

## **An Alternative Approach for Assessing the Impact of Cutting Conditions on Surface Roughness Using Single Decision Tree**

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**Abstract :** In this study, an approach to identify factors affecting on surface roughness in a machining process is presented. This study is based on 81 data about surface roughness over a wide range of cutting tools (conventional, cutting tool with holes, cutting tool with composite material), workpiece materials (AISI 1045 Steel, AA2024 aluminum alloy, A48-class30 gray cast iron), spindle speed (630-1000 rpm), feed rate (0.05-0.075 mm/rev), depth of cut (0.05-0.15 mm) and tool overhang (41-65 mm). A single decision tree (SDT) analysis was done to identify factors for predicting a model of surface roughness, and the CART algorithm was employed for building and evaluating regression tree. Results show that a single decision tree is better than traditional regression models with higher rate and forecast accuracy and strong value.

**Keywords :** cutting condition, surface roughness, decision tree, CART algorithm

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