SCHOOL Project Literature and Data Review

Internship Practicum

National Louis University

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2/2/2025

The 2010 Haiti Earthquake caused extensive damage to Port-au-Prince's infrastructure, severely affecting roads, bridges, and buildings. Voigt et al. (2011) utilized high-resolution satellite imagery for rapid damage assessment, demonstrating how situation mapping can identify critical damage zones and facilitate efficient resource allocation. This aligns with the comprehensive review by Shafapour Tehrany et al. (2023), highlighting advancements in geospatial technologies that improve earthquake management through preparedness, emergency response, and damage assessment. The review underscores the importance of remote sensing and GIS applications in understanding and mitigating the impacts of earthquakes, which are critical for effective disaster response.

Wright and Pilone (2010) further emphasize the importance of coordinated remote sensing efforts during a disaster. Their work underscores the necessity of timely data collection and dissemination to support relief operations and inform recovery planning. Coordinating geospatial data by USGS facilitated the rapid deployment of resources and provided critical information for decision-makers. This highlights the essential role of interagency collaboration in enhancing the effectiveness of disaster management efforts.

Integrating these insights with the DesignSafe-CI dataset, which includes detailed pre- and post-disaster satellite imagery and damage annotations, provides a robust foundation for visualizing and quantifying the earthquake's impact on Port-au-Prince's infrastructure. By comparing pre-disaster images with post-disaster conditions, we can accurately assess the extent of damage and identify the most severely affected areas. This comprehensive analysis, combining scholarly research and high-quality geospatial data, illustrates the critical role of geospatial technology in disaster response and recovery strategies. It supports the development of practical recovery plans and strengthens future disaster preparedness by clearly understanding the impact on urban infrastructure.

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TOPS School Project Memo

Crystal Villa

Date: 2/2/2025

Subject: Data Review – 2010 Haiti Earthquake Impact on Port-au-Prince Infrastructure

1. Voigt, S., Schneiderhan, T., Twele, A., Gähler, M., Stein, E., & Mehl, H. (2011). Rapid damage assessment and situation mapping: Learning from the 2010 Haiti earthquake. Photogrammetric Engineering & Remote Sensing, 77(9), 923–931. https://doi.org/10.14358/PERS.77.9.923

2. Shafapour Tehrany, M., Batur, M., Shabani, F., Pradhan, B., Kalantar, B., & Özener, H. (2023). A comprehensive review of geospatial technology applications in earthquake preparedness, emergency management, and damage assessment. Remote Sensing, 15(8), 1939. https://doi.org/10.3390/rs15081939

3. Wright, R., & Pilone, E. (2010). USGS remote sensing coordination for the 2010 Haiti earthquake. Earthquake Spectra, 26(3), 669-684. https://doi.org/10.1193/1.3459128

4. Maxar Technologies. (2010). Pre- and Post-Disaster Satellite Imagery of the 2010 Haiti Earthquake [Data set]. Maxar Open Data Program. https://www.maxar.com/open-data

**Steps Taken to Obtain Data:**

1. Article Acquisition: - Searched academic databases using keywords related to the 2010 Haiti Earthquake and infrastructure damage (e.g., "2010 Haiti Earthquake infrastructure damage," "Port-au-Prince earthquake impact," "Haiti earthquake building assessment").

- Selected articles based on their relevance to infrastructure impact and use of geospatial technologies.

- Accessed full-text articles through university library resources and online databases.

2. **Dataset Acquisition:**

- Identified the DesignSafe-CI dataset focusing on pre- and post-disaster satellite imagery of Port-au-Prince.

- Reviewed the dataset description to ensure it included building and road damage assessments.

- Downloaded the dataset, including high-resolution images and annotations.

- Evaluated the dataset's credibility (from an NSF-supported platform), timeliness (images from January 2010), and quality (detailed annotations and high resolution).

**Data Evaluation:**

Credibility:

- All sources are from reputable journals, organizations, and authors.

- Articles are peer-reviewed and published by well-known remote sensing and disaster management journals.

- The dataset is from a recognized provider (Maxar Technologies) and hosted on a credible platform (DesignSafe-CI).

Timeliness:

- The articles and datasets are timely, with publications shortly after the earthquake (2010, 2011) and updated reviews (2023), ensuring relevance to current standards and practices.

Quality:

- High-quality data with detailed methodologies and comprehensive analyses.

- The DesignSafe-CI dataset includes pre- and post-disaster imagery and annotations, allowing for a thorough comparison of infrastructure conditions.

- The scholarly articles provide in-depth insights into the role of geospatial technologies in disaster response and recovery.

By leveraging these high-quality sources, comprehensively understand the earthquake's impact on Port-au-Prince's infrastructure. Integrating pre- and post-disaster data with scholarly insights enhances our ability to visualize damage severity and develop effective recovery strategies, contributing to improved disaster preparedness and resilience.

