is not possible. The disadvantage of designed system is , there is no clinical review and only acts based on user's answers and can't study the correctness of user answers.

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