Innovative and Smart Methodology towards Kidney Disease Detection in Earlier Stage

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Abstract: In modern era of medical field, kidney diseases are the foremost common diseases found in the majority of the populations in subsequent years. The essential is diagnosing the problem and however advanced task that ought to be accomplished precisely with proficiently. In most of the cases, kidney condition leads to loss of life. Diagnosing could be a tough thus the intention of the research is to develop a neural-trained system to spot kidney condition risk of the patients. The Artificial Neural network will collect the data from the previous method and it will be helpful to identify the chance factors on the premise of provided data. This paper uses neural techniques for diagnosing of the kidney disease. MATLAB simulation was employed as a development tool.

Keywords: Artificial Neural Network, Chronic Kidney Disease.

1. Introduction
Now, on a daily basis the employment of technology is crucial in each filed associate degree diagnosis space isn't an exception [1]. We have a tendency to all know okay that these areas, inside which the modern computer area unit employed, possess terribly higher quality, irregularity, conjointly the employment of skilled units like mathematical logics, artificial networks and genetic algorithmic rules are established [2]. Mathematical logic may be a powerful reasoning technique which will handle uncertainty of acceptable knowledge. One among the foremost vital causes of death worldwide is kidney failure. Therefore, identification of the center disease is terribly important demand in existence to millions of uncertainty, and risk issue the cardiovascular disease identification is difficult for specialists. Once a kidney failure is known, the speed of detection is very essential to avoid wasting the lifetime of kidney failure patient and to stop kidney harm. Soft computing will be well-defined as a community of "imprecise" computational techniques to model and examine terribly advanced issues that square measure intelligently. Classical and reliable research approaches have been unable to offer low-priced, systematic, and detailed solutions for these advanced problems. Among the various components of soft computing, square measurements of mathematical logic (FL), artificial neural networks (ANNs) [3] and organic process algorithms (EAs) are considered because of the simple soppy computing practices.
2. Existing System
The maximum necessary claims of fuzzy system (fuzzy logic) are towards unsure problems. Once retardants have lively behaviors, mathematical logics could be an appropriate means that agreements with this downside. Beginning of fuzzy knowledgeable system coming up with its purpose of input/output parameters. Eleven input variables and one output variable are considered. Then, we have the tendency of all variables to model membership functions (MFs). These MFs confirm that objects are part of fuzzy sets [4,5,6].

3. Proposed System
Neural networks have very good generalization capabilities, if it is trained properly. In this paper, a neural grounded structure for sorting of Kidney condition level with the assistance of 24-input characteristics using neural based system. The proposed algorithm incapacitates the shortcomings in the learning process used for current approaches. In general, the question for classification is as follows. However, the conceptualization of our system is created on; complete design is completely new based on the optimum learning algorithm described in the next sub-section. The proposed architecture includes learning neural networks with typical database with enough training pairs to solve the problems faced by current approaches. Neural network has 24 inputs from the regular database, and 1 goal value from the disease group. Neural network processes information and controls cardiac production illnesses as normal or abnormal rates. The training range of the input information can be kept low enough for the neural network to take extreme benefit of the learning capabilities of the neural networks. The data sets selected for this study are occupied as database of heart diseases. This involves the sorting of person into normal and abnormal people.

Chronic Kidney Disease has also been identified as a Chronic Renal Dysfunction, and is still growing an alert area globally. Chronic Kidney Failure has become a progressive kidney injury for quite a while. Chronic kidney disease is a benign illness that spoils the kidneys and foreign compounds cannot easily wash out of our bodies. An individual acknowledged that chronic kidney disease is well figured-out when the function of the kidneys is below than 25 percent of the normal, kidney disease as one of the main health problems of the person. MATLAB is the method included in this paper to get the accurate effect based on the sum of input parameters as long as the set of information is specified. MATLAB provides simplicity for obtaining chronic kidney disease’s accurate estimation. The subsequent modules are used: (1) data acquisition and collection, (2) pre-processing, (3) splitting data set as training/testing, (4) classifier training, (5) test attribute prediction.

Artificial Neural Network helps to identify kidney defects. A neural network has multiple nodes for input, hidden, and output. On some results, the respective node applies a value (could be soft max, linear, logistic) and generates an output. Each node in the next layer takes a weighted average of the prior layer outputs before it achieves an output. The cognitive would be that multiple nodes will collectively raise the perception that an individual node is unable to solve a problem (such as classification).

Artificial neural network with back propagation in order to classify Landsat data, one different way of ANN with BP is proposed in the request of neural network. The back-propagation algorithm is used for neural network processing. For multispectral image classification, a further version of ANN with BP is proposed in. The BP is trained on a classical image area, and the neural network is then used to classify the image.

Improved Back propagation algorithm addresses neural network programming using gradient delta rule with back propagation algorithm. It is particularly applicable for architecture of parallel hardware. Rather than being kept constant, the momentum factor is calculated at each step. Better BP has improved speed and stability to convergence than traditional BP.

The meta-heuristic algorithms yield approximate results and are applicable to any field. Such algorithms are used where maximum local production is achieved by conventional algorithms.
Traditional algorithms also increase the cost of computation, and use more time to produce results. Several researchers in previous studies merged ANN with these meta-heuristic algorithms to address its limitations.

4. Results and Discussions

A. Prediction of Test Attribute
Prediction is based on feedback from the user. Compare user feedback with qualified dataset. The trained dataset is nothing but the neural network, regression tree classifier used to test data.

![Fig.1 Values from the test report of patient (for abnormal condition)](image1)

The result will then be provided after comparison. Fig.1 shows the values from the test report of patient (for abnormal condition) and Fig.2 shows the test output for kidney abnormal condition. Fig.3 shows the values from the test report of patient (for normal condition) and fig.4 shows the test output for kidney normal condition.

![Fig.2 Test output for kidney abnormal condition](image2)

![Fig.3 Values from the test report of patient (for normal condition)](image3)
Fig. 4 Test output for kidney normal condition

B. Result Analysis

Table 1 shows the Comparative analysis of results of proposed and existing system.

| Methods        | Attributes | No. of pairs | Training & Testing |
|----------------|------------|--------------|--------------------|
| Existing system| 13         | 303          | 92.3% & 82.20%     |
| Proposed system| 24         | 400          | 99.7% & 100%       |

5. Conclusion

ANN plays a major role in detecting kidney disease. This scheme plays prominent role in medical field. In this proposed method, the user can periodically monitor the patient’s health conditions which make user to easily detect the kidney conditions. This proposed scheme gives accurate results for kidney diseases.

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