UROP || Tackling Climate Change with AI || Visualizing Coastal Floods with Physics-Informed Generative Adversarial Networks (GANs)

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PI: Prof. Dava Newman, Media Lab, Director
Compensation: Paid; 40hrs/wk, Summer term 2022

Would a global carbon tax reduce the flood risk at MIT? The answer to this question of policy impact is critical for local policy making or climate-resilient infrastructure development, but is often hidden behind tables and scientific reports. This UROP will be part of creating *The Climate Pocket*: a climate education simulator that illustrates local science-based flood impacts of global climate policy decisions, as shown in Fig. 1 and http://trillium.tech/eie. The UROP will work in collaboration with experts in physics-informed machine learning from MIT and CERENA-IST, climate policy scenarios from En-ROADS, and physics-based flood hazard maps from Climate Central.
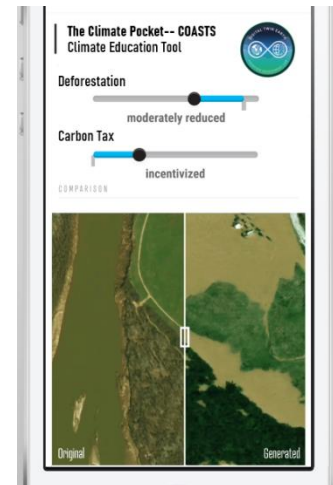

Fig. 1 The Climate Pocket

The UROP will create a global visualization layer of future coastal floods, as they would be seen from space, similar to Fig. 1. The research will include 1) assembling high-resolution satellite imagery and flood hazard maps with geospatial processing tools, such as ArcGIS, 2) exploring novel methods to combine physics-based metrics and generative vision modeling, such as generative adversarial networks (GANs) or normalizing flows, and 3) creating a shareable web-demo.

Preferred, but not necessary qualifications:

- Passion for climate issues
- Familiarity with deep learning libraries, e.g., pytorch, tensorflow.
- Familiarity with geospatial data processing in, e.g., Python-rasterio, ArcGIS, GDAL, GEE.
- Experience of large-scale data proccessing in python with, e.g., xarray, pandas
- Collaborative spirit
- Very optional, but fun if there's experience in UI/UX, web development, climate policy

We strongly value an environment of inclusion, support, and collaboration and highly encourage students from historically excluded groups to apply. The research will be with our team at the Human Systems Laboratory, Dept. of AeroAstro, and Prof. Dava Newman and can be virtual. If you're interested please feel free to email me until 04/16 with a CV and two paragraphs about your interest, experience, and long-term goals at lutjens [at] mit [dot] edu .

Thank you,

Björn Lütjens