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Predicting Household Characteristics Using Street View Images

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FedCASIC 2019

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Outline

- Motivation
- Research question
- Methods
- Potential problems/limitations
- SRO Mapping Application

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Motivation

- Screening households to identify eligible sample elements
  - Time consuming
  - Cost intensive
- Increase screening efficiency by oversampling cases likely to be eligible to the study
- Use frame, commercial and paradata variables to create models to predict eligibility
  - National Survey of Family Growth: 15-49 years old
  - Health and Retirement Study: 50+ years old

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Research question

- Can we improve the predictive power of our models by including street view image data?

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Methods (1)

- Supervised machine learning algorithm (deep learning) to predict household characteristics (eligibility criteria)
  - Usual frame, commercial and paradata variables
  - Street view images
- Training dataset:
  - Previous national survey conducted by SRO
  - n = 46,797 labeled addresses
  - Addresses geocoded by sample vendor (Marketing Systems Group) using linear interpolation

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Methods (2)

- Street View Images:
  - Download static street view images using Google Maps Street View Image API
  - R package: googleway (google_streetview function)
- Obtain eligibility probability from machine learning algorithm and compare gains/losses of predictive power with current models in validation dataset

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Potential problems/Limitations

- Geocoding
- Position of the street view image:
  - Compass heading of the camera
  - Horizontal field of view (zoom)
  - (up or down) Angle of the camera relative to Street View vehicle
- Time of street view image
- Apartment buildings/complexes
- Gated communities

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SRO Mapping Application

- SRO needed a mapping tool to assist in assigning/transfering sample cases to interviewers in the field based on their location
- R Shiny application
- https://kambanane.shinyapps.io/SROMappingTool/

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Thank you!

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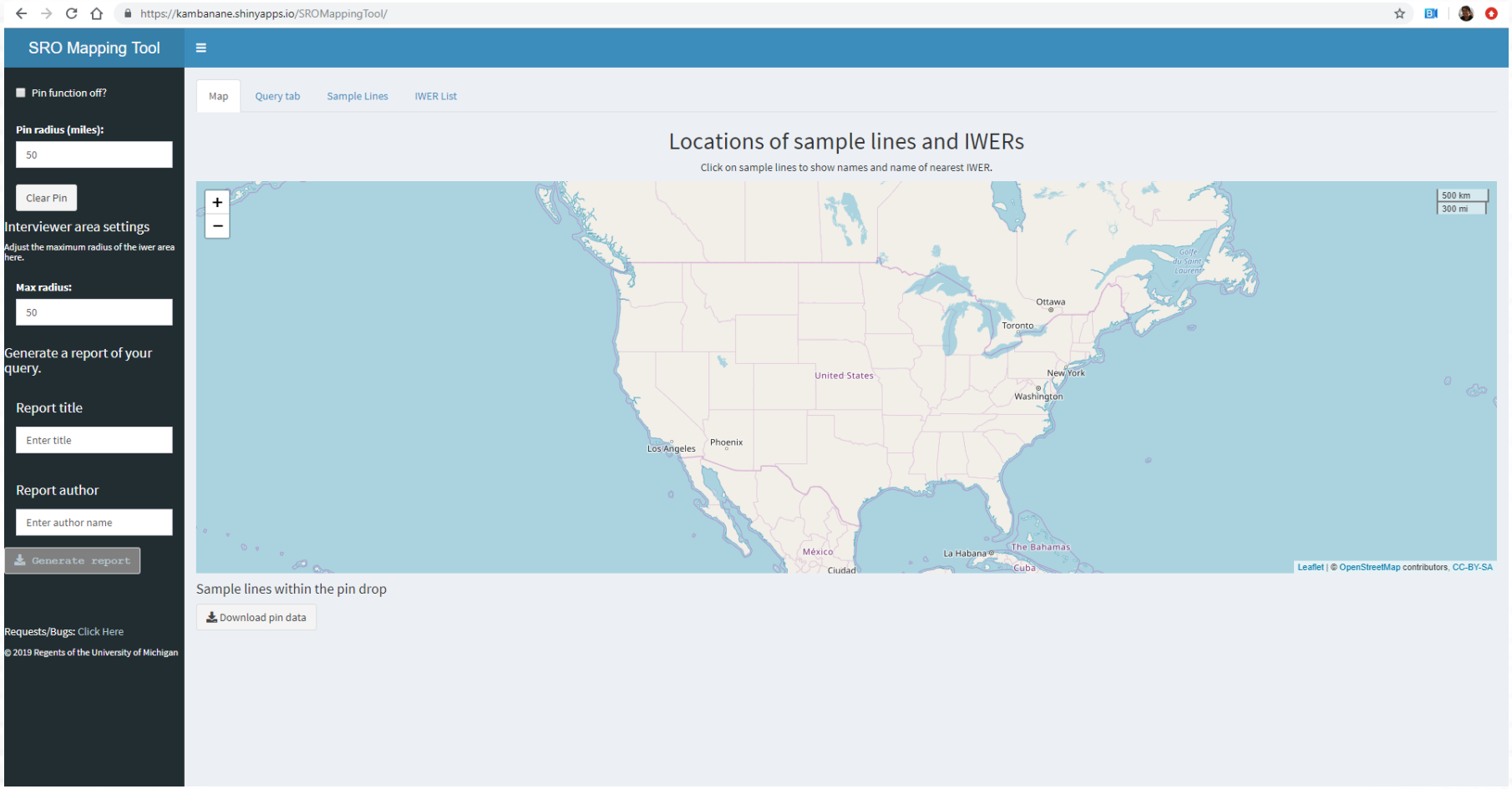

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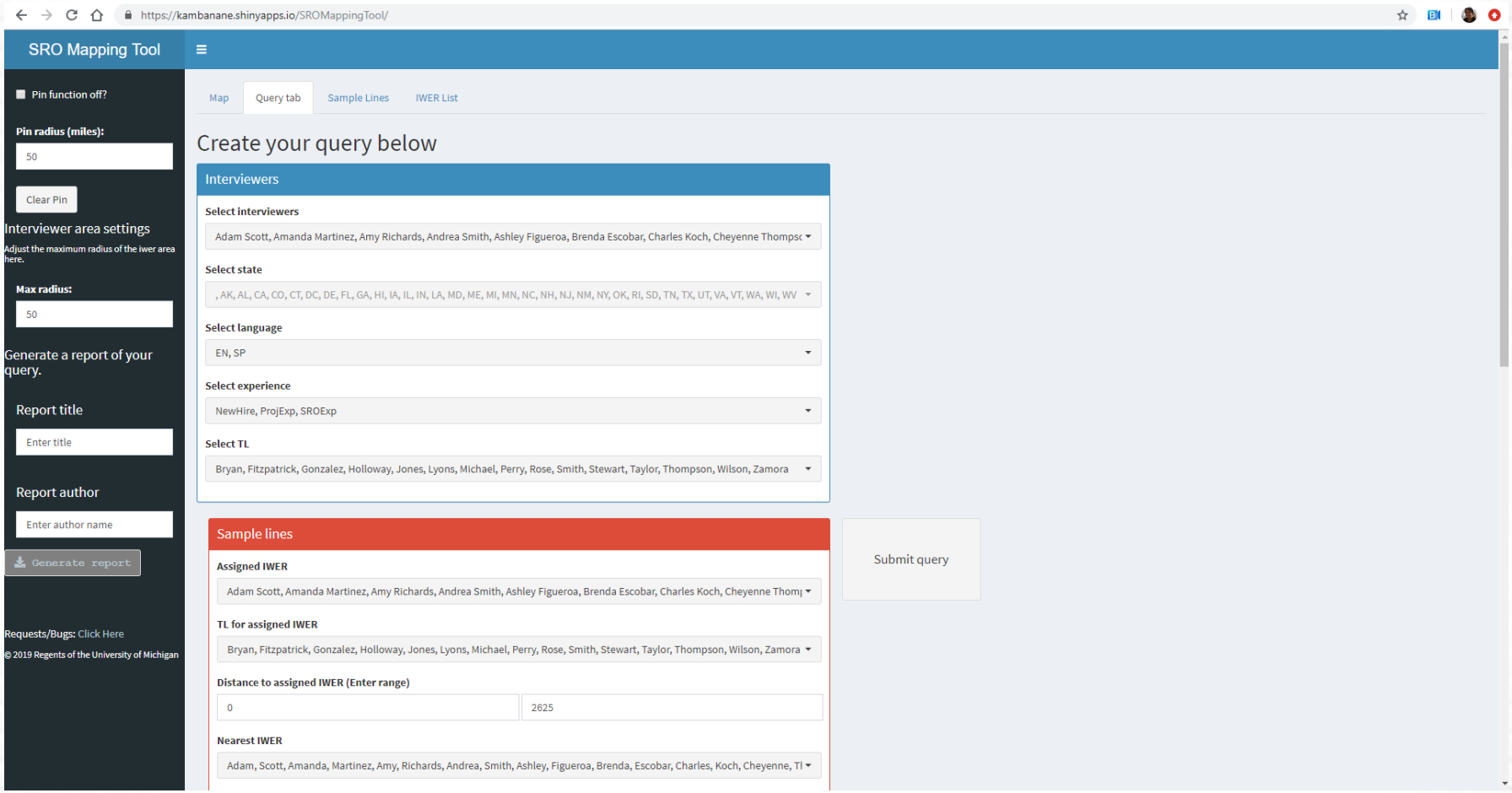

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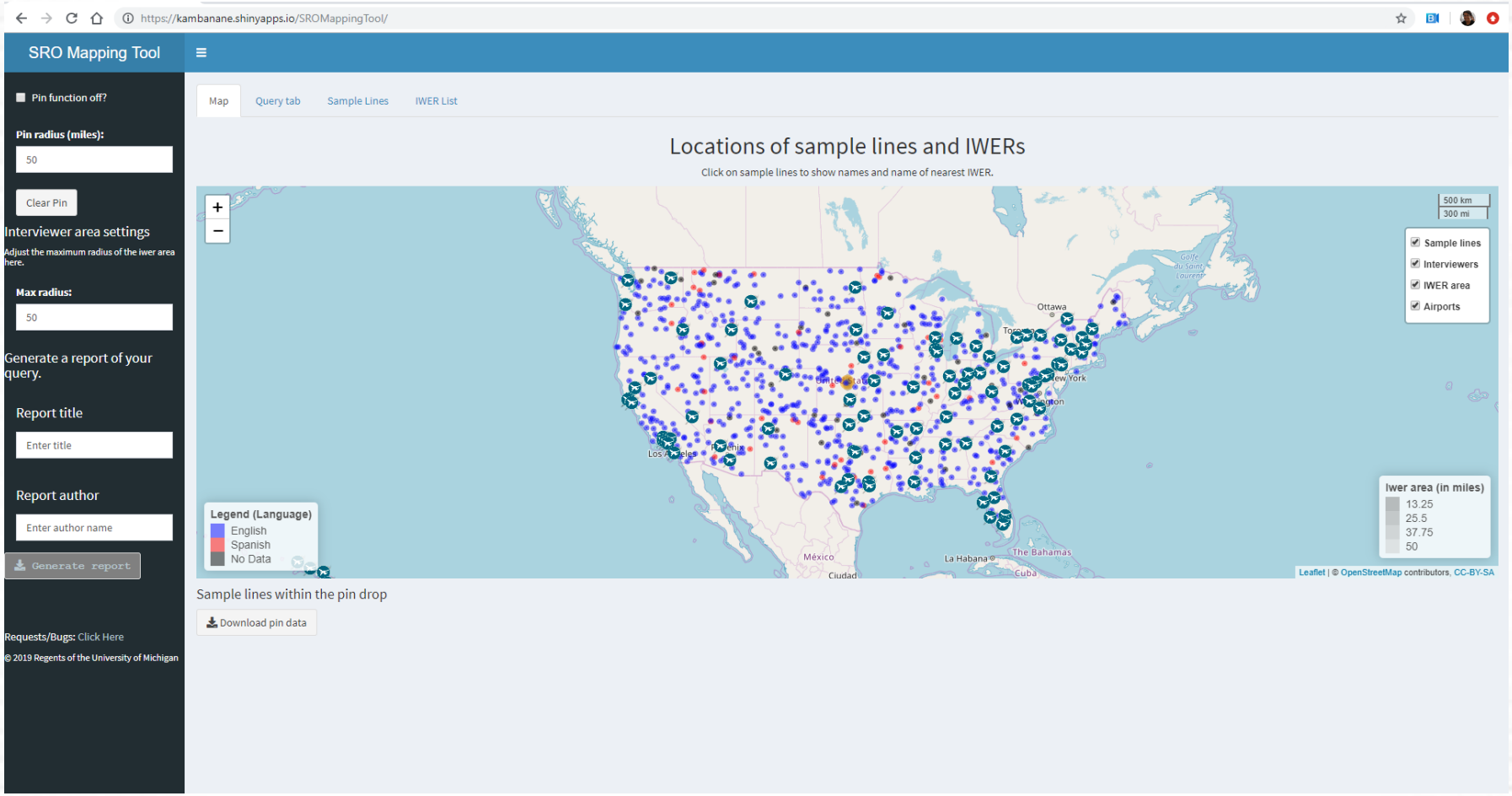

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