

Table 1  
Spearman correlation coefficient- Individual vs proposed Ensemble Filter Method

Methods	Threshold =	Threshold =	Threshold =	Threshold =
Chi - Square				
Relief				
Mutual info				
mRmR				
Proposed (Ensemble)				

Table 2  
Accuracies obtained with and without hybridization of filter and wrapper-based approaches

Methods	Accuracy	Friedman mean rank	Rank
Ensemble filter+BEEO(RL)+BMFK(proposed)			
With ensemble filter & with BEO alone (NO RL)			
Without ensemble filter & with BEO-RL			
without filter & wrapper(all 44 features to BMFK classifier)			

Table 3  
Best fitness and Mean fitness values using the proposed approach and other heuristic algorithms

Methods	Best Fitness	Mean Fitness	Accuracy	Friedman mean rank
Ensemble filter+BEEO(RL)+BMFK(proposed)				
GA- BMFK				
PSO- BMFK				
GWO- BMFK				

Table 4  
Number of features selected using the proposed approach and other heuristic algorithms

Methods	No.of features selected	Friedman mean rank
Ensemble filter+BEEO(RL)+BMFK(proposed)		
GA- BMFK		
PSO- BMFK		
GWO- BMFK		

Graph - Convergence behavior of the proposed (Ensemble filter+BEE+RL+ BMFK) approach

1. Number of iterations vs fitness value
2. Number of iterations vs mean fitness (if possible)

Table 5  
Classification performance analysis of individual ML classifier without feature selection

Methods	Accuracy	Precision	Recall	F1 Score	AUC Score
KNN					
Random Forest					
Decision Tree					
Naïve Bayes					
SVM					
AdaBoost					

ROC Plot - individual ML classifier without feature selection

Table 6  
Classification performance analysis of individual ML classifier with proposed feature selection

Methods	Accuracy	Precision	Recall	F1 Score	AUC Score
KNN					
Random Forest					
Decision Tree					
Naïve Bayes					
SVM					
AdaBoost					

ROC Plot - of individual ML classifier with proposed feature selection

Parameter settings – Sample (change the values of ours)

Algorithms	Parameter Values
Common parameter settings	N =10, Maximum number of iterations =30, value of k in KNN and BMFK =5, Fuzzy strength parameter in BMFK (m) =2, $\alpha$ in the fitness function =0.99.
GA	Mutation Rate =0.01, Crossover Rate =0.8.
PSO	Inertia weight, w =0.9, acceleration constants (c1 and c2 =2).
GWO	Convergence parameter, a =[2,0] (decreases linearly from 2 to 0)
Proposed [EF(ensemble filter)+BEE(RL)+BMKF]	Constants (c1 =2, c2 =1), P =0.5, Volume v =1