Road Damages Identification based on Traffic Big Data for Coastal City Disaster Relief

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Key words: Access to land

SUMMARY

Nature disasters, such as typhoon and earthquake, often bring extensive damage to the infrastructures of coast cities. In order to enable responsive and effective disaster relief, it is of great importance for urban authorities to identify damages in road transportation systems and resume transportation interruption in time. Traditionally, identifying road damages usually involves substantial human labor and time, such as sending out road investigators or reviewing road surveillance camera videos. In this work, we propose a real-time and low-cost approach to identify road damages leveraging large-scale vehicle trajectory data, based on the concept of Vehicle-as-a-Sensor (VaaS). More specifically, we first detect abnormal traffic patterns from vehicle GPS trajectories, and then remove irrelevant traffic anomalies, such as traffic congestion and accidents. Afterwards, we identify the causes of the road-damage-related traffic anomalies, such as fallen trees or ponding water. Finally, we verify the identified road damage events with the news updates from transportation authorities. Evaluation using real-world data from Xiamen city demonstrates the effectiveness of the proposed approach.

Road Damages Identification based on Traffic Big Data for Coastal City Disaster Relief (9167)
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FIG Working Week 2017
Surveying the world of tomorrow - From digitalisation to augmented reality
Helsinki, Finland, May 29–June 2, 2017