

Decision Support System for Asthma (DSSA)

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Abstract

In this paper Asthma, a chronic inflammatory disease of the airways, is the most common chronic disorder, Affecting many peoples. The purpose of this paper is to propose an integrated computerized decision support system for managing asthma in rural areas. DSS is by means of Asthma Symptoms is presented. So the earlier detection of these diseases is lead to save the patient's life. Usually in rural areas where the pathological and imaging tools for medical diagnosis are not available this DSS provides a great support for disease diagnosis even through the paramedical staff. In this paper we show the DSS model For Diagnosis of Asthma. This paper helps in diagnosis of Asthma and this Prediction is based on Symptoms.

Keywords: Asthma, Disease Diagnosis, Decision support system, Fuzzy logic.

1. Introduction

The most challenging problem troubling the world today is the spread of diseases and the consequent sufferings of the innocent inhabitants of this planet. The doctors and researchers all over the world work, jointly and separately, day and night to combat this grave problem to the maximum extent they can. In spite of this conscious and collective effort mistakes do occur and sometimes these prove to be highly fatal. Many times patients may lead to death; Engineer can contribute in this field by developing a software or computer program, called Expert System or Decision Support System, Our present work presents the design and development of a prototype expert system for Symptoms based diagnosis by applying fuzzy set theory to inference process and knowledge representation. The Symptoms Based diagnosis is to find the patient is

having Asthma or not using fuzzy inference and the fuzzy knowledge base. The rule base and the fuzzy sets are developed. The system has been designed keeping in mind the critical criterions of user friendliness; this disease affects millions of people, many of them children. In fact, asthma is the most common chronic childhood disease, affecting 1 out of every 20 children. The number of people with asthma has been increasing since the 1980s. Examination of asthmatic patient that are died because of acute or sudden exacerbation may result in finding some important risk factors involving these patients. Considering the risk factors gets a better understanding of variables helping patients in prediction and prevention of asthma mainly in rural areas. This paper focuses on the development and testing a fuzzy based Decision Support system for prediction of asthma. The earlier detection of these diseases is lead to save the patient's life. Methodology is used for developing this system is explained in the next section. Section 3 contains the result of system testing. Finally the conclusion of this paper is presented in section 4.

2. Methodology

The methodology of this system includes the processes of knowledge acquisitions, knowledge representation, system testing, and system maintenance. The design methodology consisted of seven iterative developmental steps:

- In this first we collect the information about Asthma from Expertise (Doctor) to know what Asthma is, and through internet we can also get much information about Asthma in detail.
- After Gathering the symptoms of the disease (Asthma) from Expertise (doctor) as well as from the patients which are having Asthma through Clinical reports. Identification of symptoms
- Design the rule base for the disease using expert knowledge and fact about the disease rules are made according to the conditions or symptoms which occurs on patient/expert queries.
- We design the architecture of Decision Support System of asthma Disease.
- Mapped both the design rule base and patient/expert queries.
- Then Analysis of patient data with clinical data.
- Result (showing efficiency).

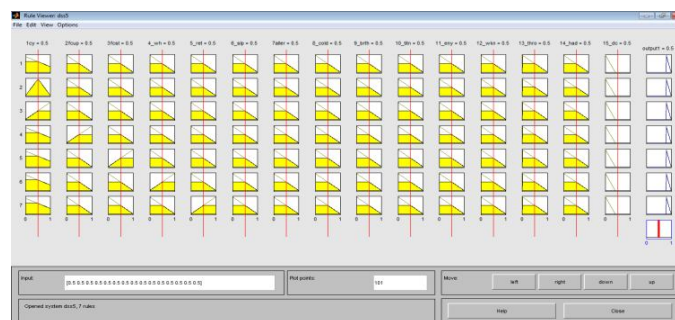


Figure 3.1: Schematic view of rules of asthma.

3. System Evaluation

The results of asthmatic patients tested by this system as shown in fig 3.1. Comparison of the output of this system with clinical data records draws the good performance of this fuzzy based Decision Support system. These data are collected based on interview with asthmatic patients

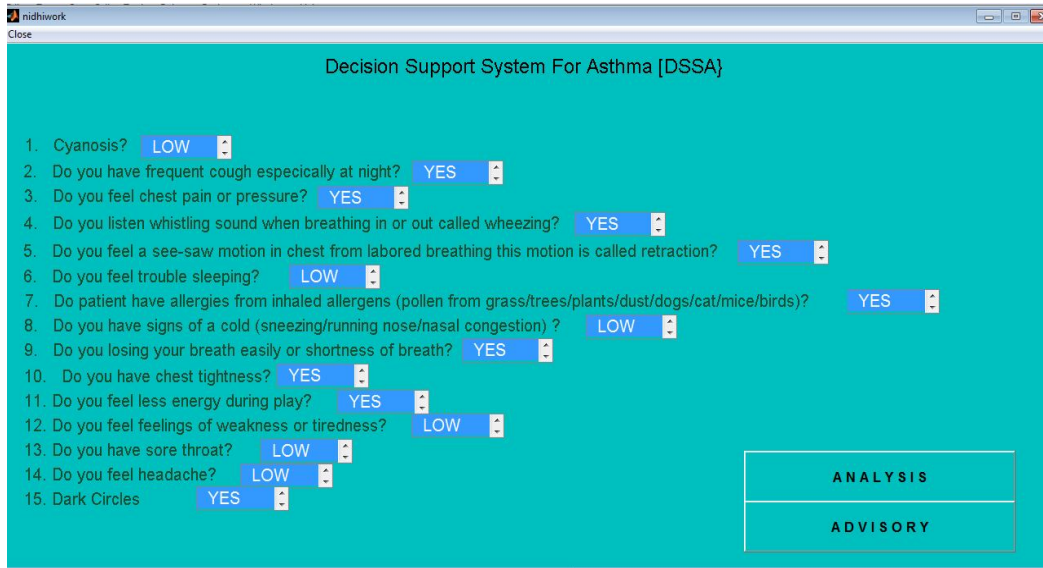


Fig 3.1: GUI of DSSA.

Table 1: The result of the testing related to fuzzy expert system.

Variable Patient	CYS	FC	CP	WZ	R	TS	AL	CS	BL	CT	LE	TN	ST	HDC	DC	System Output	Clinical Output
Patient 1	High	yes	yes	yes	yes	high	yes	yes	yes	No	No	High	Low	No	No	Sure Asthma	Sure Asthma
Patient 2	No	yes	yes	yes	yes	Medium	yes	yes	yes	yes	yes	High	High	yes	yes	Sure Asthma	Sure Asthma
Patient 3	No	No	yes	yes	yes	high	No	yes	yes	yes	No	Medium	High	yes	No	Maybe asthma	Sure Asthma

Patient 4	yes	yes	No	yes	yes	Medi um	yes	yes	yes	N O	yes	High	Yes	Yes	Yes	Sure Asth a	Sure Asth a
Patient 5	No	yes	yes	yes	yes	High	yes	yes	yes	yes	yes	High	yes	yes	No	Sure Asth a	Sure Asth a
Patient 6	No	No	No	No	No	Low	yes	No	yes	No	No	Low	yes	No	No	Not Define	Not Asth a
Patient 7	No	yes	yes	yes	yes	High	yes	yes	yes	No	yes	Medi um	yes	No	No	Sure Asth a	Sure Asth a
Patient 8	NO	yes	yes	yes	yes	High	yes	yes	yes	yes	yes	High	yes	No	No	Sure Asth a	Sure Asth a
Patient 9	Yes	yes	yes	yes	yes	High	yes	yes	yes	yes	yes	High	yes	yes	yes	Sure Asth a	Sure Asth a
Patient 10	No	No	No	No	N O	High	yes	yes	yes	No	No	Low	No	No	No	Not Define	Not Asth a

Cys= Cyanosis; FC=frequent cough; CP= chest pain; WZ= wheezing; R=retraction; TS= trouble in sleeping; Al= allergens; CS= cold signs; Bl= breathlessness; CT= Chest Tightness; LE= less energy during play; TN= tiredness; ST= sore throat; HDC= headache; DC= dark circles

4. Discussion

Asthma threatens the life of asthmatic patients in every level of severity and even in patients with controlled asthma. The chosen infectious Asthma diseases are a serious threat towards health in many countries in rural or remote areas. Decision Support system is designed in this paper can bring this prediction for patients and, so as soon as possible us curing them. DSS aims to assist in diagnosing Outputs of this system are represented by three main categories: Sure Asthma, May Be Asthma, Not define. To evaluate the results of this system, 40 patients have been interviewed. The results of this system in comparison with physicians/clinical data are proposed in the (table 1).

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