Second Deliverable

Monday, December 14, 2020

AK

Ajay Kumar

I think, you can move forward with this idea. 12:44 PM

Arooj Ahmed Qureshi Sunday, December 13, 2020 8:06 PM

- change of objective function: which I already did for you. Replacing the error function by the AUC score.
- changing S-shaped function: The report I shared with you has a proposed list of S-functions.
- converting Jaya algorithm output into binary conversion : if we change this mechanism, along with the above two, it might be a good package overall.

Parameters

- **Objective Function**
  - AUC score
  - Error Function
- **S-shaped Function** [added now]
  - 7 functions added in the report [pages 5-7]
- **Binary Conversion [page 7]**
  - Random_r [report_1 method]
  - Default_r [new method]

Algorithm

Previous Report

Algorithm: The pseudo-code of the Proposed Algorithm

1. ---------- Initialize parameters and content ----------
2. Initialize Jaya algorithm parameters. Population Size (**P**), Number of Executions (**E**), Maximum Iterations (**MaxIter**), Minimum number of Features (**D**).
3. Load Datasets Train (Tr), Test (Te)
4. Initialize content. Objective Function, S-Function, Classifier
5. ---------- Initialize the binary population ----------
6. Generate binary population $X_{(i,j)}$ $\forall\, p = 1,2,\dots,P$ and $\forall\, d = 1,2,\dots,D$ features.
7. Calculate $f(X)$
8. ---------- Execution of Jaya Algorithm ----------
9. **For** $a = 1, 2, \dots, E$ **do**
10. **For** m $= 1, 2, \dots, MaxIter$ **do**
11. **if** $P > 1$ **do**
12. Determine the best solution in the population (X_{best})
13. Determine the worst solution in the population (X_{worst})
14. **For** $p = 1,2,\dots,P$ **do**
15. **For** $d = 1,2,\dots,D$ **do**
16. $r1 = rand(0,1)$
17. $r2 = rand(0,1)$
18. Jaya $(p,d) = \mathrm{x}(p,d) + \mathrm{r1} \times (\mathrm{bestX} - |\mathrm{x}(p,d)|) - \mathrm{r2}(\mathrm{worseX} - |\mathrm{x}(p,d)|)$
19. ------ binary conversion using S-Function ------
20. $\mathrm{B}(\mathrm{X}_{\mathrm{new}}(\mathrm{p,d})) = \frac{1}{1+\exp^{(-5 \times \mathrm{X}_{\mathrm{new}}(\mathrm{p,d}) - 0.25)}}$
21. End for
22. Calculate $f'(X_{new}(p,d))$
23. End for
24. --------- population update ----------
25. **If** $f'(X_{new})) > f(X))$ **do**
26. $f(X) = f'(X_{new})$ // update objective function
27. **Else** remove $X(p,d)$ // remove population
28. $P = len(X)$ // update **P**
29. **Else** STOP **for** // for m
30. **End for**
31. **End for**
32. ---------- Optimal Subset of Features ----------
33. Re-arrange Train and Test datasets according to optimal features
34. Classify

New Report

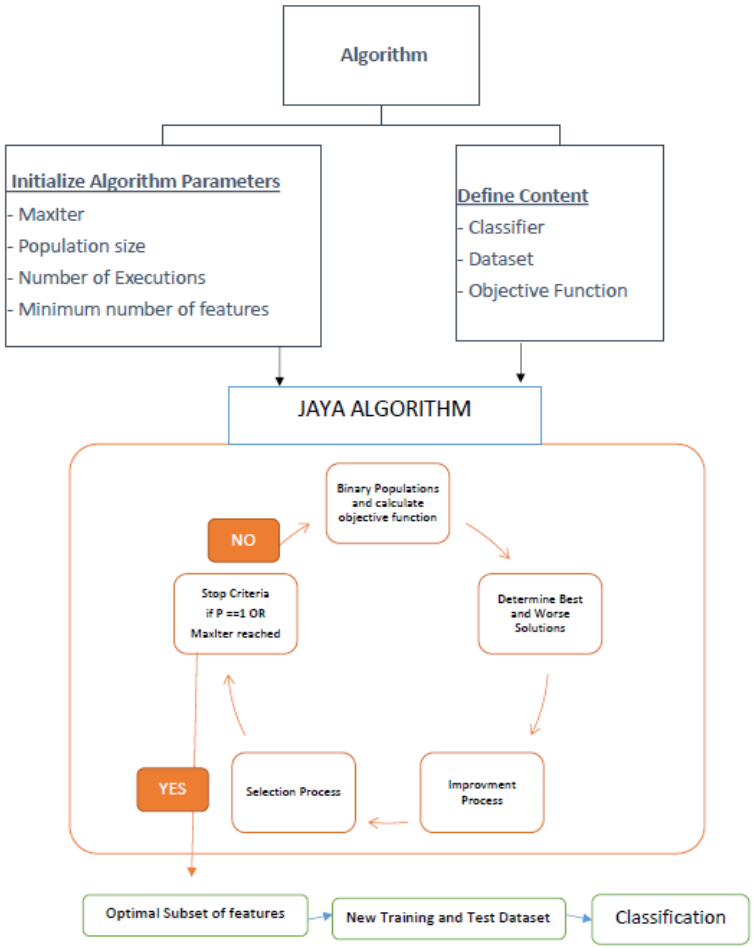
Algorithm: The pseudo-code of the Proposed Algorithm

1. ---------- Initialize parameters and content ----------
2. Initialize Jaya algorithm parameters. Population Size (**P**), Number of Executions (**E**), Maximum Iterations (**MaxIter**), Minimum number of Features (**D**).
3. Load Datasets Train (Tr), Test (Te)
4. Initialize content. Objective Function, S-Function, Classifier
5. ---------- Initialize the binary population ----------
6. Generate binary population $X_{(i,j)}$ $\forall\, p = 1,2,\dots,P$ and $\forall\, d = 1,2,\dots,D$ features.
7. Calculate $f(X)$
8. ---------- Execution of Jaya Algorithm ----------
9. **For** $a = 1, 2, \dots, E$ **do**
10. **For** m $= 1, 2, \dots, MaxIter$ **do**
11. **if** $P > 1$ **do**
12. Determine the best solution in the population (X_{best})
13. Determine the worst solution in the population (X_{worst})
14. **For** $p = 1,2,\dots,P$ **do**
15. **For** $d = 1,2,\dots,D$ **do**
16. $r1 = rand(0,1)$
17. $r2 = rand(0,1)$
18. Jaya $(p,d) = \mathrm{x}(p,d) + \mathrm{r1} \times (\mathrm{bestX} - |\mathrm{x}(p,d)|) - \mathrm{r2}(\mathrm{worseX} - |\mathrm{x}(p,d)|)$
19. ------ binary conversion using S-Function ------
20. $\mathrm{S}(\mathrm{X}_{\mathrm{new}}(\mathrm{p,d})) = sigmoid_function$
21. $\mathrm{B}(\mathrm{X}_{\mathrm{new}}(\mathrm{p,d})) = binary\ conversion_function$
22. End for
23. Calculate $f'(X_{new}(p,d))$
24. End for
25. --------- population update ----------
26. **If** $f'(X_{new})) > f(X))$ **do**
27. $f(X) = f'(X_{new})$ // update objective function
28. **Else** remove $X(p,d)$ // remove population
29. $P = len(X)$ // update **P**
30. **Else** STOP **for** // for m
31. **End for**
32. **End for**
33. ---------- Optimal Subset of Features ----------
34. Re-arrange Train and Test datasets according to optimal features
35. Classify

Flowchart

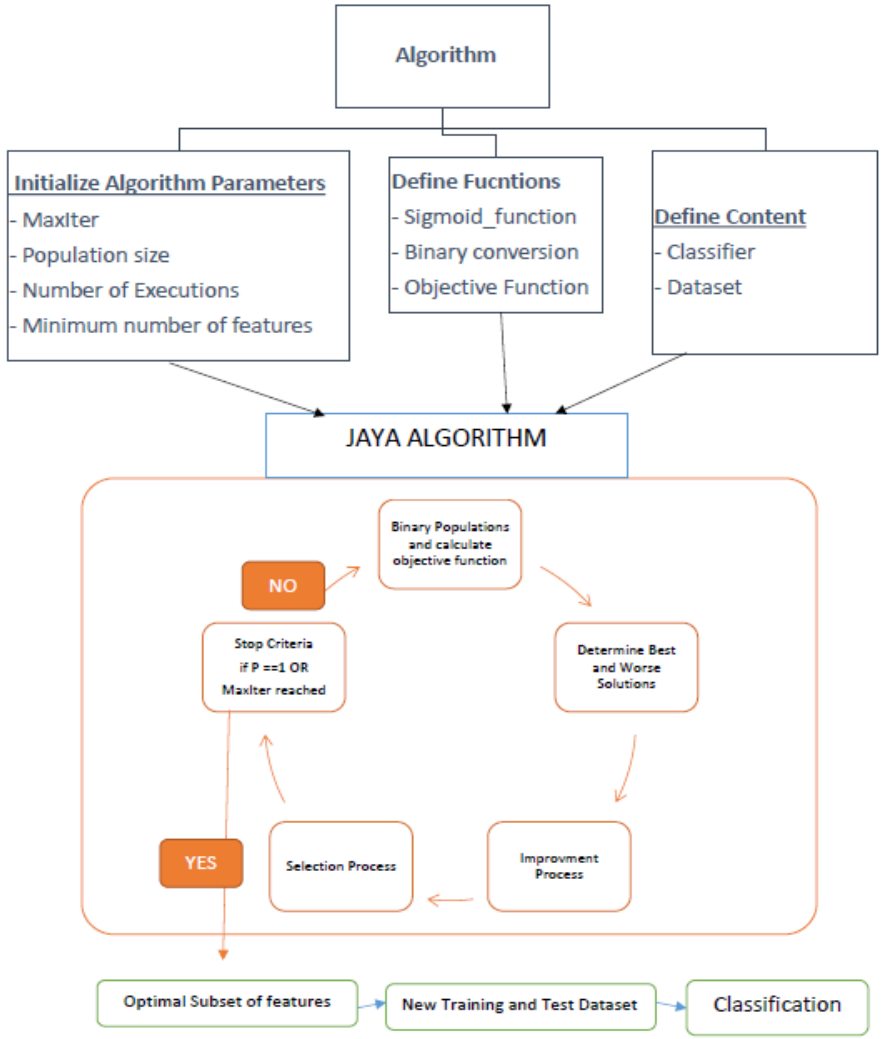
Previous Report

Flow Diagram



New Report

Flow Diagram



Results

Check reports