**Group 1: Use of new techniques (incl. simulation, machine learning, AI, and others) to model the behavior of civil infrastructure and risk to communities due to loading from natural hazards**

**Point-of-Contact:** Rakesh Salunke

**Regular Meeting Time: Every second Wednesday, 5:30 PM CST/6:30 PM EST.**

**Ti**meline:

* Feb 17, 2023 - Project Ideas and Titles due
* Feb 24th, 2023 - Abstracts due
* Mar 3rd, 2023 - Project Feedback
* Mar 10th, 2023 - Second check-in meeting
* April 14th, 2023 - Third check-in meeting
* May 12th, 2023 - Final check-in meeting
* May 26th, 2023 - Research Challenge Results Presented at the Mini-Conference

Preliminary Collaborative Research challenge abstracts are due by February 24, 2023, and can be submitted through the [Abstract submission form](https://forms.gle/t4M6vqk2njCr3i1fA). All groups will present their research challenge findings on Friday, May 26, 2023, at the inaugural NHERI GSC Mini-conference.

**By Friday, February 17, submit the following:**

* What is the motivation for your project?
  + What are you trying to understand that we don't already? What is the gap that you're trying to fill?
* What are your research question(s)?
* What dataset(s) do you plan to use?
* What method(s) do you plan to use?
* Are there any special considerations for your project?
  + This could include Internal Review Board (IRB) application for a restricted-use dataset, experimental procedures, etc.
  + What is your plan if that falls through?
* How is your project interdisciplinary?

**TO DO:**

* Set up Whatsapp
* Study up on BRAILS
* Choose a project idea and create a project title (collaborate in Whatsapp)

NOTES:  
This tool seems to align well with our group’s expertise:

* <https://nheri-simcenter.github.io/BRAILS-Documentation/>
* BRAILS: AI tool that gathers structural data.
* Building Recognition using AI at a Large Scale
* Has an ensemble of different models that can be used on several applications. We can add more to it if we want.
* The main thing is data.
* SoVI Index to what we do? Social aspect to losses and casualties. Look at how different communities may be helped differently based on social
* Finding social vulnerability wise in the

<https://hazards.fema.gov/nri/map>

Hi all,

Here's my rough notes from today. I couldn't find a transcript of the meeting, so please chime in if I missed anything!

* Rakesh is going to work on getting the Google API sorted out for BRAILS.
* Niko and Rakesh are going to determine what data we have available for locations prone to earthquakes. We'll need to pick one general location to focus our efforts on.
* Niko is going to investigate what data we can pull from HAZUS in regard to measuring social vulnerability. We can potentially draw from the [FEMA Risk Index SoVI map](https://nam11.safelinks.protection.outlook.com/?url=https%3A%2F%2Fhazards.fema.gov%2Fnri%2Fmap&data=05%7C01%7Ctodorov%40chapman.edu%7C4e6aae88dc7349a8895a08db0fb4517e%7C809929af2d2545bf9837089eb9cfbd01%7C1%7C0%7C638121039370809144%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C3000%7C%7C%7C&sdata=QU8k3nEWJpDTgWNKxZ7E9OYKVKryZ2daznvwHxeZcB4%3D&reserved=0) (which can only get down to the Census Tract level), but if HAZUS can get more granular, we should definitely go that route.
* Niko and Rakesh will get familiar with the BRAILS system.
* Julie will download GitHub and make sure the main collaborative document is up-to-date with information from our latest discussion.
* Julie will submit the title and description by Friday, once I hear back from you guys.
* We didn't discuss this during the meeting, but I can write the abstract once we iron out the details next week. **You guys just let me know what else I can do in the meantime!**

Here's a working title and description (below). Let me know what needs to be reworded or changed! Thanks, all! I'm excited for this project.

**Possible Title**: Use of Building Recognition using AI at Large-Scale (BRAILS) To Understand Potential Earthquake Damage and Social Vulnerability in Relation to Community Assets

**Description**: Our assigned topic is the use of new techniques (incl. simulation, machine learning, AI, and others) to model the behavior of civil infrastructure and risk to communities due to loading from natural hazards. We want to understand the use of AI to better understand infrastructure damage and how surrounding communities may have to adapt should an earthquake occur. Building Recognition using AI at Large-Scale (BRAILS) is AI modeling program that can, using satellite imagery and Google street view, exact potential building damages from earthquakes. Our research question is: How can BRAILS be used to understand potential earthquake damage and social vulnerability in relation to community assets?

Researchers plan to use BRAILS to understand potential earthquake damage in a specified area (location to be determined). The results of the analysis will be overlaid with demographic characteristics (race, income, home tenure type, and other details as appropriate, obtained via HAZUS) to assess where potential building damages may impact socially vulnerable populations. The researchers will then overlay the locations of community assets (i.e. schools, houses of worship, community centers, etc.) as indicated via Google data and perform geospatial analysis to determine which assets may be resilient to earthquake shaking and also be near socially vulnerable areas. Community assets meeting both criteria may be considered strategic facilities for collaboration with emergency management officials and serve important response and support roles in the event of an earthquake in the surrounding community.

There are no special considerations for our project at this time.

Our project incorporates the perspectives of an engineer, computational data scientist, and social scientist. The study has the potential to contribute to several intellectual fields and has broader impacts for practitioner communities.

Best,

Julie

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