**MA-LSTMNet: An Efficient Multiscale Attention LSTMNet-based Heart Disease Prediction Framework with IoT Devices Incorporating Hybrid Rat Swarm-Red Deer Algorithm**

**Methodology:** Heart disease is the biggest cause of death in the globe. The method of predicting cardiac disease is exceedingly complex. It can only be done properly if the doctor has a lot of expertise and is well-versed in the condition. Internet of Things (IoT)-based illness prediction is a relatively recent technology for accurately classifying diseases based on sensor data. Several machine learning-based methods have recently been proven for predicting and diagnosing cardiac illness. However, these algorithms are unable to manage high-dimensional information due to the lack of a smart framework that can combine several sources to anticipate cardiac illness. Therefore, an efficient IoT-based heart disease monitoring system will be developed in this abstract using the multiscale attention-based deep learning architecture. This developed model includes (a) IoT-based data collection, (b) Data pre-processing, (c) Deep Feature Extraction, (d) Signal Feature Extraction, (e) Weighted Feature Fusion, and (f) Heart Disease Prediction. Initially, the IoT-based heart disease data will be collected from the standard benchmark datasets. The collected heart disease data will be given into the data pre-processing. Then, the pre-processed data will be considered for deep feature extraction phase and signal feature extraction. Here, the deep feature extraction will be done with the help of Deep Convolutional Neural Network (DCNN) and signal features like computing peak amplitude, total harmonic distortion, zero crossing rate, entropy, standard deviation, and Root Mean Square of sum of the Successive Differences (RMSSD) will also be extracted. Then, both the deep features as well as signal features will be given to the weighted feature fusion phase, where the weights will be optimized and optimal features will be selected with the help of hybrid optimization algorithm of Rat Swarm Optimizer (RSO) [1] and Red Deer Algorithm (RDA) [2] for enhancing the prediction performance. Then, the weighted fused features will be used into the heart disease prediction phase, where the Multiscale Attention-based Long Short Term Memory Network (MA-LSTMNet) for predicting the heart disease. Here, the parameter optimization will takes place using the same developed RSO+RDA for getting accurate predicting results. The experimental analysis will be carried out by comparing the implemented IoT-based heart disease prediction model and conventional models.

**Expected Outcome-**The proposed IoT-based heart disease prediction model will be developed in Python, and the experimental analysis will be performed. Here, the performance of the proposed model will be compared over the conventional models in terms of Type I and Type II measures. Here, Type I measures are positive measures like Accuracy, Sensitivity, Specificity, Precision, Negative Predictive Value (NPV), F1Score and Mathews correlation coefficient (MCC), and Type II measures are negative measures like False positive rate (FPR), False negative rate (FNR), and False Discovery Rate (FDR).

**References**

[1] Gaurav Dhiman, Meenakshi Garg, Atulya Nagar, Vijay Kumar & Mohammad Dehghani,"A novel algorithm for global optimization: Rat Swarm Optimizer,"Journal of Ambient Intelligence and Humanized Computing, vol. 12, pp. 8457–8482, 2021.

[2] Amir Mohammad Fathollahi-Fard, Mostafa Hajiaghaei-Keshteli, and Reza Tavakkoli-Moghaddam, "Red deer algorithm (RDA): a new nature-inspired meta-heuristic", Soft Computing, October 2020.