



COMPREHENSIVE REVIEW ON HEART DISEASE PREDICTION USING OPTIMIZATION TECHNIQUES

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ABSTRACT

Heart disease is one of the main sources of demise around the world. It is imperative to predict the disease at a premature phase. The computer aided systems help the doctor as a tool for predicting and diagnosing heart attack. This research mainly focuses on the study of women heart attack prediction are analysed. Heart disease is the leading cause of death for both men and women. The early symptoms of heart attack can be quite different from men & women. It is a common belief that women are better at looking their health than men. But when it comes to heart health, research shows that many women don't and often put the needs of others before themselves. In this study we studied various available techniques and diagnosis of heart attack disease with a sophisticated approach to data extraction, the Ant Colony Optimization technique.

KEYWORDS: data mining, Heart disease, Ant colony optimization, pheromone

1. INTRODUCTION

Heart disease is one in all the most sources of ending round the world. It's imperative to predict the difficulty at a premature section. The pc assisted systems facilitate the doctor as a tool for predicting and designation heart attack. This analysis chiefly focuses on the study of ladies heartfailure prediction are analysed. Cardiovascular disease is that the leading reason for death for each men and ladies. The first symptoms of heart failure will be quite completely different from men & women. It's a typical belief that women are higher at wanting their health than men. However once it involves heart health, analysis shows that a lot of women's don't and sometimes place the requirements of others before

themselves. This paper has focused on Data mining method and technology to change this information into useful data for conclusion. The data mining algorithms will helps to produce the outcome in fast prediction of disease with high accuracy. This study focusedon numerous accessible techniques and designation of heartfailure problem with a complicated approach to information extraction, the ant Colony improvement technique.

Health care data is the collection and consumption of information from all aspects of fitness and it has the target of analysing the patient what will happen for them in a manner as a both efficient and accurate. The final target for the health data is the quality of concern that the health care field can provide to the patients. Research can apply the



data mining and investigative the medical information in order to develop a innovative ways of making the conclusion faster and efficient and it will be more accurate and its cost effective than existing procedure. The unconsumed information has been changed to beneficial data with the help of various data mining techniques.

In the present world, Cardiovascular Disease (CVD) is the highly increasing disease. CVD is disorders of the heart and the blood vessels and it have been included of heart disease, Cerebrovascular disease, rheumatic heart disease. Many human deaths in recent are due to the heart attacks and strokes. CVD can exhibit blood pressure, glucose, and lipids and mainly for the youngsters due to the overweight and obesity. A good quality life style and the premature detection is the way for preventing the heart disease. This early detection can be done with the help of computer the use of the computer is able to present the health check improvements. In modern world, the recognition of the disease can be easily done by the medical expert abilities with the basic current test results. To make a diagnose of the disease is so critical task that needs high skills and a great deal knowledge. The mainly focusing for detecting the disease with the help of data mining techniques. Machine learning makes it achievable to

obtain the information from a enormous data, it's impossible for the human.

2. MACHINE LEARNING TECHNIQUES

ANT COLONY OPTIMIZATION(ACO):

The ant colony algorithm is for discovery the best paths and that is based on the performance of ants searching for food. Ants will communicate their information to other ant by leaving "markers" (pheromones). Those pheromones show the path for the food. The others have moving on the way of the markers they will likely to follow the path of the pheromones with a high probability. If the ants do the same then they populate the pathway with help of their own Pheromones as they bring the food back faster. Then the others ants are also find the path, it will gets much stronger till there are a pair of streams of ants were progress to the different food sources close to the colony.

Ant behaviour is shown in Figure below using random moves and the markers (pheromones) within a land containing one nest and one food source, the ants will go away from the nest, discover the food and return to the nest. After some time, the path being used by the ants will be converging to the shortest way.

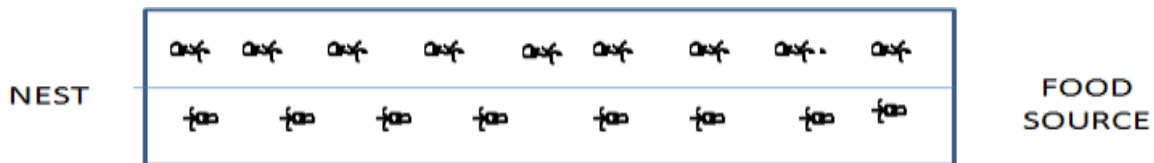


FIGURE1. Ants in a pheromone trail between nest and food

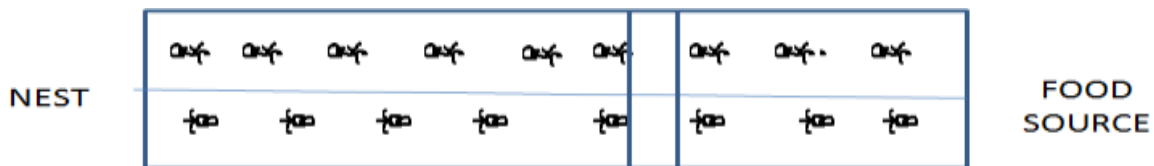


FIGURE2. An obstacle interrupts the trail

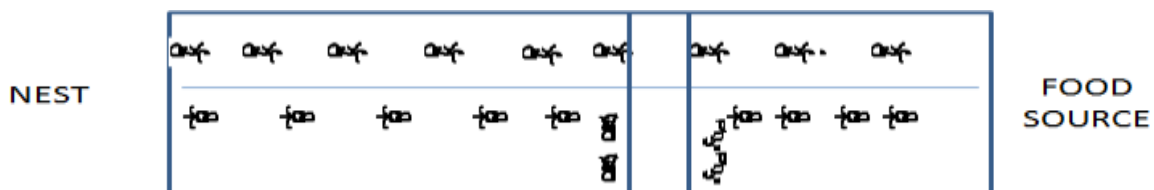


FIGURE 3. Ants find two paths to go around the obstacle]

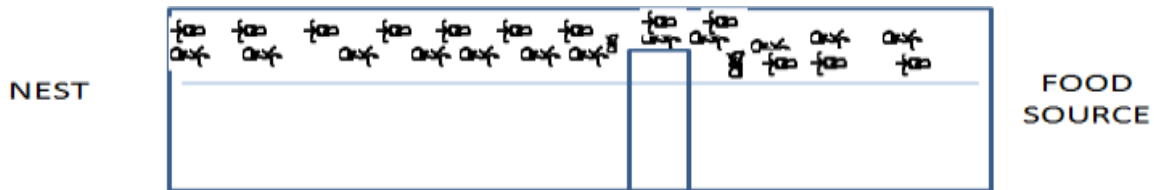
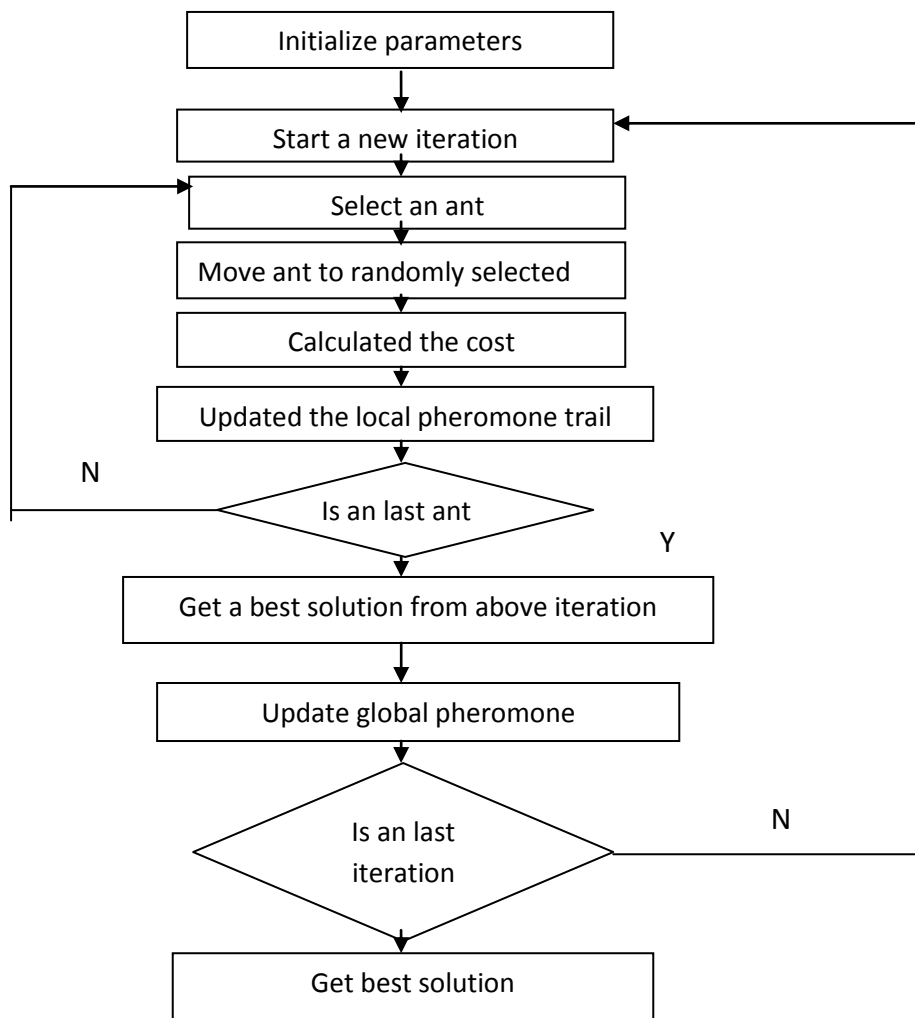


FIGURE 4. A new pheromone trail is formed along the shorter path.

The ACO algorithm is based on extensible altering the pheromone on the path at each node

shown in following figure. The selection of this node is leads to a probability based selection approach.



EXISTING LITERATURE

Poonam Kataria, parag et al [1], present work has been implemented method using PSO based classification and it has been successfully using UCI Repository of Machine Learning Databases. The goal of classification is to attain improved classification using data set of diabetic patients for discovery of diabetes. The results has proven that the accuracy

generated by using particle swarm optimization(PSO) is more as compare to other optimization algorithms named as genetic algorithm and ant colony optimization algorithm(ACO) in classification process.

Rafael S. Parpinelli, parag et al [2], they have been proposed an algorithm for rule discovery called Ant-Miner. The aim of Ant-Miner is to find out



classification rules in the data sets. The algorithm is based both on investigate on the behaviour of real ant colonies and on data-mining concepts and ethics. They have been compared the performance of Ant-Miner and the well-known CN2 algorithm in six public domain data sets. The conclusion the results proved that, concerning predictive accuracy and the rule lists has been exposed by Ant-Miner are considerably simpler than those exposed by CN2.

Pise Satish Prakashra, parag et al [3], the study has determined on the formulation and implementation of an better and reliable model for the analysis of heart attack disease with a sophisticated approach to information extraction, using the Ant Colony Optimization technique(ACO). They have first generated the support, symptom weight, which will be the initial value of the pheromone. There are different types of heart disease that can be considered here as Congenital Heart Disease, Congestive Heart Failure, Coronary Heart Disease. Based on this they have finding the risk and identify the maximum value of the pheromone and the maximum value of the pheromone is the addition of weight and risk level. The ant has to find out the maximum value of the pheromone, as the sensitive ant movements and the ratio of the symptoms will modify. According to these techniques, the number of fragments can be managed via the ACO parameter. They has proven the higher recognition accuracy.

“Parag Deoskar and Dr. Divakar Singh, parag et al [4], An Efficient Support Based Ant Colony Optimization Technique for Lung Cancer Data, they have been proposed a new algorithm that is support based ant colony optimization technique (SPACO). This algorithm is generally separated into three types, first type they accept the data set of cancer symptoms which is a generalized a system for creating the patterns for Lung Cancer Framework, second type find the relevant information from the patterns. At this stage picks up the repeated symptoms only by using the support count value. Depending on the support value then decide the ants and pheromone value. By initialize the pheromone

value which is the sustain of the pattern for the cancer symptoms. It will update in each trial. By updating the pheromone value in each step now check the symptom quality which either increases the prediction or decreases the prediction. In result analysis they have been the effectiveness of our algorithm.

“Youness Khouardifil, Mohamed Bahajl”[5], Heart Disease Prediction and Classification Using Machine Learning Algorithms Optimized by Particle Swarm Optimization and Ant Colony Optimization, The proposed work has been applied to heart disease dataset, the results has exhibit the efficacy and robustness of the proposed hybrid system in processing different types of data for heart disease classification. The research has been observe the different machine learning algorithms and compares the results using diverse performance measures, i.e. accuracy, precision, recall, f1-score, etc. A highest classification accuracy of 99.65% using the optimized model proposed by FCBF, PSO and ACO. The results proven the performance of the proposed system is superior to that of the classification method

“Wei Gao” [6], Improved Ant Colony Clustering Algorithm and Its Performance Study, A new abstraction ant colony clustering algorithm using a information combination method has proposed to progress the computational efficiency and accuracy of the ant colony clustering algorithm. The concept of ant colony clustering algorithm is used to cluster benchmark trouble, and its performance is compared with the ant colony clustering algorithm and other techniques has used in existing literature. According to the similar computational problems and complexities, the results illustrate that the concept of ant colony clustering algorithm produces the results that it was not more accurate but also more efficiently resolute than the ant colony clustering algorithm and the other techniques. so, the concept of ant colony clustering algorithm can be used for efficient multivariate data clustering.

**4. INFERENCES FROM EXISTING STUDY**

Author	Year	Purpose	Techniques used	Accuracy
Poonam Kataria , Navpreet Rupal , Rahul Sharma	2014	comparative study of GA, ACO & PSO based Data Clustering methods.	GA, ACO & PSO	particle swarm optimization techniques results as the best optimization technique
Rafael S. Parpinelli, Heitor S. Lopes, and Alex A. Freitas	2002	compare the performance of Ant- Minerwith CN2. To discover classification rules in data sets.	ACO & New ACO	Ant-Miner has consistently found much simpler (smaller) rule lists than CN2
Pise Satish Prakashrao, Anoop Singh & Ritesh Kumar Yadav	2018	Improved and reliable model for the diagnosis of heart attack disease	ACO and K-Means Algorithm	Achieved higher recognition accuracy
Parag Deoskar, Dr. Divakar Singh, Dr. Anju Sing	2013	They present an effective approach which is based on association and optimization for lung cancer prediction.	SPACO,ACO	Result analysis,has proved the effectiveness of SPACO algorithm
Youness Khourdifi, Mohamed Bahaj	2018	Exploited the Fast Correlation-Based Feature Selection (FCBF) method to filter redundant features in order to improve the quality of heart disease classification. compare algorithms with different performance measures using machine learning	ACO,PSO	The performance of the proposed system is superior to that of the classification technique
Wei Gao	2016	A new abstraction ant colony clustering algorithm using a data combination mechanism is proposed to improve the computational efficiency and accuracy of the ant colony clustering algorithm	ACO, Abstraction ACO	The abstraction ant colony clustering algorithm produces results that are not only more accurate but also more efficiently determined than the ant colony clustering algorithm and the other methods. The abstraction ant colony clustering algorithm can be used for efficient multivariate data clustering.



5. CONCLUSION

Heart disease prediction is not easy and very significant in the medical field. It's complicated to recognize the heart disease since there are several con-tributory risk factors such as diabetes, blood pressure, cholesterol, abnormal pulse rate and numerous factors. Different techniques in data mining have been engaged to find out the harshness of heart disease among humans. The goal of the paper is to provide an insight of heart disease risk analysis using ACO.

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