

Subsurface Anomaly Detection Utilizing Synthetic GPR Images and Deep Learning Model

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ABSTRACT

Ground Penetrating Radar (GPR) is a nondestructive methodology to detect subsurface objects. In this paper, a deep convolutional neural network was utilized to detect characteristic hyperbolic signatures from measured subsurface features. As a first step, training data were collected with the created 877 categorized images. Then, 6500 synthetic GPR profile images were created for training purposes. The results indicate that the accuracy of the deep convolutional neural network in detecting different classes was 98% with F1 score of 0.58 demonstrating the effectiveness of the deep convolutional neural network model.

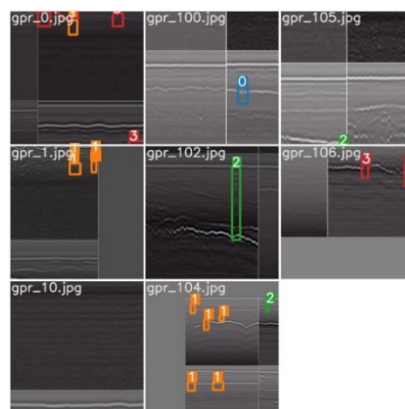


Fig. 1 Data Augmentation Mosaic.

REFERENCES

Abdelmawla, A, Kim, S. S., (2020) "Application of Ground Penetrating Radar to Estimate Subgrade Soil Density." *Infrastructures.*; 5(2):12.

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