

Green Infrastructure

Research Scenarios

1. Mary, Environmental Sociology Postdoc: Mary is an environmental sociologist interested in the socially structured factors (power, politics) that perpetuate environmental inequality. She is interested in visualizing the spatial distributions as well as the changes over time of the distribution of people (by differing socio-economic sub-types, or by spatial groupings), environmental hazards, and mitigation efforts (e.g. green infrastructure) in order to identify where there is coincidence between environmental hazards and traditionally marginalized socio-economic groups.
2. Mary sits down and opens the software interface on her PC. A repository of models and tools for analysis and visualization are available for her to access through the interface

Data Use Cases

You can view the PPT slides with template, straw-man examples, and rough Dose of Nature example.

| Name | Location (Ideally a URL) | Formats (Commas separated list) | Desired Derived Data or Metadata | Software used (out of box, or group created software /scripts, etc.) | Scenario (# from above) | Notes |
|---|---|---|--|---|--|-------|
| Green Infrastructure Modeling for human preferences | Group hard drives, cloud storage (https://box.illinois.edu/) or dropbox | Excel - *.xls, *.csv Image file - *.png, *.jpg, *.tiff Video file - *.mp4 | Shape information Color, physiological states, preference matrix, texture, geographic location of GI | Excel, VideoPlayer, Image reader | #1 | |
| Green Infrastructure Modeling for human preferences | Group hard drives, cloud storage (https://box.illinois.edu/) or dropbox | Video bounding box files - *.vbb | Ground truth, bounding boxes for identified objects (human preferences like trees, bushes, lamp post, side walks, etc.) | Matlab, VbbPlayer | #2 | |
| Green Infrastructure Modeling | Group hard drives, cloud storage (https://box.illinois.edu/) or dropbox | Matlab- *.mat, R - *.Rdata, Numpy file - *.npy | physiological states, preference matrix, texture, geographic location of GI | Python, R, Matlab, Javascript | #1 #2 | |
| Does of Nature | Group hard drive | SPSS - *.sav Excel - *.xlsx Image file - *.jpg, *.png Video file - *.mp4 | Tree cover density from aerial and panoramic eye-level photos; Perceived eye-level tree cover; Landscape preference; Self-reported stress; Physiological measures of stress from skin conductance and temperature, heart rate variability, and blood pulse volume; Hormonal measure of stress from salivary cortisol. | Google Earth, Photoshop (histogram function), SPSS, EXCEL | Scenario # 1: Tony, a psychologist, is interested in people's preference for the neighborhood with different tree cover densities. He has calculated the tree cover density with panoramic and Google Earth photographs, and developed a photograph-survey using a Likert scale. Tony wants to figure out the relationship between greenness and preference with regression analysis. Scenario # 2: Lydia is a PhD student in public health research. She is interested in the effects of Green Infrastructure on human well-beings. Now Lydia starts her study with self-reported stress recovery of people who participated in an experiment to view pictures and videos with different level of greenness. | |
| Trees and Test Score | Group's hard drive | Excel - *.xls, *.csv SPSS - *.sav, Image- *.tiff. | Time and frequency domain data of electrocardiogram(EKG), blood volume pulse (BVP), heart rate variability (HRV), Electroencephalography(EEG) data; derived affect data from EEG; self-reported stress, self-reported and objectively measured attention. | SPSS, SAS, R, Excel, Biofeedback, CardioPro | Scenario # 1: Lucy is a community health researcher, who wants to know how physiological signals are processed and translated into stress level indicators. She also wants to know how EEG data are cleaned and preprocessed, and how to extract certain frequencies from the data, as well as how to obtain affect data. Scenario # 2: Luby is an environmental psychologist. She investigates into the relationship between physiological stress and environmental factors. She wants to use the data obtained from physiological from different treatment conditions to see if there is significant difference across conditions. | |
| LiDAR tree dection | http://crystal.isgs.uiuc.edu/nsdihome/webdocs/ilhmp/data.html | .las, .xyz | Tree volume in the city context ; Vegetatoin distribution; Subcanopy structure in the urban forest | Lastools, R, ArcGIS | Leo is a professor in urban forestry. He wants to derive urban forest information using a fast and accurate approach. Since LiDAR data is more accessible than before, he seeks helps of using automated tools to generate tree/forest information in the urban context using big LiDAR data. | |

