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Monitoring of Civil Engineering Structures Supported by Vision System

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In the paper the optical-based method of civil engineering construction's in-plane deflection measurements and state monitoring was presented. Displacement field of the analyzed structure resulting from load was computed by means of digital image correlation coefficient. The application of homography mapping enabled the deflection curve to be computed from two images of the construction acquired from two distinct points in space. This new approach was feasible by employing homography transformation in order to remove perspective effects. The implemented image pre-processing and analysis methods make possible to develop fully automatic system. In the paper there were also discussed the damage detection and localization issues based on the irregularity detection by means of the analysis of the deflection's curve wavelet transform coefficients. The results of the model based Probability of Detection for the measurement method was presented. The developed methodology, vision-based measurement system as well as experimental results obtained from tests made on lab set-ups and civil engineering constructions were investigated.

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Ключевые слова:

Содержание

Abstract

Introduction

Vision in-plane deflection measurement method

Experimental investigation of the method in the lab

The evaluation of the vision system on the civil engineering construction

Damage detection and probability of damage detection and localization

Conclusions

Acknowledgements