CutLeader Nesting Technology

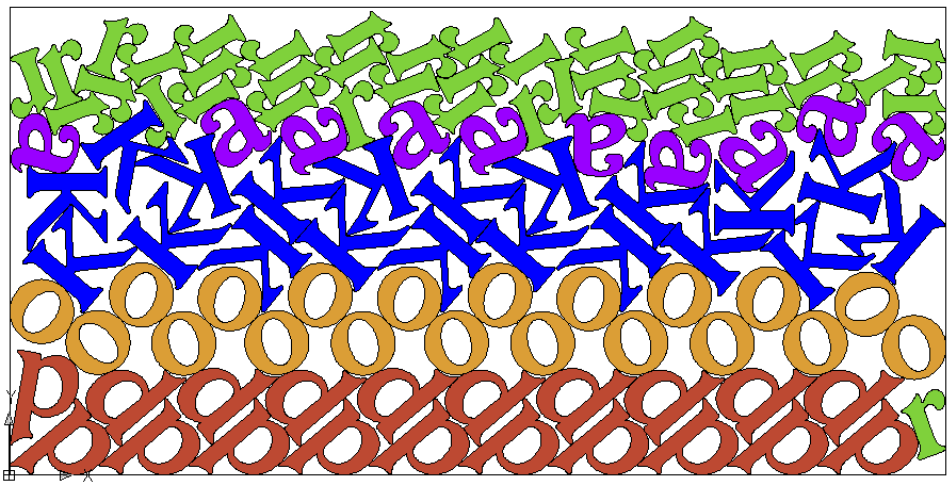
Nesting algorithm is the soul of nesting software. For example knapsack algorithm, Pair technology, are able to get a better nesting result. The former is the approximate optimization algorithm; the later is a local search method which cannot reach the overall best nest result. Only by keeping integrate new theories from each other, the better nesting result could get.

Genetic algorithms have become a hot field of artificial intelligence, genetic algorithms (GA) is from a University of Michigan Professor Holland proposed optimization methods using evolutionary strategy to find the optimal solution in the solution space . It is a simulation of the evolution of biological populations , start from a population generated randomly (the optimization problem solution set), according to the principle of survival of the fittest , after choosing, crossing, mutation and various genetic operations, and make the overall fitness of the population (i.e. optimization objective function value problem) to the direction of increasing evolution.

Artificial intelligence, genetic simulated annealing algorithm (GSA) has been applied to the field of computer-aided nesting. Heuristic nesting algorithm was put forward in the paper based on genetic simulated annealing (GSA) techniques.

By combining the advantages of the GA and SA, TAOSoft achieved greater efficiency and better optimization results after many years of accumulated technology. Improve the utilization of the materials and reduces the production costs. Currently we have reached the top level group of nesting algorithm technology, but we will still keep gaining in experience and forge ahead.

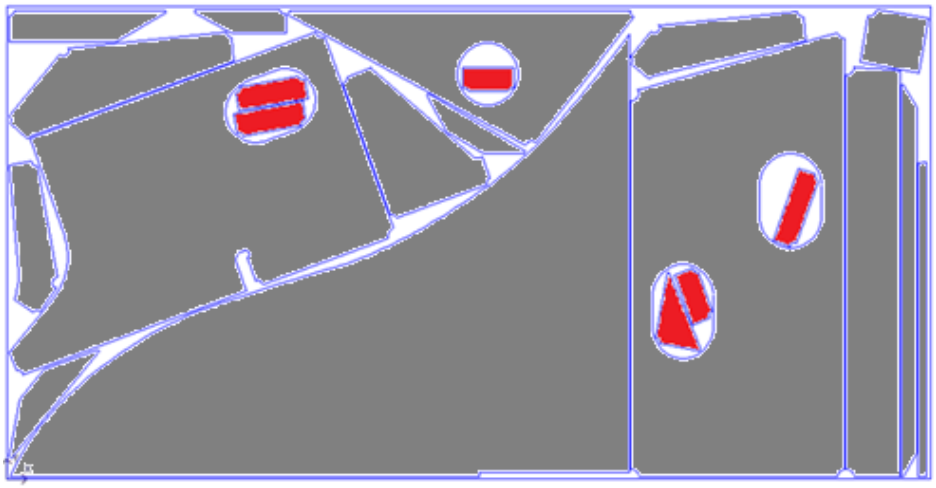
- **TRUE SHAPE NESTING ALGORITHM :**



Notes:

True Shape nesting algorithm is to maximize the material utilization, by which the system could put the parts much thicker and more concentrated.

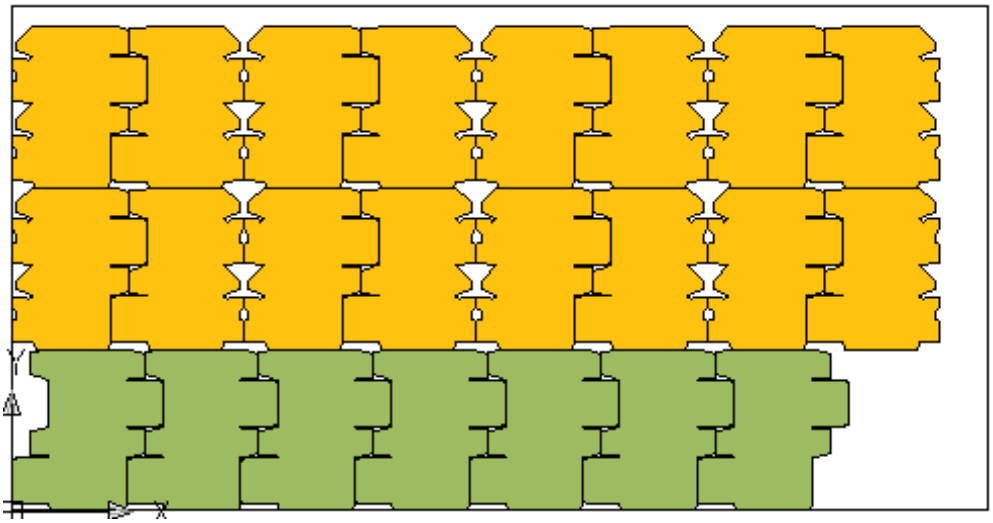
- **PART-IN-PART TECHNOLOGY:**



Notes:

Part-In-Part function is to maximize the material utilization, and then the system put small parts into the big hole or part internal scraps.

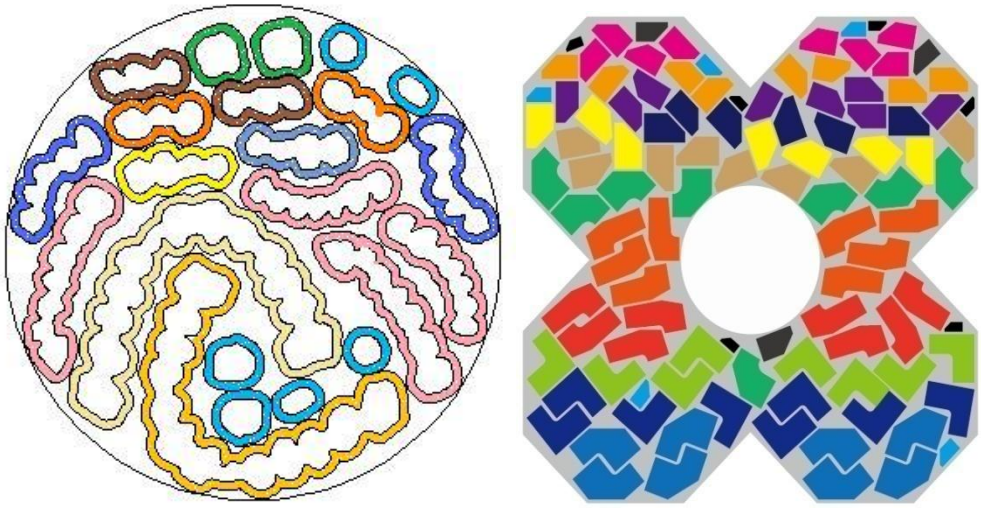
- **PAIR TECHNOLOGY:**



Notes:

Pair function is to maximize the products occlusion rate in order to improve material utilization. Specific work process is as follows: convex hull rate equal parts area divided by circumscribed polygon area, when a part convex hull rate is less than 90%, system will consider the combination with other parts. The system detects the new combination parts' convex hull rate automatically, if the combination convex hull rate greater than 95%. It will be accepted and the system continues the subsequent nesting tasks.It is used widely in packaging industry.

- **IRREGULAR MATERIAL NESTING TECHNOLOGY:**

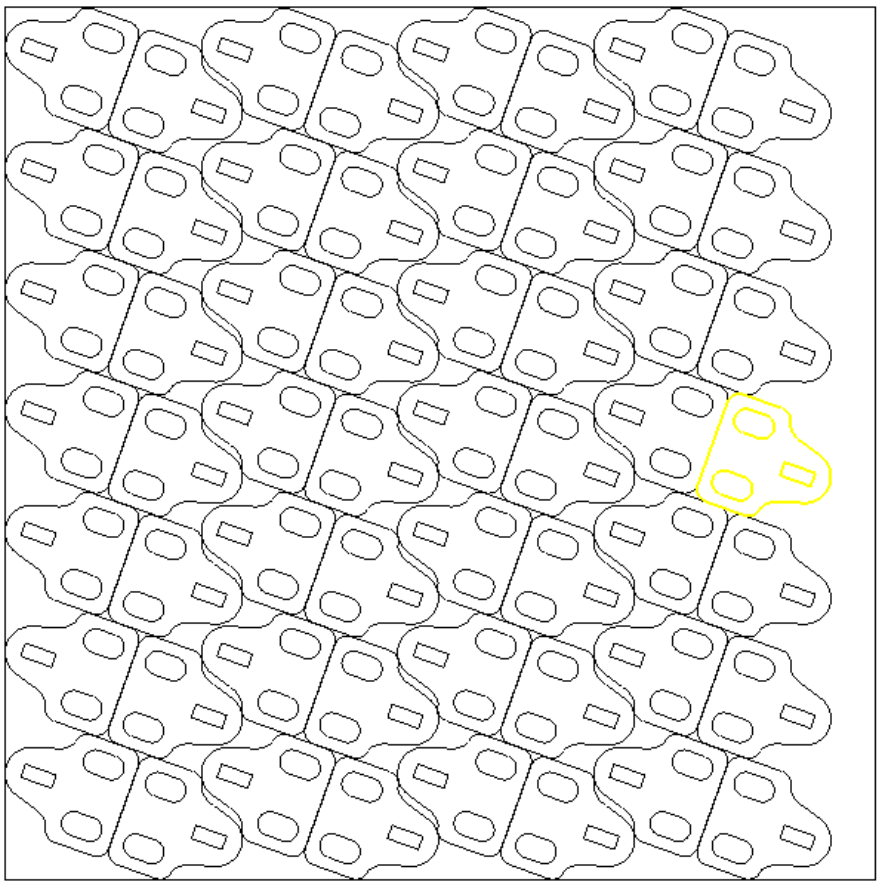


Notes:
Usually, you have to nest parts on irregular shaped sheet metals including some remnants, some materials with irregular boundaries, some materials with some useless area inside, etc.
Saving material is to maximize cost savings, especially for processing precious materials. TAOSoft supports irregular material nesting task. by this functions, User can easily improve material utilization. The above example is a typical nesting effect in the teeth model manufacturing.

Customer Test Cases

Test Case1:

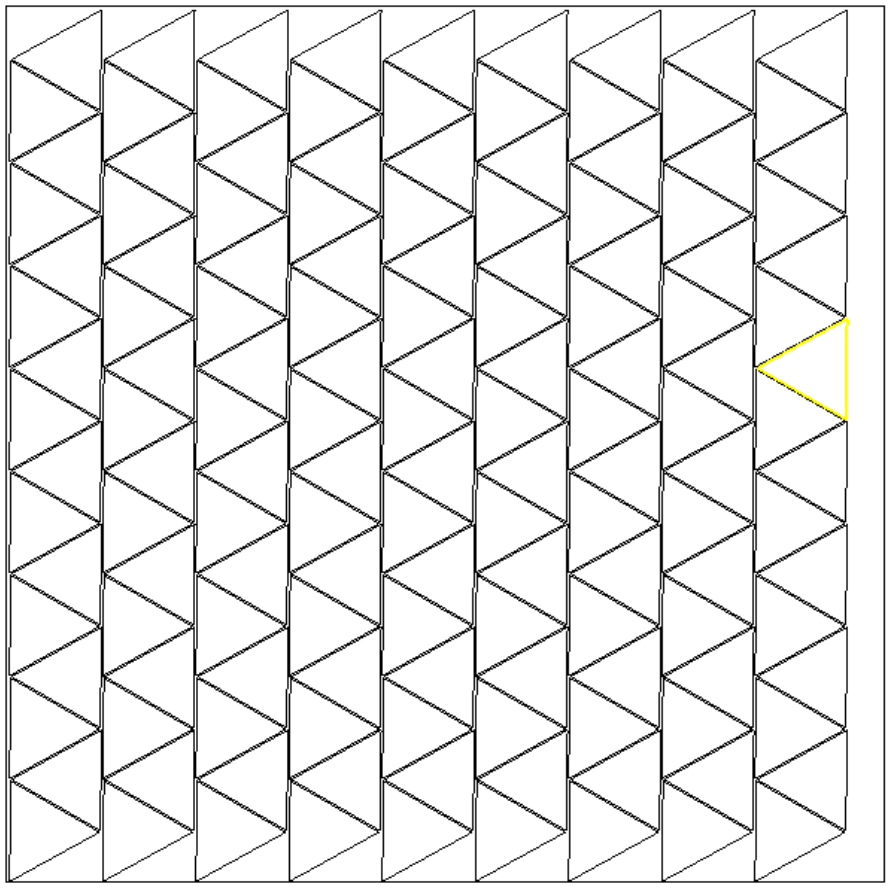
Nesting Direction	Part Distance	Start Angle	Distance from boundary	Cutting features	Sheet size	Test Part	Nesting Result
Horizontal (left to right)	0-0.5	lower left corner	0	N/A	200*200	Check below	Check below

CutLeader Rapid Nest

56 Parts

Test Case2: TRIANGE

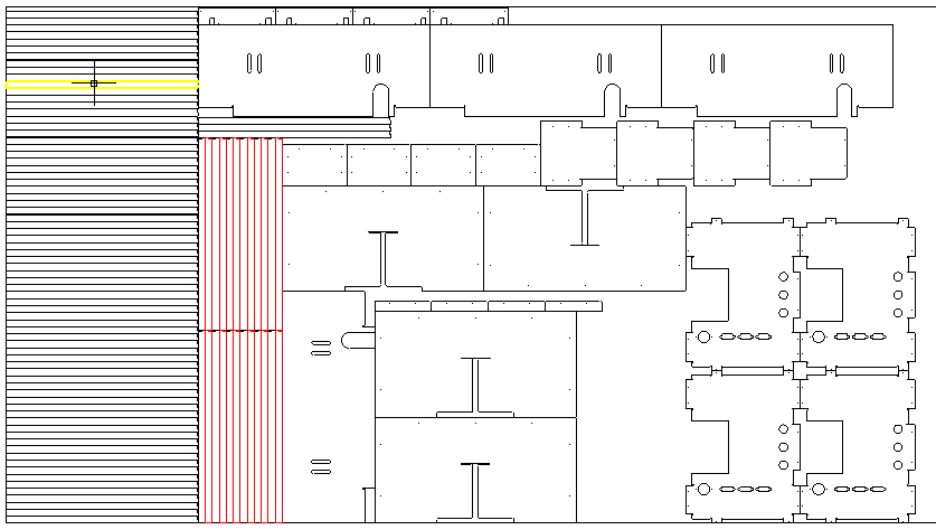
Nesting Direction	Part Distance	Start Angle	Distance from boundary	Cutting features	Sheet size	Test Part	Nesting Result
Horizontal (left to right)	0-0.5	lower left corner	0	N/A	50*50	Check below	Check below

CutLeader Rapid Nest

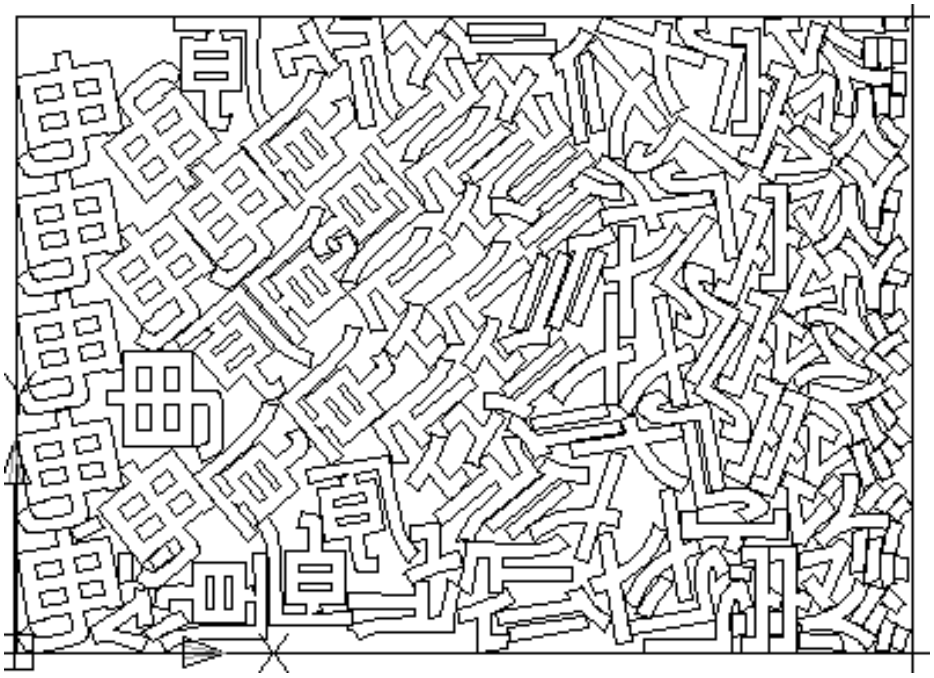


144 Parts

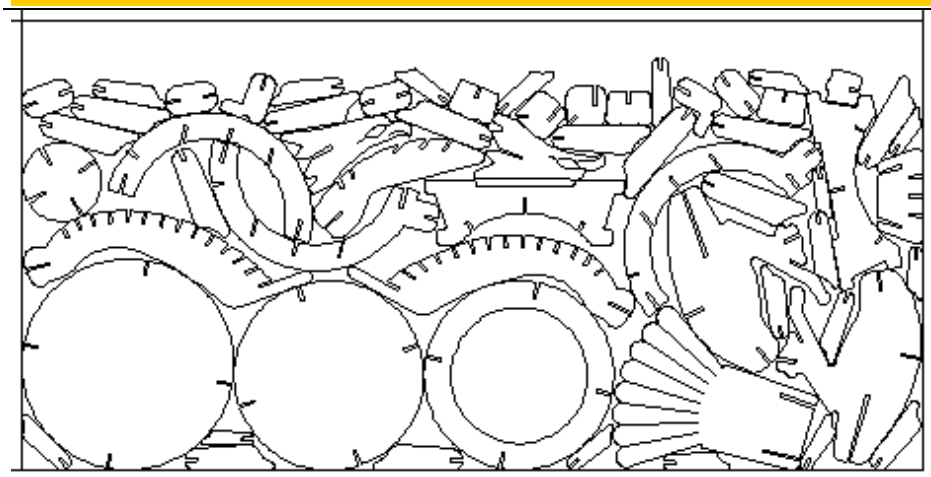
- **Test Case3: Standard Sheet Metal Nesting**



Test Case4: Text Nesting



Test Case5: Art Pattern Nesting.



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