Validating every change
Vandalism

- As online communities grow, destructive actors increase
- OSM is vulnerable
- Mapbox protects the users from harmful data
Harmful data
Way: I've replaced the batteries but my smoke detector won't stop beeping! (550734402)

Added houses, garages, roads, foot paths, apartments and more Modified streets and more

Edited 5 months ago by
Version #1 - Changeset #55141960

Tags

building  commercial

name  I've replaced the batteries but my smoke detector won't stop beeping!

Nodes
5319183860
5319183870
5319183871
5319183872
5319183873
5319183874
5319183875
5319183876
5319183877
5319183878
5319183879
5319183969

Download XML · View History
Retirement House for the old grannys of England
because why does it have to be white
Factory of Small Children Meat
Statistics (per million changes)

- 570 incorrect labels
- 300 editing failures (dragged nodes)
- 160 spam incidents
- 100 harmful deletions
- 50 obscene labels
- 20 graffiti
- ...
Daily change statistics

- 2 million features get touched
- 10k label edits
- 30k changesets
  - 0.2% is vandalism
  - 2% are low quality
- 20k new contributors join monthly
  - 30% of new users make a mistake in their first 10 edits
Daily touched features by data layer
Past approaches at Mapbox

- Validating changesets
- Relying only on algorithms
- Monitor new users
- Building blacklists

One approach does not address all cases of vandalism.
Approach

**Step 1**
Split the OSM mono layer into data layers

**Step 2**
Diff the changes per day.

**Step 3**
Cluster daily changes into deltas.
A new unit of change
Step 4
Review the daily changes

Step 5
Apply the updates to the map and protect from harmful changes

Step 6
Share harmful changes and fix them
Machine review

- Profanity checking in 100 languages for labels
- Use NLP to determine how likely a label is a place name
- Shape classifiers for likelihood of a shape being a building
- Drastic changes to stable features
- ...

[Image of icons]
Human review

- Review changes in
  - geometry
  - labels
  - hierarchy
  - primary tags
- Classify harmful changes
Isolate changes
QA of reviews

- Review team regularly gets sampled
- >99% accuracy for selected cases
- Expert mappers double check each review and single out the problematic features
Review statistics from Mapbox

- Our review team reviews all 80'000 changes on a daily basis
- We flag around 1000-2000 changes a day
- We fix >200 defects on a daily basis
- 50% of issues are fixed by OSM
Daily catch
Sharing vandalism detections

- **osmcha.mapbox.com** is the one-stop shop for OSM validation.
- All our harmful detections are made public.
- Mapbox regularly fixes harmful data.

**Reasons for Flagging**

- Park added by new user
- Waterbody added by new user
- Feature overlaps with existing features

Flagged for Review by Mapbox

- 60742589
- 307, 117, 224

Import of address data from Prefeitura do Recife

- suspect_word
- possible import

Flagged for Review by Mapbox

- 60740975
- 4348, 55, 15

Gebäude bearbeitet

Flagged for Review by Mapbox

- 10 days ago
Takeaways

- Only 0.2% of edits are vandalism
- OSM is eventually consistent
- Mapbox provides you a validated view of OSM
- Let’s protect the future of OSM before vandalism becomes a bigger problem
- We need better shared monitoring efforts