Knowledge-based Encoding in Interactive Genetic Algorithm for a Fashion Design Aid System

Hee-Su Kim and Sung-Bae Cho

Computer Science Department, Yonsei University
Shinchon-dong, Sudaemoon-ku, Seoul 120-749, Korea (Rep. of)
[madoka, sbcho]@candy.yonsei.ac.kr

1 KNOWLEDGE BASED ENCODING

Evolutionary computation gives a great potential in several real-world problems as a powerful tool for optimization and classification, but there still remain a lot of obstacles to be applied to artistic domains. To overcome this, several techniques have been proposed, and interactive genetic algorithm (IGA) is extensively studied these days among them. IGA can be applied to artistic domains such as music or design, for it takes user's evaluation as fitness function directly to evaluate each individual. We have applied IGA to fashion design in our last research [1]. In this paper we have focussed on the encoding scheme, which is effective and appropriate to be applied to the domain of fashion design.

There have been several design aid systems using evolutionary computation, but they occasionally produce impractical designs because they do not consider domain specific knowledge. To solve this problem we have encoded the detail model based on the knowledge of the fashion design. We have reclassified general detail factors into three parts, and encoded them with extra 3 bits for each, which choose the color of corresponding parts. A design is made from combining them, and some combinations preferred by users are found out from the IGA process. Fig. 1 shows the interface of the system.

Fig. 1 User interface

2 EXPERIMENTAL RESULTS

The population is composed of 8 individuals. We have used one-point crossover and mutation at the rate of 0.5 and 0.05 for each, with elitist strategy. To show that the number of preferred schemata is increasing, we have presumed the best individual from the last generation as the nearest solution, and chosen some meaningful building blocks contained within it. One process of searching for cool-looking design is selected randomly, and the frequency of chosen building blocks is counted in each generation. The nearest solution selected was an individual with slit body design with white color, sleeveless arm design, and scooter skirt design with blue color. Fig. 2 shows that each building block corresponding to the solution's characteristic increases independently. In other words, preferred schemata were tried more generation by generation. Another important point is that the number of solution schema was near 0 at the initial population. It tells us that though the number of generations was limited by 10, the evolution process did not depend upon its initial population much, and sought for ideal solution within its generations.

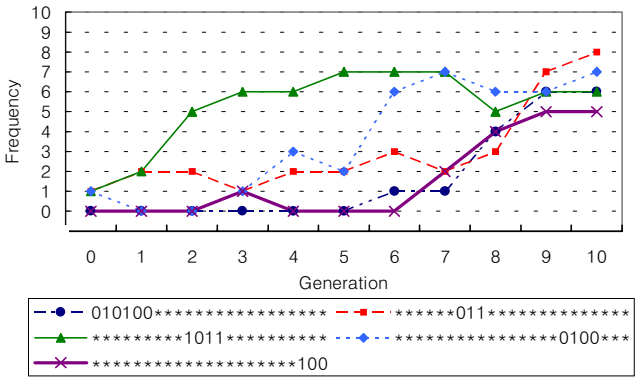

Fig. 2 Frequency of each solution schema

References

[1] H.-S. Kim and S.-B. Cho, "Development of an IGA-based fashion design aid system with domain specific knowledge," *Proc. Of IEEE Int. Conf. On Systems, Man, and Cybernetics*, 1999.