

Machine learning base sickle disease prediction and recommendation system

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Abstract: The expert systems and smart devices played a key role in the development of health care in terms of continuous monitoring of patients treatment and preservation of E-medication system.

The basic challenge that patients faced is the fact of that is based on patient disease recommend the doctor. The problem is previously, machine learning techniques uses one classifier to classify data. This approach was not so reliable when it comes to disease prediction. To improve accuracy of prediction result, we have proposed ensemble method as collection of classifiers which will return prediction result which will have highest accuracy.

Also, this system will manage a large amount of patients data and treatment preservation of E-medication system.

In Healthcare System, the basic challenge that patients faces is the fact of difficulty in contacting physician specialists. System will provide communication way for treatment concerns.

Index Terms: Sickle Cell Disease; Machine Learning Algorithm; Mobile Healthcare Service; Real-time data; Self-care, Management System; E-Health.

INTRODUCTION

Now a day E-Healthcare is the most popular because of machine learning. For the continuous analysis and monitoring of patients treated and preservations, the experts and smart devices played a crucial role. But most of the times patients face difficulties in contacting physician specialist. The problem is there was no direct contact with the physician. In this paper, we present an intelligent system which allows self-care and monitoring system. Whenever the patient sends his information about his blood test and other tests, the system will decide whether the situation is critical or not. In non-critical situations, the intelligent system will provide recommendations and treatments directly. Otherwise, it will contact the physician directly to suggest proper action that patient should take. The further system will update data regularly with the patient's information.

Related works

1) Self-care Application

In many of healthcare organizations, the spread of sickle cell disease becomes an essential concern. This make necessity of developing a new system that provide self-care is important and critical issue. Provide such a system will avoid unnecessary admission to the hospital. The main goal of developing self-care application system is to provide an effective system that offer a high level quality of monitoring and following up the patient's condition. This application can be implemented at patient's home to ensure effectiveness and efficiency. There are two major key points behind developing such an application and encourage the health organization to implement it. First, intelligent system can guide the patient at his home to proper treatment rather than visiting the hospital. Second it will provide a scalable model that will move the data to specialist physicians which in turn will reduce the communication cost and workload. The system also take into its consideration the emergencies since this application will offer treatment as early as possible.

2) Decision Support Systems in Health Care

Decision support systems (DSSs) plays a vital role in healthcare environment. The importance of adding such system to SCD patients is to ensure the optimal matching between patient's symptoms and physician in examining the patient condition, avoid the medical mistakes, and to provide the optimal care foe the patient. Developing such an expert system will allow the physicians the collect thee data easily and make the process of diagnosis better [15].

This system will include diagnose the disease, managing and maintain patient's situation.

3) Reminders Application:

The Reminder technique used in medical healthcare have a vital role Kannisto, et al , since this type of service has a significant positive effect during patient's treatment, management of patient' condition, and other medical issues. The main reason for publishing such a tool is to make the patients to take the treatment on the right time or to guide them for other recommendations as shown in Fig.2. Many research studies show that the best way to communicate between physician and patients is through mobile message or calling. Furthermore, this method will provide an essential opportunity to practitioner doctors to decide the proper treatment and diagnose the patient remotely specially in high risk condition. The reminder application will keep the patients up-to date about all information that the healthcare will take such as follow up, recommendations, and treatment.

Motivation:

We are developing this system for providing the motive of the system is to provide 24/7 service for health seeker which will result in reduction of efforts, time and cost of visiting healthcare provider. Proposed system should be able to provide way for disease prediction. This system can be useful for patients as well as pathologist for faster retrieval of outcome of health related test.

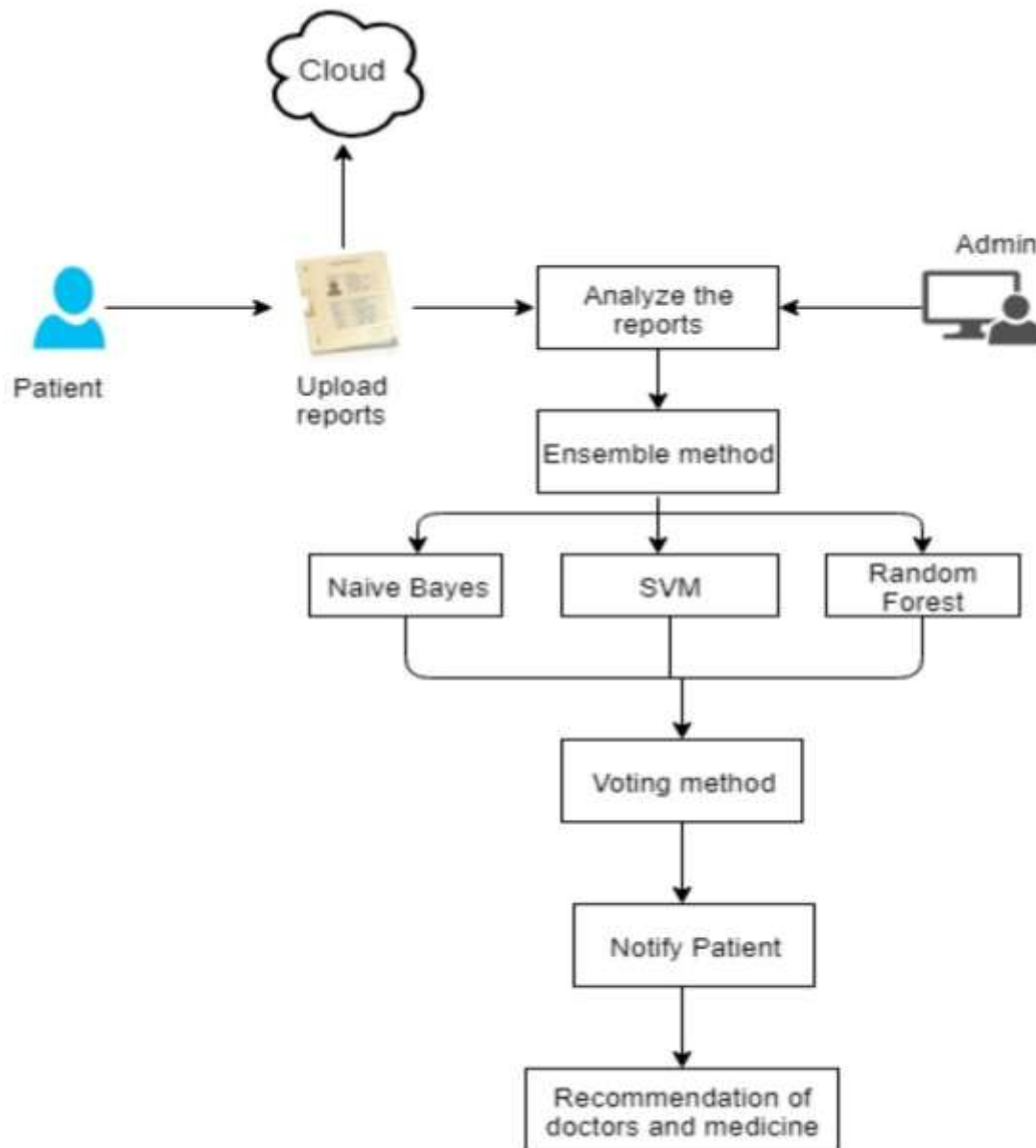
System Architecture:

Figure shows the flow of our System. The system consists of two phases: The patient phase and admin phase. In patient phase, user enters all detail in registration form and then login. After login patient fill-up the report and this report generated on text file then upload it on cloud and database. Then at admin phase first register the by admin and then login after login the admin view the all details about patient then apply prediction on disease attribute uploaded by patient then get the disease after getting disease admin recommend the doctor and medicine via mail.

Mathematical Model

$S = \{I, F, O\}$

Where, S = Proposed system.

I = Input of system (image). F = Functions of the system.

O = Output of the system (disease prediction).

$F = \{f1, f2\}$

• $f1$ = Feature extraction.

- F2= Classification.
- F3= Disease prediction.

First, user provides input as an image that might be infected with diseases.

System takes the input from Attribute form.

Let F be the set of features

These attributes are compared with algorithm and by using algorithm prediction processed.

Conclusion: In this paper, we propose disease prediction system with doctor and medicine recommendation scheme. We are going to propose recommendation system by using machine learning algorithm. In the end, we analyzed disease and recommend doctor medicine

References:

- [1] J. Egea, M. González, and M. Menéndez, "E-Health Services Adoption by European General Practitioners," in *Assessing the Different Roles of Marketing Theory and Practice in the Jaws of Economic Uncertainty*, H. E. Spotts, Ed., ed: Springer International Publishing, 2015, pp. 205-210.
- [2] A. Eleftheriou, M. Angastiniotis, D. Loukopoulos, C. Kattamis, and J. Meletis, "3rd Pan-European Conference on Haemoglobinopathies and Rare Anaemias, 24-26 October 2012, Limassol-Cyprus," *Thalassemia Reports*, vol. 2, pp. 1-41, 2012.
- [3] D. J. Weatherall, "The Role of the Inherited Disorders of Hemoglobin, the First Molecular Diseases, in the Future of Human Genetics," *Annual review of genomics and human genetics*, vol. 14, pp. 1-24, 2013.
- [4] I. Roberts and M. de Montalembert, "Sickle cell disease as a paradigm of immigration hematology: new challenges for hematologists in Europe," *Haematologica*, vol. 92, pp. 865-871, 2007.
- [5] S. D. Grosse, I. Odame, H. K. Atrash, D. D. Amendah, F. B. Piel, and T. N. Williams, "Sickle cell disease in Africa: a neglected cause of early childhood mortality," *American journal of preventive medicine*, vol. 41, pp. S398-S405, 2011.
- [6] D. J. Weatherall, "The importance of micromapping the gene frequencies for the common inherited disorders of haemoglobin" *British*
- [7] D. J. Weatherall, "The inherited diseases of hemoglobin are an emerging global health burden," *Blood*, vol. 115, pp. 4331-4336, 2010.