

Modelling Daily First Time Through Status for a Top Brand in a Leading Apparel Manufacturing Company in Sri Lanka

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There is an effect from the apparel industry to the total export earnings of Sri Lanka. This paper consists of a case study relevant to the product quality of a leading apparel manufacturing plant in Sri Lanka. Quality is measured using daily first time through (FTT) percentage that calculated using daily output and number of defects. The main purpose of this study is to identify the factors affecting the daily FTT and to build a model to forecast daily FTT status. Factors affecting daily FTT were identified using multiple linear regression and Yeo Johnson power transformation methods. According to the attained results material defect, incorrect fabric direction, missing trim, and needle cut were identified as the influential factors for daily FTT. The factory standard is to maintain FTT 98% or above. For lower FTT measurement out and color, shading was affected. Data mining techniques were applied due to the violation of statistical assumptions in the aforementioned traditional methods. Classification tree and Probabilistic neural network (PNN) techniques were applied to the classes of daily FTT values of high and low as a classification problem based on the factory standard level. The under-sampling technique was used due to a class imbalance problem. The best split attribute was the number of damages and daily output was the afterward split attribute in the classification tree. In PNN the best model was selected using adjustment of the spread parameter from 0 to 1. Least false positive and false negative values were in the spread value 0.80 with the highest true positive and true negative values. PNN model consists of 1857 and 2 hidden neurons in the first and second hidden layers respectively. Accuracy was 0.98 in the classification tree which is higher than the accuracy of PNN, which of 0.93. However, both models can be used in forecasting with high accuracy. This research can benefit the apparel field to get remedial actions before arising quality issues.

Keywords: Apparel industry, First time through, Data mining, Classification tree, Probabilistic neural network