# DESIGN AND DEVELOPMENT OF AN INTELLIGENT EMERGENCY STATE REPORTING SYSTEM FOR PUERTO RICO

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## Geographic Information Systems: Vulnerability and Risk Mapping

### INTRODUCTION

In emergency situations like natural disasters it's important to know what event happened and where, but an aspect of the response that could be overlooked is the very people who could need saving. A visual format of handling this information allows for faster parsing and decision making. A web map, to be integrated into the admin portal is an ideal way to do this. Highlighting the expected losses, or percentage of vulnerable groups in an area is useful to gauge how dire a situation is and what places might require more attention.

### OBJECTIVE

Create a web map that displays:

- Information about expected damages from dangers like natural phenomena
- The vulnerable groups in a municipality
- Reported emergencies

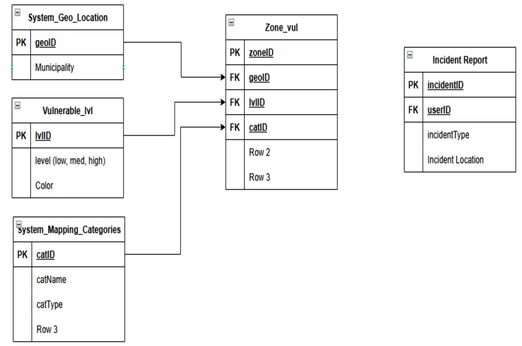
### METHODOLOGY

To create the map different web technologies had to be used:

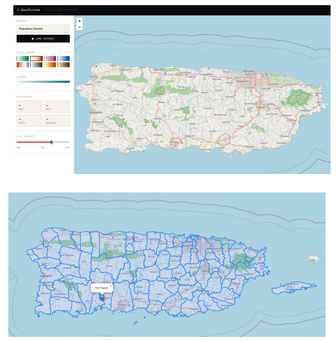
- HTML, CSS, and Javascript were used to create the front end functions of the map
- Leaflet, a JS library brought the web map making functionality
- OpenStreetMap provided free access to have the needed map images.
- Canva and Microsoft Office 365 were used to develop the documentation required throughout the process.

### KEY FINDINGS

- Currently, online map hosting is easiest as self hosting methods do not provide adequate image quality.
- The information is useful and freely available but more detailed reports may prove better if they can be obtained.
- A map of this time is relatively straightforward to create and could be managed and used well.




**Database Structure**



**UI Options**

### CONCLUSION

A system that highlights the areas most affected by certain risks is certainly possible and likely useful. The tools selected are good options for making it exist though other options do exist. Leaflet and OpenStreetMap are necessary components due to their utility and them being the most viable option for the work needed.

### FUTURE WORK

Any continued work should build up the website from its current simple state implementing each category into the map and working how to implement into an admin portal that overviews reports while ideally having a triage system for prioritization.
Additionally, the alternative solutions for self hosting should be revisited in the future to see if it becomes possible to implement, alongside other tools that a change could prove useful.



Agency for Toxic Substances and Disease Registry (July 22, 2024) Plans and Health – Geospatial Research, Analysis, and Services Program - (GRASP) | atsdr.cdc.gov https://www.atsdr.cdc.gov/place-health/php/svi/?CDC_AAref_Val=https://www.atsdr.cdc.gov/placeandhealth/svi/index.html - FEMA. (2022, June 10). National Risk Index | fema.gov. https://www.fema.gov/flood-maps/products-tools/national-risk-index - *Leaflet — an open-source JavaScript library for interactive maps.* (n.d.). Leafletjs.com. https://leafletjs.com/index.html - Node.js, Node.js – JavaScript runtime built on Chrome's V8 JavaScript engine. [Online]. Available: https://nodejs.org/en/docs