

ABSTRACT

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**IMPLEMENTATION OF CONVOLUTIONAL NEURAL NETWORK
ALGORITHM USING VGG-16 ARCHITECTURE FOR UNBALANCED
DATA IN QUALITY CONTROL OF CASTING PRODUCTS.**

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**Keyword : Convolutional Neural Network, VGG-16, Casting, Unbalanced
Data, Resampling.**

(xiii + 83 + attachment)

Convolutional Neural Network or CNN is a deep learning algorithm which commonly used in computer vision problems such as image classification. CNN's ability to classify images can be used in product quality control. However, in applying deep learning algorithms such as CNN to real world cases, there are problems that can arise such as unbalanced data. This problem occurs when one class in the dataset has more data than the other class. Therefore, this research was conducted to apply the CNN algorithm to the problem of quality control of casting products. Resampling with oversampling, undersampling, and hybrid-sampling methods was also applied to balance the distribution of data between each class. In addition, the model was created using the modified VGG-16 architecture. The model will classify datasets that have gone through the process of resampling or those that have not. The dataset has 2 classes, defect and not defect. From the results of training and testing, the average accuracy value is above 98% and 99%. The resampling method applied to the data has no effect on increasing the performance of the model. In addition, the VGG-16 architecture is able to extract features and classify the given data.

Bibliography (2014-2022)