

street sense: learning from google streetview

kim, gaurav, and suriyan

Why Learn About the Public Infrastructure?

Why Learn About the Public Infrastructure?

Worse the quality of the public infrastructure,
generally, the worse the quality of life.

Why Learn About the Public Infrastructure?

Worse the quality of the public infrastructure,
generally, the worse the quality of life.

- Potholed roads \rightsquigarrow slower speeds, bumpier ride

Why Learn About the Public Infrastructure?

Worse the quality of the public infrastructure,
generally, the worse the quality of life.

- Potholed roads \rightsquigarrow slower speeds, bumpier ride
- Unpaved sidewalks \rightsquigarrow physically disabled have tougher time

Why Learn About the Public Infrastructure?

Worse the quality of the public infrastructure, generally, the worse the quality of life.

- Potholed roads \rightsquigarrow slower speeds, bumpier ride
- Unpaved sidewalks \rightsquigarrow physically disabled have tougher time
- Garbage \rightsquigarrow foul smells, greater risk of disease

Learning About The Quality of Streets

Learning About The Quality of Streets

- Open Street Maps (OSM) for data on roads

Learning About The Quality of Streets

- Open Street Maps (OSM) for data on roads
- Chunk each road into .5 km segments

Learning About The Quality of Streets

- Open Street Maps (OSM) for data on roads
- Chunk each road into .5 km segments
- Randomly sample from the segments

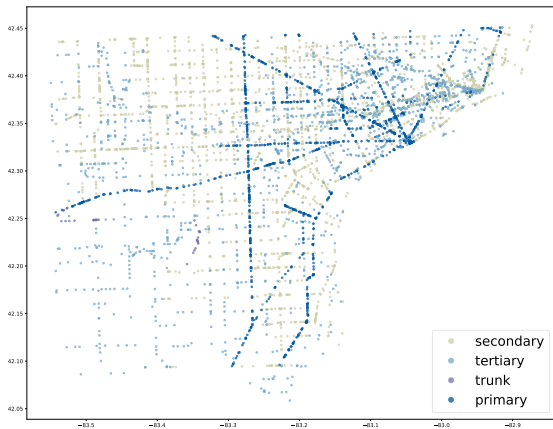
Learning About The Quality of Streets

- Open Street Maps (OSM) for data on roads
- Chunk each road into .5 km segments
- Randomly sample from the segments
- Google Street View API for lat/long of top-left of the segment with fixed direction of camera

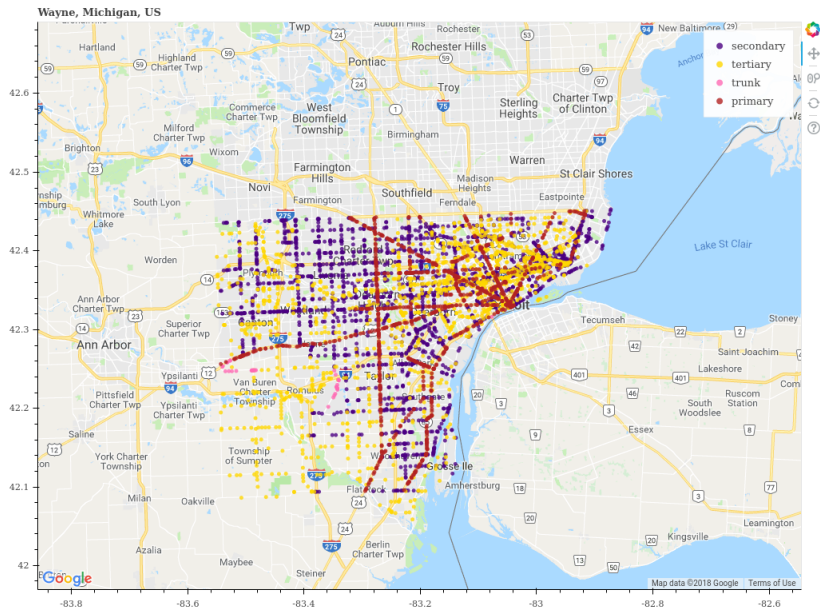
Learning About The Quality of Streets

- Open Street Maps (OSM) for data on roads
- Chunk each road into .5 km segments
- Randomly sample from the segments
- Google Street View API for lat/long of top-left of the segment with fixed direction of camera
- Concern: Google Streetview doesn't have adequate coverage. Dhaka — 24.6%

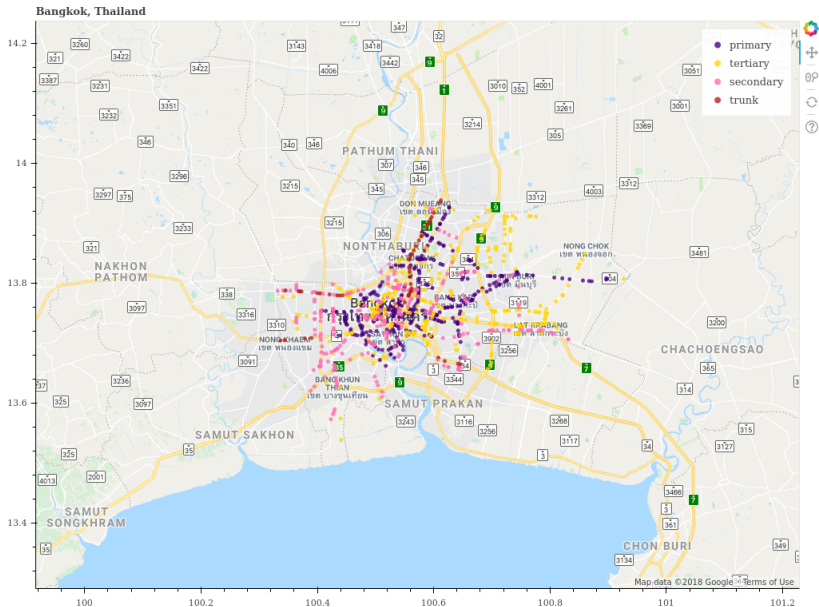
Sampled Locations in Wayne, MI



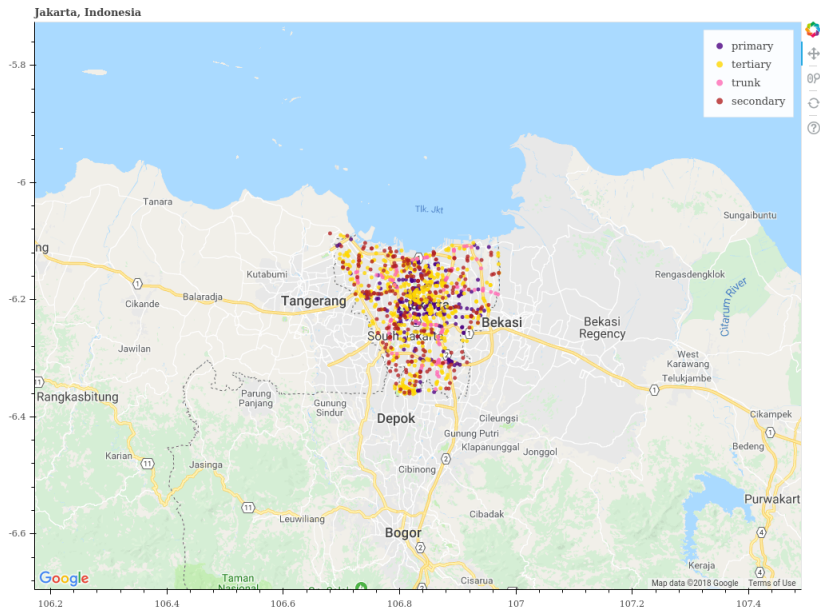
Sampled Locations in Wayne



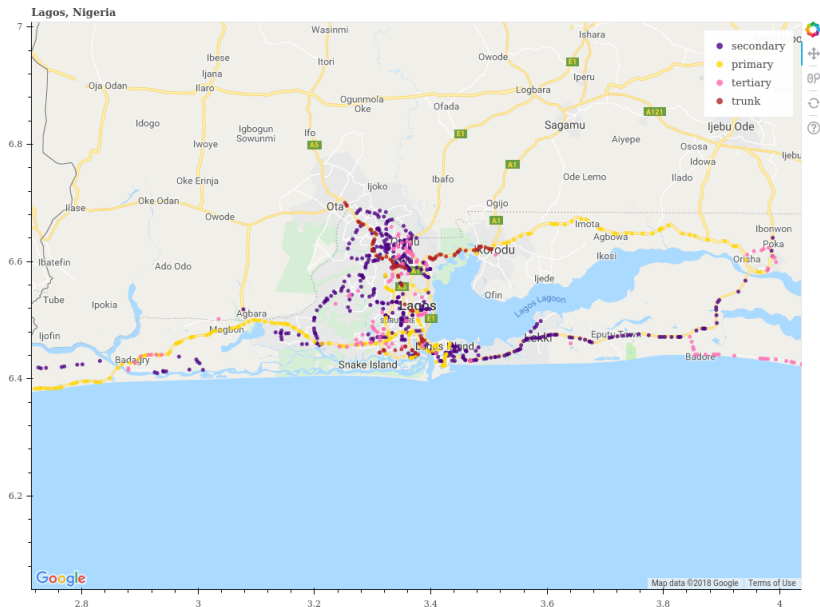
Sampled Locations in Bangkok



Sampled Locations in Jakarta



Sampled Locations in Lagos



Crowdsourced coding

Crowdsourced coding

- Only *Master* Mturkers

Crowdsourced coding

- Only *Master* Mturkers
- 5 cents per image

Crowdsourced coding

- Only *Master* Mturkers
- 5 cents per image
- Randomly checked images to ascertain quality

Screenshot of the Bangkok, Jakarta, and Wayne Questionnaire



Does the road have any...?

- ☐ Cracks
- ☐ Potholes

Do you see any of the following?

- ☐ Litter
- ☐ A paved sidewalk

Road markings are painted marks on the road to guide traffic, e.g. pedestrian crossing, lane dividers, etc.

If there are any road markings, are they clear?

- ☐ Yes
- ☐ No

Submit

Condition of the Roads in Different Places

city	potholes	cracks	clear markings	litter	paved sidewalk
bangkok	.06	.24	.81	.06	.51
jakarta	.23	.44	.34	.21	.49
lagos	.06	.20	.23	.15	.30
wayne	.07	.62	.60	.09	.67

Condition of the Roads in Different Places

city	potholes	cracks	clear markings	litter	paved sidewalk
bangkok	.06	.24	.81	.06	.51
jakarta	.23	.44	.34	.21	.49
lagos	.06	.20	.23	.15	.30
wayne	.07	.62	.60	.09	.67

Condition of the Roads in Different Places

city	potholes	cracks	clear markings	litter	paved sidewalk
bangkok	.06	.24	.81	.06	.51
jakarta	.23	.44	.34	.21	.49
lagos	.06	.20	.23	.15	.30
wayne	.07	.62	.60	.09	.67

Condition of the Roads in Different Places

city	potholes	cracks	clear markings	litter	paved sidewalk
bangkok	.06	.24	.81	.06	.51
jakarta	.23	.44	.34	.21	.49
lagos	.06	.20	.23	.15	.30
wayne	.07	.62	.60	.09	.67

Future

Future

- Build a classifier

Future

- Build a classifier
- Track overtime conditions

Future

- Build a classifier
- Track overtime conditions
- Use satellite data

<https://github.com/geosensing/streetview>

Robustness Check

Screenshot of the New Jakarta Questionnaire



Please look carefully as the image is low-quality and blurring can be deceptive.

The photo is from Google Street View. Portions of the image may be blurred to preserve privacy. Road markings are painted marks on the road to guide traffic, e.g. pedestrian crossing, lane dividers, etc.

If you don't answer all the multiple-choice questions, the HIT will be rejected.

If there are any road markings, are they clear?

- ☐ Clear markings
- ☐ Not clear
- ☐ No markings

Do you see any of the following?

- ☐ Litter
- ☐ A paved sidewalk

Instructions



[View full instructions](#)

[View tool guide](#)

If there are multiple cracks/potholes, create a bounding box around each one.

Draw the narrowest bounding box that fully encloses the item.



Labels

- | | |
|----------------------------------|---|
| <input type="checkbox"/> Pothole | 1 |
| <input type="checkbox"/> Crack | 2 |



☐ Nothing to label

Submit