

Health Resiliency in Lima Peru

Leqi Zeng LeqiZeng@stanford.edu



Kushagra Gupta kushgpt@stanford.edu

Introduction

- World Bank Frontline Report, Data Driven Study of health resilience based on:
 - Foundations:
 - Point of care
 - Systems planning
 - Integrating healthcare with disaster management
 - Infrastructure
 - Sustainable Development goals
 - SDG 3.8 "achieve universal health coverage,"



Objective and Goals

- World Bank goals
 - Develop health resilience in developing countries.
 - For this project, we focus on Lima, Peru (3rd most congested city in the world)
- Health Accessibility
 - Construct a graph of health facilities in Lima and perform geospatial analysis the road network and health system
 - Examine the time/distance required to travel to healthcare amenities.
 - Understand and explain differences for different socioeconomic groups.
- Assumptions Made
 - Maximum travel speed along road network
 - Uniform travel times throughout the day and across the week
 - Sampling nodes by population from population grids
 - No distinction between nodes of the graph
 - Proxy connections between subgraphs
 - No distinction between type of destination (hospital, clinic, etc)

Results

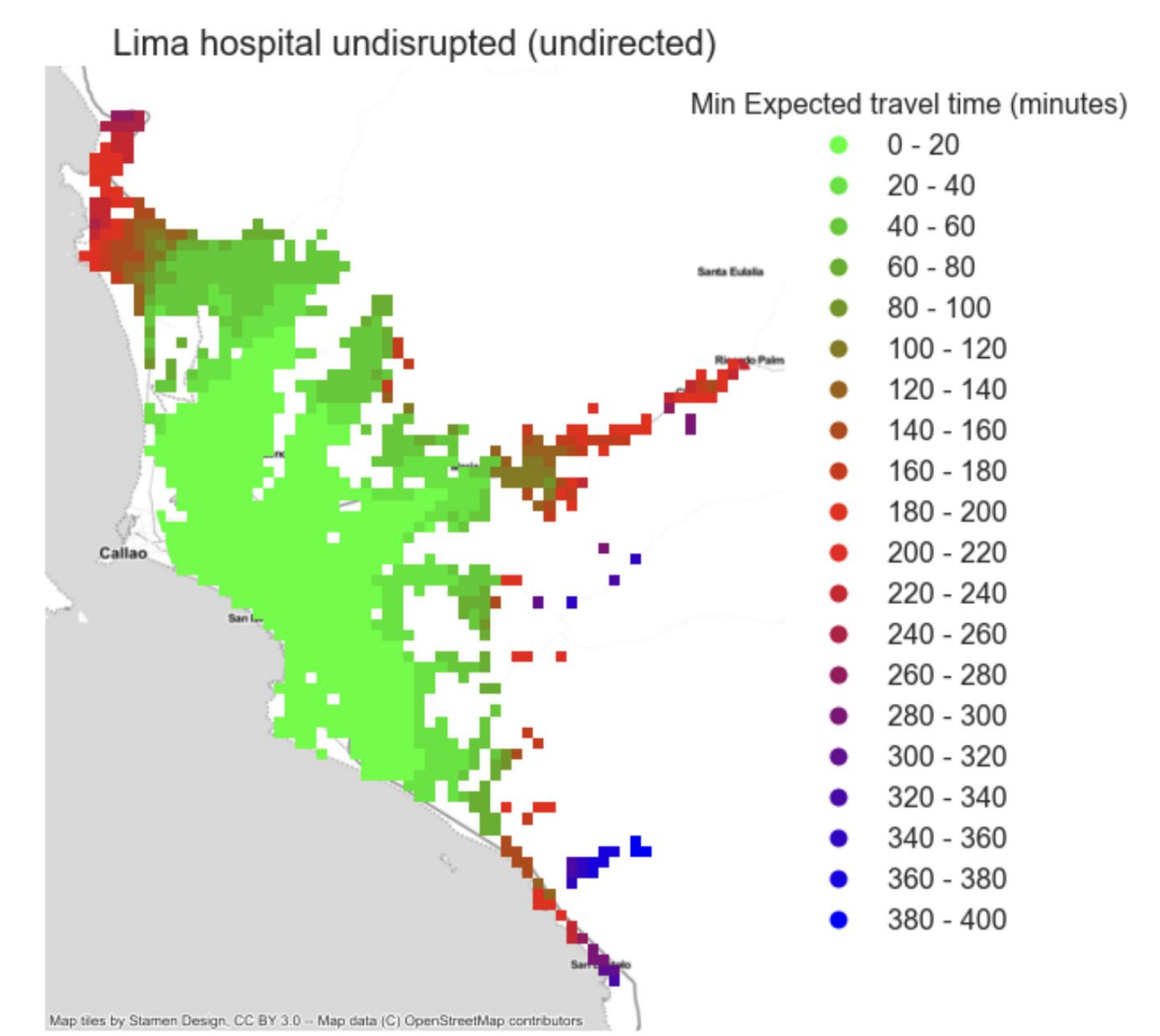
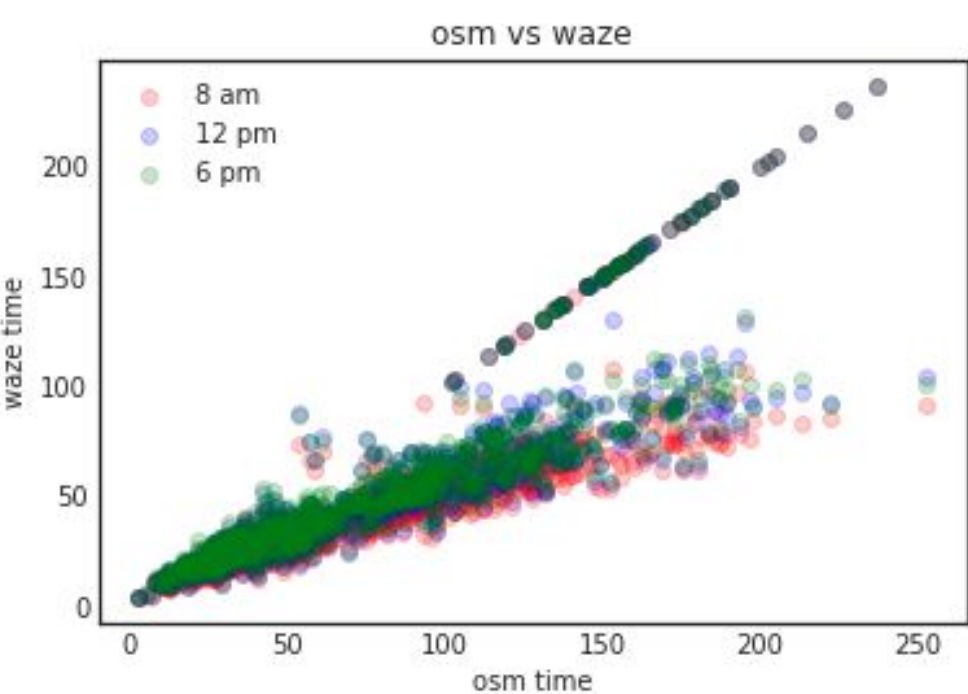
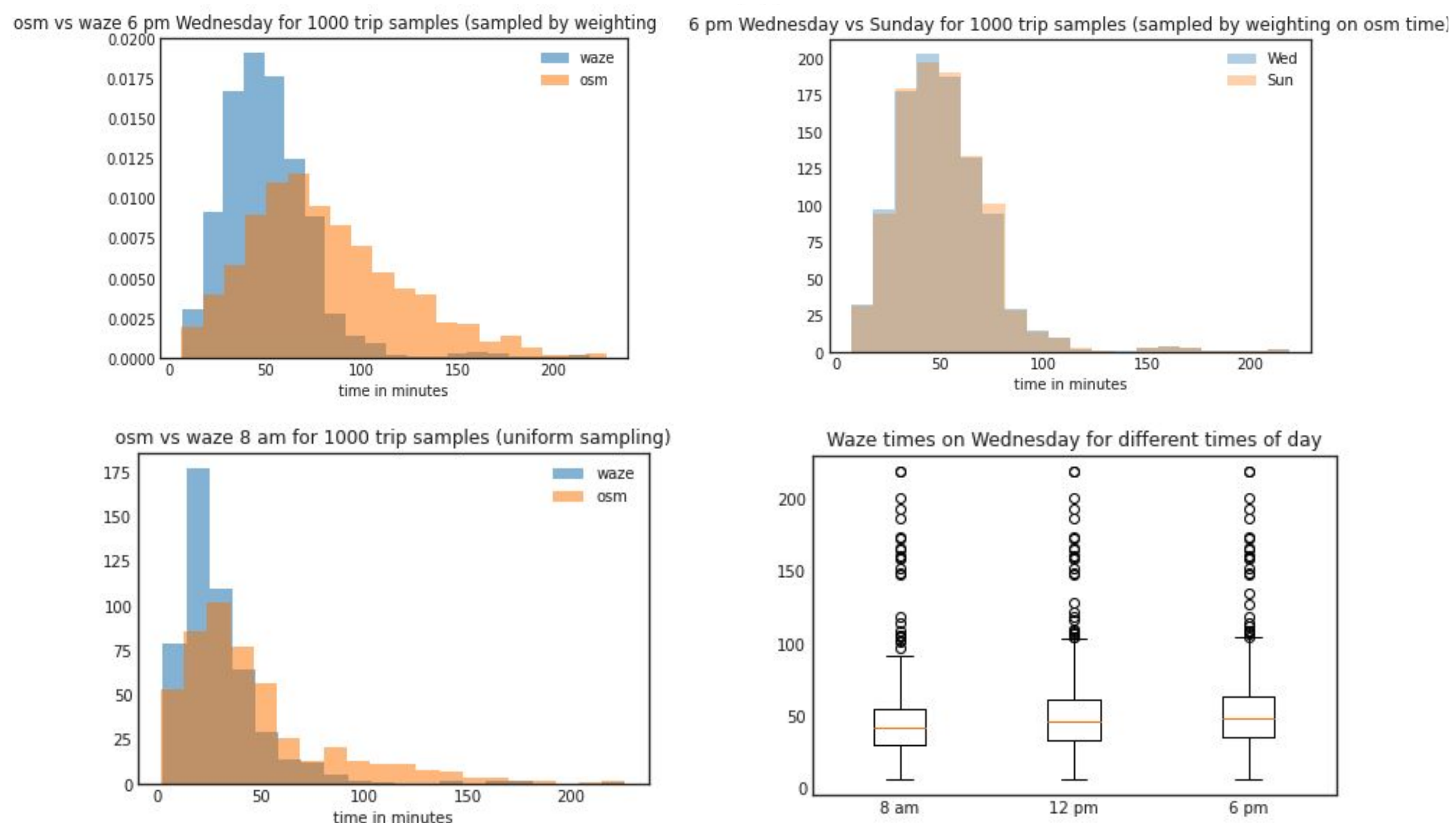


Figure: Heatmap of Travel times from starting points within Lima Peru to Hospitals. Shows the level of health system accessibility from locations within Peru

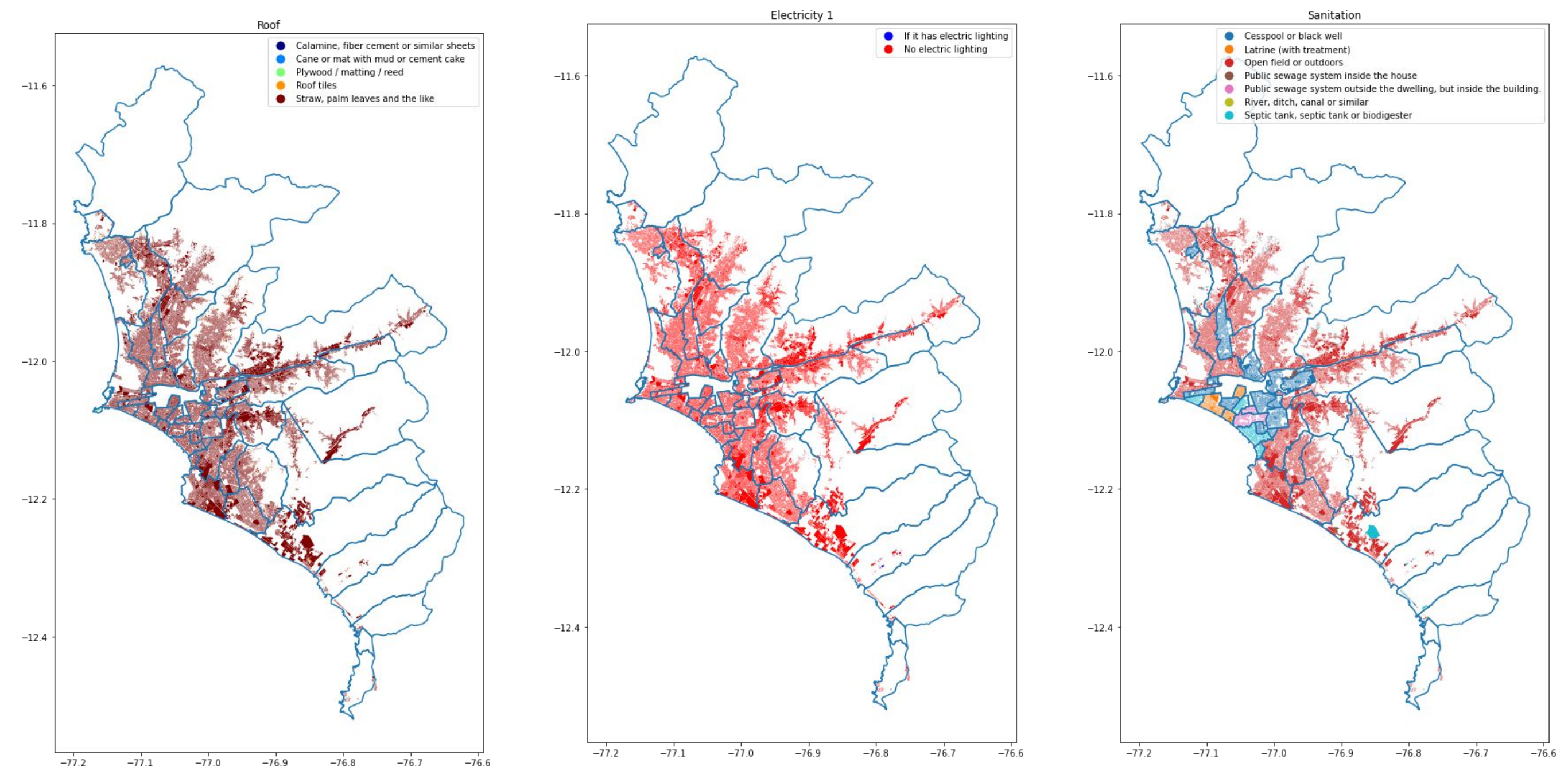
Adding Waze Traffic Times



R^2	Train	Test
XGB	0.98	0.93
GBT	0.86	0.82

Figures: F(OSM) = Waze. Training Models using Waze data

Finding Indicators for Poverty



Figures: Using Census Data to provide information on levels of poverty within Peru using Indicators such as roof type, electricity usage, and sanitation. This information will be used to provide distinction to nodes.

Special Thanks to our Mentors Dr. Mersedeh Tariverdi and Miguel Nunez

Figures: Figures Provide Comparisons between original Open Street Map Graph data to Waze Traffic Data and distribution of times during various times.