CHAPTER 7

CONCLUSION AND FUTURE SCOPE

7.1 SUMMARY

Myocardial Infarction is one of the leading deaths causing cardiovascular disease which has to be identified and prevented at the early stage. Out of all acute coronary syndromes (ACS) the STEMI is the most severe type. WHO provided a statistical report saying nearly 17,327,000 people die due to cardiovascular disease worldwide every year. WHO also reports that most of the CVD’s can be prevented by addressing behavioural risk factors and identifying in the early stage. Under the leadership of WHO an action plan is generated to reduce the number of mortality due to CVD’s before 2025.

To prevent the ST segment elevation myocardial infarction in the early stage the clinical industry requires a perfect and accurate clinical assistant. An accurate clinical decision support system is required to predict the myocardial infarction in the early stage. With this inspiration the proposed research work is intended to develop a support system which helps the clinicians to prevent the ST segment elevation myocardial infarction in the early stage. This research work considered all factors involved in the occurrence of ST segment myocardial infarction.
As it is proved in many literatures that the behavioural habits of any individual is the main cause of heart disease this research work considers the behavioural characteristics as the risk factors in the initial stage. In the later stage the same individual’s ECG data is processed and applied to the algorithm to predict the ST segment elevation myocardial infarction. The accuracy of this work is compared with other classical algorithms like CART and BFOA. This work pleased all the proposed objective of the current research.

The first objective of this research work is to extract and classify the data using data mining techniques. Different data mining preprocessing techniques are used to extract the useful information. All the data are normalized using the min max and chi merge normalization method. The data mining technique K means clustering is effectively used.

The disease prediction from the risk factors is done by the artificial neural networks. The main objective of this work is to reduce the error rate of ANN in all iterations. The error signal is validated with the threshold value less than 0.001 in each step. Based on the error value with the aid of back propagation algorithm the weights of the previous nodes are adjusted. Due to this error adjustment on each node the accuracy of the network is increased to 96.81%.

Extraction the ST segment data from the ECG signal and the optimized values are recovered using the algorithms CART and BFOA. Various algorithmic measures are taken to reduce the impurities in the CART and the error in the BFOA. As the number of best prediction in CART and number of best position in BFOA is comparatively less the accuracy of the system also found to be less.
To increase the accuracy the BFOA is driven with an external frequency in the FDABFOA model. The ST segment is extracted from the ECG signal and applied to the proposed FDABFO algorithm to predict the occurrence of ST segment elevation MI. The detection is chosen from the global optimum value obtained by the algorithm. In order to attract the global optimum value using the proposed FDABFOA the elimination rate is minimized. To reduce the elimination rate in the proposed FDABFO algorithm an external frequency of 0.29 is driven. It results in increasing the tumbling rate and the system accuracy. The proposed FDABFO algorithm is compared with the classical BFOA in terms of accuracy and elimination rates. The accuracy rate achieved by the FDABFOA is 98.7% and classical BFOA is 93.2%. It proves that the proposed model attains the high accuracy rate which leads to accurate prediction of disease.

The accuracy rate, error rate of the three algorithms CART, BFOA and FDABFOA are evaluated and compared. A regression analysis is carried out on the entire obtained accuracy rate to confirm the validity of the algorithms.

7.2 FUTURE SCOPE

As illustrated before the system can be used as a clinical assistant for any clinicians. The disease prediction through the risk factors can be hosted online and hence any internet users can access the system through a web browser and understand the risk of heart disease.

The proposed frequency dependent adaptive BFOA can be used in any optimization problem. In order to achieve the global optimum value either
the global maxima or global minima the proposed model can be utilized. The proposed model can be implemented for any real time application. The main drawback is the computational time of the algorithm when used in real time application.

Using the proposed model other type of heart disease also can be determined. Different heart diseases such as rheumatic heart disease, hypertensive heart disease, ischemic heart disease, cerebrovascular disease and inflammatory heart disease can be identified. Other health care systems can be formulated using this proposed model in order to identify the diseases in the early stage.

The proposed model requires an efficient processor with good memory configuration to implement it in real time. The proposed model has wide area of application like grid computing, cloud computing, robotic modeling, etc.