



Intelligent Application to Detect Heart Disease Issues and Treatment

Aya Ismail Abdel Reda ^{1,*}, Mohammed Dauwed ¹

¹ Department of Computer, College Science, Baghdad University, Baghdad, Iraq

Article information

Article history:

Received: June, 01, 2022

Accepted: June, 30, 2022

Available online: July, 05, 2022

Keywords:

Intelligence,
Clinical Decision Support,
Electronic Health Record Systems

*Corresponding Author:

Aya Ismail Abdel Reda
mohalyasari@gmail.com

Citation : Reda, A. I. A. ., & Dauwed, M. . (2022). Intelligent Application to Detect Heart Disease Issues and Treatment. *Journal of Advanced Sciences and Nanotechnology*, 1(2), 43–46. <https://doi.org/10.55945/joasnt.2022.1.2.43-46>.

Abstract

Intelligent Application to Detect Heart Disease Issues and Treatment. It might have happened so many times that you or someone yours need doctors help immediately, but they are not available due to some reason. Intelligent application for detection heart rate disease is an end user support provide an online/offline consultation. Here, we propose an application that allows users to get instant guidance on their heart disease through an intelligent system. The application is fed with various details and the heart disease associated with those details. The application allows user to share their heart related issues. It then processes user specific details to check for various illness that could be associated with it. Here we use some intelligent data mining techniques to guess the most accurate illness that could be associated with patient's details. Based on result, the can contact doctor accordingly for further treatment. The system allows user to view doctor's details too. The system can be used for free heart disease consulting online or offline.

DOI: [10.55945/joasnt.2022.1.2.43-46](https://doi.org/10.55945/joasnt.2022.1.2.43-46),

ISSN: 2791-0903/© This is an open access article under the CC BY License.

1. Introduction

The complexity and rise of data in healthcare means that artificial intelligence (AI) will increasingly be applied within the field. Several types of AI are already being employed by payers and providers of care, and life sciences companies [1, 2]. The key categories of applications involve diagnosis and treatment recommendations, patient engagement and adherence, and administrative activities. Although there are many instances in which AI can perform healthcare tasks as well or better than humans, implementation factors will prevent large-scale automation of healthcare professional jobs for a considerable period. Ethical issues in the application of AI to healthcare are also discussed [3].

Heart disease is one of the most critical human diseases in the world and affects human life very badly. In heart disease, the heart is unable to push the required amount of blood to other parts of the body. Accurate and on time diagnosis of heart disease is important for heart failure prevention and treatment. The diagnosis of heart disease through traditional medical history has been considered as not reliable in many aspects. To classify the healthy people and people with heart disease, noninvasive-based methods such as machine learning are reliable and efficient. Heart disease describes a range of conditions that affect your heart. Heart diseases include: Blood vessel disease, such as coronary artery disease, Heart rhythm problems (arrhythmias), Heart defects you're born with (congenital heart defects), Heart valve disease, Disease of the

heart muscle, and Heart infection. Many forms of heart disease can be prevented or treated with healthy lifestyle choices [4]. Thus, the diagnosis of heart failure can be difficult, even for heart failure specialists. New technologies have the potential to assist physicians in heart failure diagnosis. Thus, the objective of this study is to diagnose the heart disease based on identified symptoms by designing a new software application to identify related heart disease based on disease history stored in database.

2. Background

The complexity and rise of data in healthcare means that artificial intelligence (AI) will increasingly be applied within the field. Several types of AI are already being employed by payers and providers of care, and life sciences companies [5]. The key categories of applications involve diagnosis and treatment recommendations, patient engagement and adherence, and administrative activities [6]. Although there are many instances in which AI can perform healthcare tasks as well or better than humans, implementation factors will prevent large-scale automation of healthcare professional jobs for a considerable period. Ethical issues in the application of AI to healthcare are also discussed [7].

Heart disease is one of the most critical human diseases in the world and affects human life very badly. In heart disease, the heart is unable to push the required amount of blood to other parts of the body. Accurate and on time diagnosis of heart disease is important for heart failure prevention and treatment. The diagnosis of heart disease through traditional medical history has been considered as not reliable in many aspects. In many countries, heart disease is the leading cause of death. The term "heart disease" encompasses a wide range of heart conditions. Coronary artery disease (CAD), which can lead to a heart attack, is the most common type of heart disease in many countries. Through lifestyle changes and, in some cases, medication, it is possible to greatly reduce your risk of heart disease. Thus, this system has been proposed in order to classify the type of heart disease based on symptoms.

3. Experimental Procedure

The study began by gathering information on diseases and heart rate symptoms. Then, based on the input provided for earlier suggestions made by specialized doctors, an algorithm was developed to predict and suggest treatments. When a patient's symptoms first entered the system, the classification process started. A ratio percentage indicating which condition is more closely related to patient symptoms is provided by the system classification. This classification system was created using the C sharp programming language.

4. Results and discussion

4.1 Identify the heart diseases

In this step, identifying the heart diseases and related symptoms from different resources such as internet, medical websites, academic articles and so on. In this project, identified 11 heart diseases for adult person, and 6 symptoms that have a relationship for identified diseases.

4.2 Identify the symptoms

The symptoms were selected based on six categories. These categories organized based on the diseases stages on the human. This in order to improve the performance of database selection and reading.

4.3 Import the heart disease symptoms in the database

The database was selected based on suitability and flexibility to do the project easier. Access database was selected to build the relationships between symptoms and diseases. The database is built based on a table called sheet3, includes: ID, Disease, Symptom 1, Symptom 2, Symptom, Symptom 3, Symptom 4, Symptom5, Symptom 6. Each group has a different list of symptoms to reduce the redundancy and repetition.

4.4 Create User Interface

The usability and ease of use factors have been considered in the interface design. The user interface was included the 1) six combo box with dropdown list connected with database to read the symptoms from database column or group. 2) button to activate the diagnosis function. 3) datagridview to show the list of diseases and symptoms from database. 4) datagridview to present the most related diseases based on the

selected symptoms. 5) rich text box to present the advice and treatment that may be useful for physicians and patients. Figure shows the interface design.

Figure 1. Interface design

4.5 Create Diagnosis algorithm

The algorithm is design to filter the symptoms relationships to the disease. In which higher related disease appear in the first lines to show as suggestion to the user. This system may help to predict or identify the heart disease as first diagnostic.

5. Results and discussion

To classify the healthy people and people with heart disease, noninvasive-based methods such as machine learning are reliable and efficient. In the proposed study, we developed a machine-learning-based diagnosis system for heart disease prediction by using heart disease dataset. We used seven popular machine learning algorithms, three feature selection algorithms, the cross-validation method, and seven classifiers performance evaluation metrics such as classification accuracy, specificity, sensitivity, Matthews' correlation coefficient, and execution time. The proposed system can easily identify and classify people with heart disease from healthy people. Additionally, receiver optimistic curves and area under the curves for each classifier was computed. We have discussed all of the classifiers, feature selection algorithms, preprocessing methods, validation method, and classifiers performance evaluation metrics used in this paper. The performance of the proposed system has been validated on full features and on a reduced set of features. The features reduction has an impact on classifiers performance in terms of accuracy and execution time of classifiers. The proposed system will assist the doctors to diagnosis heart patients efficiently.

Conflict of Interest

The authors declare that they have no conflict of interest.

References

1. Ahmed, A., Ali, A., & Dauwed, M. (2022). Development of a Hybrid Mobile App for Student Management System. *Journal of Advanced Sciences and Nanotechnology*, 1(1), 1–6.
2. Witten, I. H., & Frank, E. (2002). Data mining: practical machine learning tools and techniques with Java implementations. *Acm Sigmod Record*, 31(1), 76–77.
3. Abdallah Abdallah Mohammed Dauwed, A. A. A. B. F. F. I. K. B. J. C. (2022). An Optimal Method for Supply Chain Logistics Management Based on Neural Network. *Computers, Materials & Continua*, 73(2), 4311–4327. <https://doi.org/10.32604/cmc.2022.031514>
4. Omar, S., Radzani, M., Yasin, M., & Dauwed, M. (2018). Validity and Reliability Questionnaire for Social,

- Environment and Self-Efficacy Related of Deaf Adolescents Physical Activity. *Journal of Theoretical and Applied Information Technology*, 96(21).
5. Shrestha, A., & Mahmood, A. (2019). Review of deep learning algorithms and architectures. *IEEE access*, 7, 53040–53065.
 6. Jarrar, M., Al-bsheish, M., Aldhmadi, B. K., Albaker, W., & Meri, A. (2021). Effect of Practice Environment on Nurse Reported Quality and Patient Safety : The Mediation Role of Person-Centeredness, 1–17.
 7. Meri, A., Hasan, M. K., & Satar, N. S. M. (2017). Towards Utilizing Cloud Health Information Systems: A Proposed Model. *Journal of Engineering and Applied Sciences*, 12(8), 1–11. <https://doi.org/10.3923/jeasci.2017.8397.8408>