

## Rekognisi Tulisan Tangan Aksara Bali Menggunakan Faster R-CNN

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### Abstract

In Balinese culture, the ability to read Balinese script is a challenge the younger generation faces. Advances in machine learning propose handwriting detection systems using traditional and deep learning models. However, traditional approaches are impractical as they require manual feature handling. Convolutional Neural Network (CNN)-based models improve performance by integrating feature extraction and classification in an end-to-end process. This research proposes an object detection approach to add localization in the end-to-end process to detect multiple characters simultaneously using Faster R-CNN. Four CNN models, including ResNet-50, ResNet-101, ResNet-152, and Inception ResNet V2, were tested to detect 28 single Balinese characters, including 18 consonants and 10 digits using Intersection over Union (IoU) boundaries: 0.5 and 0.75 and scenarios using intact and through tiling train data. The results indicated overfitting in the intact data scenario caused by the lack of variance in the position and number of objects. While the tiling scenario resulted in an mAP (Mean Average Precision) of 0.971 at IoU 0.5 and 0.843 at IoU 0.75 with Inception ResNet V2 model. Error analysis indicates there are similarities between classes "ca" and "sa" and classes "wa" and "pa". This research contributes to experimenting with Faster R-CNN in detecting written Balinese script.

**Keywords:** Balinese script, Faster R-CNN, handwriting

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