

Volumetric Damage Quantification For Visual Inspection

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We propose a method to segment and quantify visual damage in civil infrastructure. A pipeline is built where an on-site user equipped with a mixed reality headset (MRH) can obtain a quantitative measure of the volume of damage in concrete. We define the volume of damage as the volume enclosed within the concave defect and a hypothetical flat plane that would have been present on the undamaged surface. A deep learning based interactive segmentation algorithm deployed in the MRH is used to segment the defect in the structure. Structure from Motion is applied to get a detailed point cloud reconstruction of the damage using a series of images captured by the MRH on-site. The segmentation mask is applied to categorize points in the point cloud inside and outside the damage. A dense three-dimensional mesh is created for the deformed region using the mask and selected points. We calibrate our meshed model to obtain the scale of damage by utilizing the built-in depth sensor in the MRH.