

## ABSTRACT

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Study of Program : Computer Science  
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Levels : Master Degree (S2)  
Concentration : Software Engineering & Data Science  
Title : Crack Detection in Embankment Structures Using a Deep Learning Approach Based on Object Detection and Segmentation

Manual visual inspection of the embankment has subjectivity constraints and the risk of detection errors in large areas. The research developed an automated detection system that integrates R-CNN and FCN, as well as applied augmentation and patching strategies to overcome data limitations. This approach has proven to be effective in preventing overfitting and significantly improving model generalization. The results of the R-CNN model test were able to outperform conventional methods as an initial filter with 90% accuracy, while FCN was effective in estimating the morphology and area of damage 87%. The synergy of these two models results in a comprehensive, accurate, and objective infrastructure inspection solution in mapping the location and severity of damage.

*Keywords: Crack Detection, Deep Learning, RCNN, FCN*



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