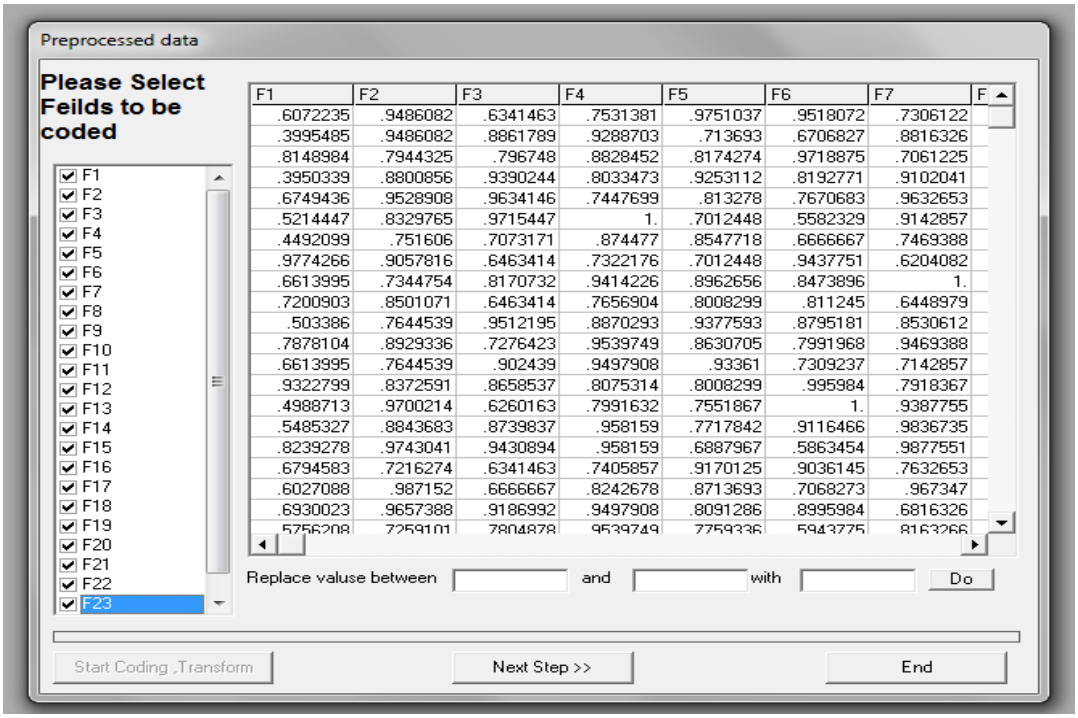
Step 2: convert the values of above database to the values in the same range [0,1] as explain in fig. (4.2).



Step3: in this work, we apply the genetic algorithm to find the optimal six features (electrical conductivity, thermal conductivity, tensile, yield, elongation, hardness) in the alloys database (i.e. this database consist of (50) samples and each sample contain of (24) features) as explain in chapter four.

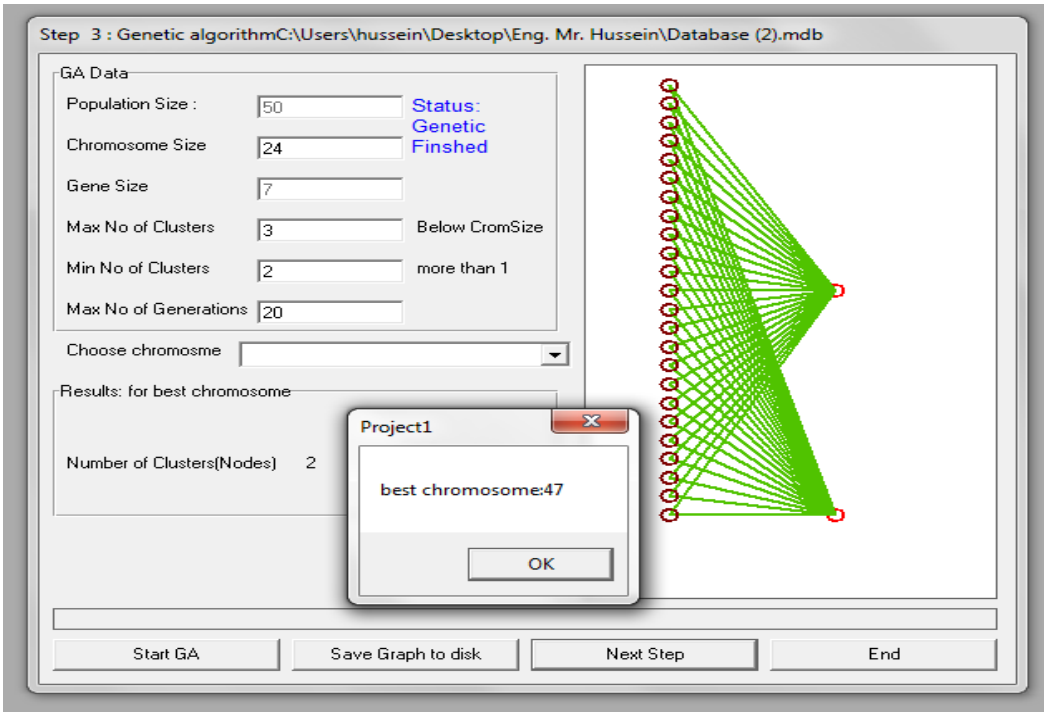


Fig. (4.3) results of genetic algorithm

Genetic algorithm applied to find the best values of the final results of alloys features. Before this, we need to determine some of parameters relate to GA such as (population size= 50 individuals, the probability of crossover=90%, the probability of mutation = 10%, number of generation =20).

After we get the best values of alloys features by genetic algorithm, features each gene in best chromosome (i.e., the chromosome have the maximization value of fitness function in the last generation).

Total number of cells in database = 1200

Population size = 50
Chromosome size = 24
Gene size = 7
Max. No. of clusters = 3
Min. No. of clusters = 2
Max. No of generation = 20

The following table shows the results of the optimization algorithm represented genetic algorithm compared with the experimental results.

Table (4.1) shows the results of the optimization algorithm represented genetic algorithm compared with the experimental results

Features	Experimental	Optimization Algorithm
F_1	44.6	40.2
F_2	46.80	44.24
F_3	49.20	47.12
F_4	47.90	46.29
F_5	48.30	47.45
F_6	49.80	49.23
F_7	49.00	48.14
F_8	178.00	168.16
F_9	184.60	172.42
F_{10}	196.30	189.10
F_{11}	188.40	175.58
F_{12}	193.60	181.82
F_{13}	197.60	194.71
F_{14}	196.00	186.90
F_{15}	427.00	420.80
F_{16}	225.00	219.40
F_{17}	10.60	11.36
F_{18}	77.30	77.24
F_{19}	86.40	82.34
F_{20}	86.80	82.79
F_{21}	89.30	84.38
F_{22}	97.60	96.93
F_{23}	94.50	89.53
F_{24}	93.10	88.94

5. CONCLUSION

1. Investigation of optimization through the adoption of waste recycling style represented empty soft drink cans and scrap electric wires damaged and utilization in the manufacturing of electric power transmission wires for voltages (11,33,66,132 kv).

2. Add two (Zr) and (B) pursuant to a significant leap in improving the physical and mechanical properties of the alloy.

3. Showed alloy (C_8) after heat treatment (T8) and forming ratio (40%) clear superior in mechanical and physical properties compared with alloy (A), as the ratio of improvement in tensile strength (158.7%) for Alloy (C_8) compared with (A) and the ratio of improvement in the yield strength for the same alloy (226%), while the ratio of improvement in the hardness of the alloy itself (70.7%) compared with (A) while the ratio of improvement in the electrical conductivity of the alloy (C_8) amounted to **(58%)** compared with the alloy base (A) and the ratio of improvement in the thermal conductivity (54%) for alloy (C_8) compared with (A).

4. The properties of alloys can calculate values manually in the laboratory without using computer techniques, but this method may take a long time and may lead to get error in results, therefore the using of computer less from the time required to compute results and the probability of down in error (i.e., the results givens more accuracy with short time).

5. The properties of alloys used in this research succeeded in the description of all sample, where the genetic algorithm enables from determine all alloys properties.

6. The genetic algorithm is given already the optimal solution of any problem by generating an integrated population of individuals as well as it is able to determine the properties more accuracy and generality.

Acknowledgement

Researcher would like to thank the ministry of Iraqi electricity to give him a chance to complete the study and Ms. Amira, head of development for its continued support throughout the period of research, as well as thanks go to Dr. Samaher of the College of Information Technology - University of Babylon for submitted me scientific tips.

REFERENCES

[1]. Andrey Popov," GENETIC ALGORITHMS for OPTIMIZATION", Hamburg, 2005.

[2]. Leila Mansouri[2] & Reza Rafeh[1], " Proposing a Model for Predicting Flow Stress of Aluminum Alloy in Tensile Test", Arak University (1), Islamic Azad University, Malayer Branch (2), Vol. 2, Issue 6, pp.039-042, November- December 2012.

[3]. The Math Works, "Genetic Algorithm and Direct Search Toolbox", Version 1, pp. 2-26, 2004.

[4]. Lluis.B, "A Study in Function Optimization With The Breeder Genetic Algorithm", 1999 Site:http://citeseer.ist.pus\cache\paper\cs.

[5]. Angela.B, "Soft Computing", England, 2003.Site:http://www.tessella.com

[6]. Tawfiq A, et al. "Object Oriented Classification of Forest Images Using Soft Computing Approach", IEEE, 4rth International Conference: Sciences of Electronic, Technologies of Information and Telecommunications March 25-29, 2007 – TUNISIA.

[7]. Morita.M, et al." "Unsupervised Feature Selection Using Multi-Objective Genetic Algorithms for Handwritten Word Recognition", Canada, 2003.

[8]. Sanghamitra.B, et al." Genetic Clustering For Automatic Evolution OF Clusters and Application to Image Classification", the Journal of the Pattern Recognition Society, Vol.35, PP. 1197-1208, 2002.

[9]. Nadia.B, "Cluster Validity Algorithms", Computer Science Department, Trin College, 2004.

[10]. Samaher H. Ali," Designing a Software for Classifying Objects for Air Photos & Satellite Images using Soft Computing", M.Sc. Thesis. Babylon University, 2005.