

## **A Method of Measuring Information Using Image-Based Reinforcement Techniques**

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### **ABSTRACT**

A number of large-scale construction accidents, involving both human and property damage, have occurred due to structural collapses during construction. These accidents are often attributed to poor supervision, unauthorized structural changes, and omission of reinforcement during design and construction. Given the impracticality of supervisors being present and conducting detailed checks at all locations on a construction site, supervision typically relies on visual inspections and manual measurements based on the supervisor's experience. To enhance the efficiency of supervision, recent research has focused on the use of 3D scanners and depth cameras. While extensive studies have addressed the measurement of reinforcement length and spacing, the accuracy of detecting reinforcement diameter, especially between small diameters like D10 and D13, remains insufficient. In this study, images were captured using a readily available iPhone SE (3rd generation), and a 3D point cloud was generated. This study developed automatic detection technologies for reinforcement bar diameter, length, and spacing to assess their applicability on construction sites. The validation of these technologies involved comparing the automatically detected values with actual measurements. The experimental setup included a reinforcement assembly measuring 2,100mm in length, 195mm in width, and 395mm in height. MATLAB and METASHAPE were employed to produce the point cloud and perform the automatic detection using computer vision and image processing technologies.

### **REFERENCES**

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