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Editorial

Remote Sensing-Based Structural Health Monitoring and Damage Assessment

Jónatas Valença [1,*], Xiaoqiong Qin [2], Ling Chang [3], Jie Dong [4], Xuguo Shi [5] and Joan R. Casas [6]

[1] CERIS, IST-ID, University of Lisbon, 1049-001 Lisbon, Portugal
[2] College of Civil and Transportation Engineering, Shenzhen University, Shenzhen 518060, China; xqqin@szu.edu.cn
[3] Department of Earth Observation Science, Faculty of Geo-Information Science and Earth Observation, University of Twente, 7514 AE Enschede, The Netherlands; ling.chang@utwente.nl
[4] School of Remote Sensing and Information Engineering, Wuhan University, Wuhan 430079, China; dongjie@whu.edu.cn
[5] School of Geography and Information Engineering, China University of Geosciences, Wuhan 430074, China; shixg@cug.edu.cn
[6] Department of Civil and Environmental Engineering, Universitat Politècnica de Catalunya, 08034 Barcelona, Spain; joan.ramon.casas@upc.edu
* Correspondence: jonatas.valenca@tecnico.ulisboa.pt

1. Introduction

With the rapid development of society and the economy, significant infrastructure, such as roads, buildings, high-speed railways, and bridges, have been built all over the world. However, the increase in operating time and environmental loads have destabilized the structures, resulting in slow structural damage. Such damage, if not detected in time, can threaten normal structural operations, or even cause significant hazards. Therefore, the operational safety of urban infrastructures, as an important practical issue, has attracted increasing attention from multi-disciplinary fields, such as public security, earth observation, civil engineering, and so on. However, since the urban infrastructure is widely distributed, the current manual periodic detection and on-site automatic sensor monitoring methods are spatially or temporally incomplete, and damage could remain undetected. Thus, there is an urgent need to develop scientific and efficient technical methods to carry out convenient and accurate structural damage monitoring, provide technical support for the timely detection of potential safety hazards, and ensure their safe operation.

Remote sensing technology can quickly obtain large-scale surface information, which outperforms the traditional methods with high measurement accuracy, non-destructiveness, continuous space coverage, and so on. Benefiting from the rapid development of remote sensing techniques (higher resolution, shorter revisit time, more bands, and platforms, etc.), the research on these techniques has been very active in recent decades. In this context, this Special Issue, "Remote Sensing-based Structural Damage Mapping", aims to include state-of-the-art studies that discuss the remote sensing techniques available for structural damage mapping and resilience assessment, presenting some of the most relevant research currently underway, highlighting future challenges, and including several case studies.

2. Topics/Contributions

In this Special Issue, "Remote Sensing-Based Structural Health Monitoring and Damage Assessment", an interesting overview of the current state of the art, covering relevant new developments in the field, is presented. A wide range of topics are addressed:

1. Deng, J.; Dai, K.; Liang, R.; Chen, L.; Wen, N.; Zheng, G.; Xu, H. Interferometric Synthetic Aperture Radar Applicability Analysis for Potential Landslide Identification in Steep Mountainous Areas with C/L Band Data. *Remote Sens.* **2023**, *15*, 4538. https://doi.org/10.3390/rs15184538.

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2. Han, Y.; Li, T.; Dai, K.; Lu, Z.; Yuan, X.; Shi, X.; Liu, C.; Wen, N.; Zhang, X. Revealing the Land Subsidence Deceleration in Beijing (China) by Gaofen-3 Time Series Interferometry. *Remote Sens.* **2023**, *15*, 3665. https://doi.org/10.3390/rs15143665.
3. Zhang, G.; Wang, Z.; Sang, W.; Zhou, B.; Wang, Z.; Yao, G.; Bi, J. Research on Dynamic Deformation Laws of Super High-Rise Buildings and Visualization Based on GB-RAR and LiDAR Technology. *Remote Sens.* **2023**, *15*, 3651. https://doi.org/10.3390/rs15143651.
4. Gao, H.; Xiong, L.; Chen, J.; Lin, H.; Feng, G. Surface Subsidence of Nanchang, China 2015–2021 Retrieved via Multi-Temporal InSAR Based on Long- and Short-Time Baseline Net. *Remote Sens.* **2023**, *15*, 3253. https://doi.org/10.3390/rs15133253.
5. Torres-Gonzáles, M.; Valença, J.; Santos, B.O.; Silva, A.; Mendes, M.P. StainView: A Fast and Reliable Method for Mapping Stains in Facades Using Image Classification in HSV and CIELab Colour Space. *Remote Sens.* **2023**, *15*, 2895. https://doi.org/10.3390/rs15112895.
6. Wu, J.; Shi, Y.; Wang, H.; Wen, Y.; Du, Y. Surface Defect Detection of Nanjing City Wall Based on UAV Oblique Photogrammetry and TLS. *Remote Sens.* **2023**, *15*, 2089. https://doi.org/10.3390/rs15082089.
7. Yuan, H.; Wu, Y.; Zhang, Y.; Shi, X.; Bian, S. Isostatic Anomaly and Isostatic Additional Force Analysis by Multiple Geodetic Observations in Qinling Area. *Remote Sens.* **2023**, *15*, 740. https://doi.org/10.3390/rs15030740.
8. Liu, C.; Li, C.; Yang, J.; Hu, L. Sea-Crossing Bridge Detection in Polarimetric SAR Images Based on Windowed Level Set Segmentation and Polarization Parameter Discrimination. *Remote Sens.* **2022**, *14*, 5856. https://doi.org/10.3390/rs14225856.
9. Su, Y.; Yang, H.; Peng, J.; Liu, Y.; Zhao, B.; Shi, M. A Novel Near-Real-Time GB-InSAR Slope Deformation Monitoring Method. *Remote Sens.* **2022**, *14*, 5585. https://doi.org/10.3390/rs14215585.
10. Zhu, Y.; Tang, H. Automatic Damage Detection and Diagnosis for Hydraulic Structures Using Drones and Artificial Intelligence Techniques. *Remote Sens.* **2023**, *15*, 615. https://doi.org/10.3390/rs15030615.

3. Summary

The papers published in this Special Issue fulfill their original purpose, which is to present the state of the art and to discuss remote sensing techniques available for structural damage mapping and resilience assessment. Damage mapping in different civil engineering works is presented, from landslide and subsidence, to building façades, bridges, and hydraulic structures. The final result clearly transcends the sum of its individual papers, and we hope that we can make a contribution and inspire readers to also contribute to the advancement and growth of this field.

4. Further Reading

Readers who are interested in the use of remote sensing tools for structural health monitoring, in addition to this Special Issue, are encouraged to read recent publications on other special remote sensing issues, such as, "Structural Health Monitoring and Damage Assessment by Advanced Remote Sensing Techniques and Methods" (https://www.mdpi.com/journal/remotesensing/special_issues/SHM_DA_RS, accessed on 19 March 2024). This is the second edition of this Special Issue, which focuses more on advanced remote sensing tools and data processing methods.

Conflicts of Interest: The authors declare no conflict of interest.