

A Study Of Concrete Bridge Inspection Using Convolutional Neural Networks And Mixed Reality

Mahta ZAKARIA, Enes KARAASLAN, Necati CATBAS

Advancements in computer vision methodologies and convolutional neural networks (CNN) have made a breakthrough in bridge inspection. Researchers now focus on developing AI models that can detect and measure defects on structure surfaces. This study introduces a methodology for localization and quantification of the concrete defects using CNN object detection and segmentation models. Many architectures were tested to select the most robust model for defect localization and quantification. The selected CNN models were then trained for deployment in a Mixed Reality (MR) headset. An MR platform was generated that allows the inspector to communicate with AI using hand gestures and voice commands. It allows the inspector to correct the AI's mistakes and collect data on-site to further improve the accuracy of the models. Finally, the developed technology was used on a pedestrian bridge for the proof of concept. The cracks and spalling on the surface of the bridge were detected and measured.