Sheet metal parts are widely used in the engineering field during manufacturing process. In this highly competitive industrial environment, it is very important to minimize the production cost. As the material cost is the major portion of the cost involved in mass production of the sheet metal components, efficient nesting of parts will become a major factor. It minimizes the amount of scrap material and reduces the overall production cost significantly. The main objective of any industry is to minimize wastage by increasing the profit by means of arranging the parts orderly on the master sheet. The parts are to be arranged in the sheet in an acceptable position. The arrangement of the parts needs various algorithms for placing the parts on the sheets like Heuristic algorithm, Meta heuristic algorithm, Bottom left heuristics algorithm, etc., but it takes considerably longer time to achieve all optimum solution. Computational complexity can be overcome with the help of various nontraditional algorithms.

Traditionally, nesting layouts were carried out manually and it is a very time consuming process. Depending on the designer's skill and experience, the optimal layout may be obtained. Selecting the optimal blank orientation is quite challenging to perform manually, because the blank orientation changes according to the width, pitch, etc. The measure of interest will be the utilization of the sheet material, which is a function of the area used per strips. Selecting the orientation which minimizes the pitch does not maximize the material utilization and manually evaluating the both the pitch and width changes leads to great difficult. This gives a birth to computer-aided software tools to carry out the nesting of part blanks automatically. The computational needs the capabilities of CAD Systems for solving this problem.
The development of new sheet metal forming processes and tooling have done based on an experience, rules of thumb and trial and error methods. Experience is not sufficient to handle the above problems which are very expensive with regard to both effort and time. Therefore great need has been given a way for the development of experimental engineering methods which identify the problems and to tackle them effectively, and to reduce production cost, lead time between design and production.

The method of implementing the optimization technique is very essential, because the nesting of two dimensional shapes for the press tool design is one of the optimization problems. In mass production industries, the small inefficiencies will land up into the huge wastage. This is also known as two-dimensional Cutting Stock Problem (CSP) and it commonly arises in industries such as sheet material, aerospace, shipbuilding, clothes and shoe manufacturing.

The proposed work considers all possible combinations of part sequence and its orientation. This research work gives the optimum nested pattern. The sequence and orientations of parts are selected randomly and arranged in the sheet in acceptable positions. Hence Genetic Algorithm is employed for aligning the centre of all parts that lies in the same line and quickly identify the position of the part with respect to the sheet.

This experimental work evaluate on sheet metal blank using a simple mechanism (manual method) and complex mechanism (blanking and progressive die) followed by plasma arc cutting after preparing the nesting layouts which are discussed in details. The response between the various cutting conditions like number of strips used, leaving the bridge width between strips and the stock size are also described. The combinations of the strips in the blanking operations reduced human effort, die making cost and
ensure material saving. The Response Surface Modeling used to find the interaction effects of process parameters for blanking operation.

The Meta heuristic optimization is the most popular predictor than the conventional techniques. Hence the optimization technique Genetic Algorithm (GA) is executed for the proposed work. The machine coding has been generated and executed with feasible iterations to get the optimum results.

Coordinate Optimization Technique (COT) is applied to generate the partial sequence and orientation of the overall performance with a tolerable period of time using MATLAB software. COT is cost effective, robust and easy to implement for our requirements in the area of blanking of sheet metal. The result evident that this technique is minimizing the material wastage which in turn reduces the setup cost.

The optimized results of Material Utilization Ratio (MUR) using Traditional and Nontraditional technique are discussed. It was concluded that the nontraditional approaches yields better results when compared to traditional approaches because of non human intervention. It shows that the high material utilization ratio was achieved in GA and Coordinate Optimization Technique was described. Validation has been done for the accuracy of the model representation for the present work. Three approaches have been used to validate the model. Here the comparison of model was done with input output transformations corresponding to input output transformation of present model was done.