Project report for ME 504-2020

Optimization of sand casting Defects by ANN

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Objective:

In this project we are making an Artificial Neural Network with the input parameters as different casting conditions and output as the average total casting defects percentage. In early times,a company had to reject their products due to casting defects and the only method available was trial and error to predict these defects.But with the help of ANN we can predict the percentage defects before ,saving the time and money and wastage for a company. Getting output results as percentage defects ,hence we have to minimize it and get optimal parameters for doing so.

Results and conclusion:

To optimize the sand casting process parameters for minimum casting defect the data were collected from different research papers. Here we can observe the MSE is converging(from Figure 1) to a point. And also the predicted and actual defect percentage(as shown in Figure 2) are also close enough to predict the casting defects.It has been established that the Artificial Neural Network has many applications in different fields .

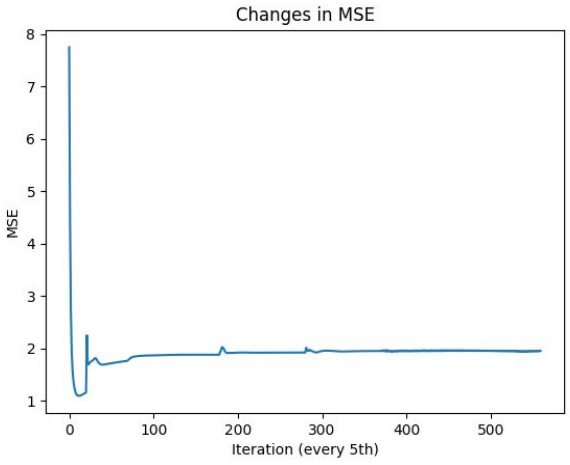

Figure 1. MSE vs iteration

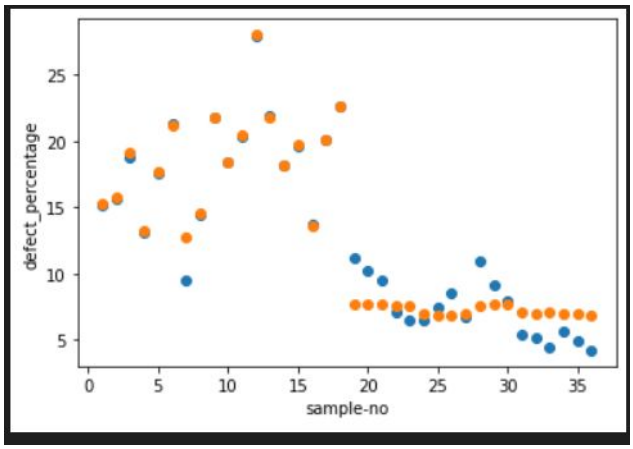

Figure 2. Defect % vs Sample no.

Novelty:

Traditional method of trial-and-error based on know-how and experience has many disadvantages such as being non-systematic, time consuming, error-prone and prolonged experimentation.

We collect data from different research papers and combine the study to get the best results.
So results are already shown in figures.

By considering the most common defect parameters which cause most of the defects in sand casting. We build our own Artificial neural network to predict the percentage defects in sand casting(which can replace trial error method) and get optimum sets of input for our process.

Reference:

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