

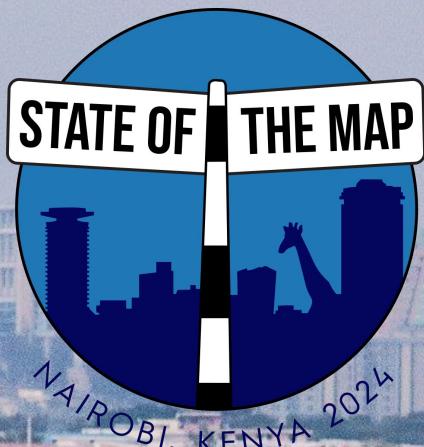


MapTCHA

The open source CAPTCHA that
improves OpenStreetMap

FOSDEM 2025





https://wiki.openstreetmap.org/wiki/File:A_giraffe_with_a_beautiful_background_of_Nairobi_City_Skyline.jpg



The screenshot shows a web browser window with the title "Home | fAir - Humanitarian OpenStreetMap Tools". A yellow circle highlights the URL bar, which displays "https://fair.hotosm.org". The page content features a large image of a person wearing headphones, viewed from behind, working on a laptop. On the left, a dark overlay contains the text "YOUR AI MAPPING PARTNER" and "AI-powered assistant that amplify your mapping efforts intelligently and quickly, helping you map smarter and faster." Below this are two buttons: a red "CREATE MODEL" button and a white "START MAPPING" button. On the right, a screenshot of a laptop screen shows a map of Chinoyi Urban Renewal, Zimbabwe, with various buildings and roads labeled. The URL "https://fair-dev.hotosm.org/" is visible at the bottom of the page.

Home | fAir - Humanitarian OpenStreetMap Tools

https://fair.hotosm.org

fAir

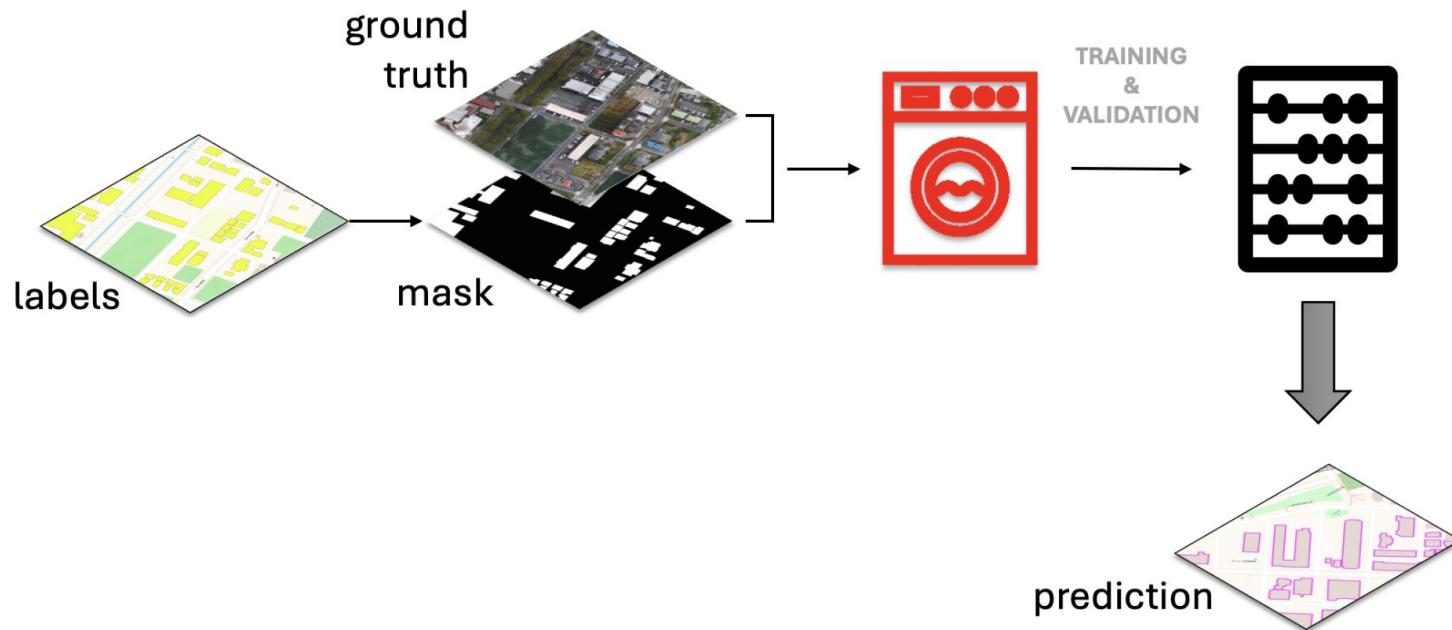
YOUR AI MAPPING PARTNER

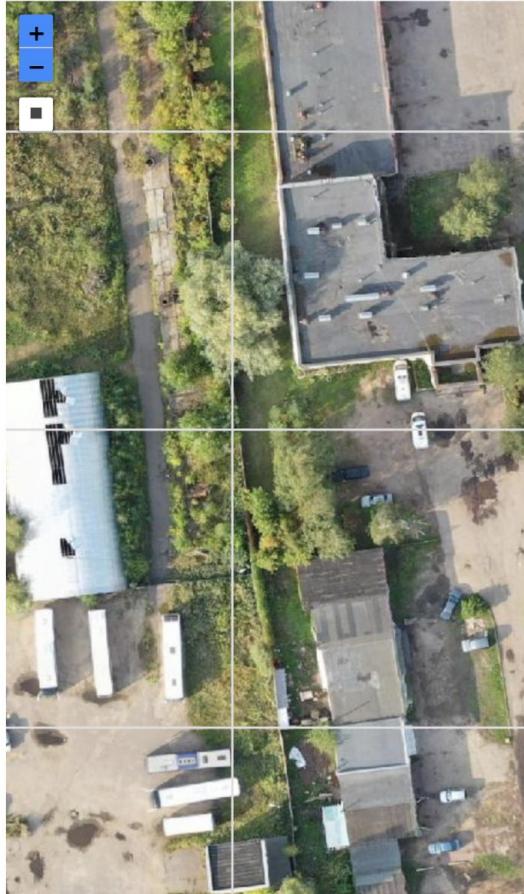
AI-powered assistant that amplify your mapping efforts intelligently and quickly, helping you map smarter and faster.

CREATE MODEL

START MAPPING

Check also <https://fair-dev.hotosm.org/> for more models





Dataset 244 :
StarayaRussia_Russia_metric
Zoom: 19.1
[VIEW MODELS](#)

Open Aerial Imagery

Старая Русса
Max zoom:25, Min zoom:12

Training Areas (1)

AOI id 1062
Area: 52,518 sqm

Fetched +1 week(s) ago

Import TM Project Validated Tasks

TM Project Id
11999

Project id, e.g. 11999

[IMPORT ↑](#)

Importing validated tasks from HOT Tasking Manager project is still an idea



fAlr

LEARN TRAINING DATASETS AI MODELS START MAPPING DOCUMENTATION



AnnaZanke

**RUN PREDICTION**

Current Zoom: 20

Response: 0 sec

ConfigUse JOSM Q: Confidence: ▾

Vectorization Config :

Tolerance: Area: **Feedback**

Initial Predictions: 0

Total feedbacks count: 20

Loaded Model

ID: 51

Name: fair demo model

kakuma

Last Modified: 11/04/2024,
15:51:17**Published Training**

ID: 364

Description:

Zoom Level: 19, 20, 21

Accuracy: 97.60 %

Model Size: 123.85 MB

**RUN PREDICTION**

Current Zoom: 20
Predicted on: 20 Zoom
Response: 12 sec

Config

Use JOSM Q:

Confidence: 90 %

Vectorization Config :

Tolerance: 0.3 Area: 0

Feedback

Initial Predictions: 360
Total feedbacks count: 20

Loaded Model

ID: 51
Name: fair demo model
Kakuma
Last Modified: 11/04/2024, 15:51:17

Published Training

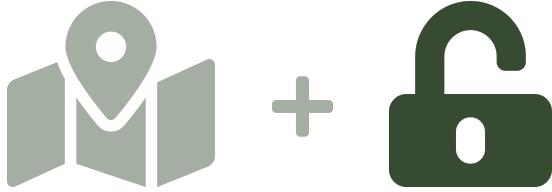
ID: 364
Description:
Zoom Level: 19, 20, 21
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Options**REMOVE OSM FEATURES****OPEN WITH JOSM**

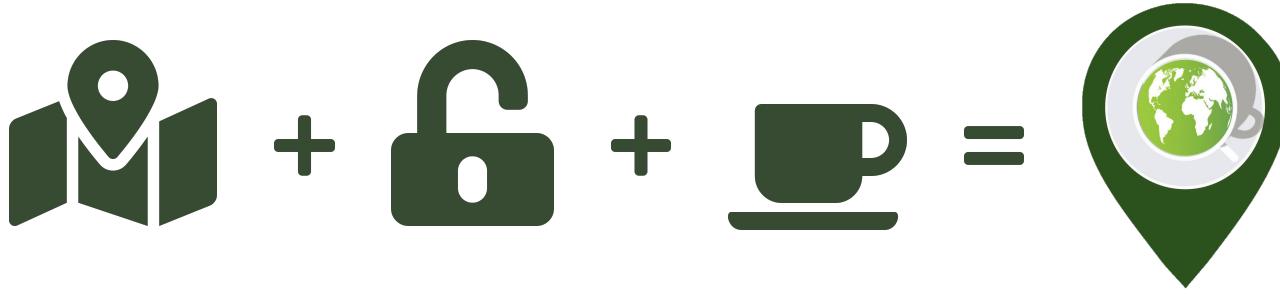


Get feedback on the AI
prediction from a wider
audience





Tool that helps block bots
(CAPTCHA), *without* improving
proprietary maps and software,
or exposing user information to
third parties







-What are we trying to do

1. Building something that reliably can tell the difference between a human and a bot.
 - a. Some of the images we are showing are explicitly ones that the best computer vision algorithm for detecting buildings has failed on.
 - b. How would we in production use this to distinguish between the two.
2. Generates good validation data for improving models.
 - a.

For this test we know the answers, but that won't be true in production.

a.



Build something that can
reliably tell the
difference between a
human and a bot?



Get better data for
OSM? Get good
validation data for
improving AI models?



<https://maptcha.crown-shy.com>



Welcome to MapTCHA

The opensource CAPTCHA that improves OpenStreetMap

Bots and spam are challenges for online platforms. Traditional CAPTCHAs help block bots, but often involve improving proprietary maps and software, while exposing user information to third-party CAPTCHA providers.

OpenStreetMap (OSM) has many objects remaining to be mapped, but the quality of AI-generated objects is not high enough for direct inclusion.

We introduce here "MapTCHA", a CAPTCHA that leverages the uncertainty of interpreting imagery with computer vision, and provides human verification for AI predictions: you are asked to identify images containing correctly interpreted objects, e.g. building outlines.

MapTCHA is still a work in progress. We are testing it now on potential users. In the following interface you will be shown what looks like a typical CAPTCHA interface, both in grid and swipe format.

Please try a few identification tasks (you'll be shown 9 images per session) until you get to a short

instruction screen, which will tell you how to proceed.

Start



SWIPE

Swipe right if the red shape is correctly outlining a building. If not swipe left.

Incorrect Correct

GRID

Maptcha

Click on the images where the red shape is correctly outlining a building

Submit

Participants randomly assigned interface type when they first come to the site



SWIPE



Swipe right if the red shape is correctly outlining a building. If not swipe left.

Incorrect Correct

<https://maptcha.crown-shy.com>



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Please try a few identification tasks (you'll be shown 9 images per session) until you get to a short

instruction for the next step. See the bottom right for the button.

Start



GRID

MapTCHA

Click on the images where the red shape is correctly outlining a building

Submit

<https://maptcha.crown-shy.com>

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Please try a few identification tasks (you'll be shown 9 images per session) until you get to a short

Start



WEB COMPONENTS



https://github.com/ciupava/maptcha_dev



758

Users



398

Images

206



21 514



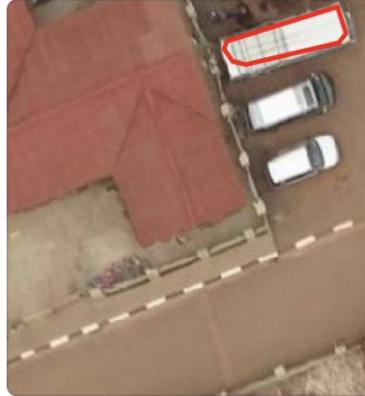


Predictions
on labelled
data!

T



F



P



N





T

F

P

Is the red shape correctly
outlining a building?



N





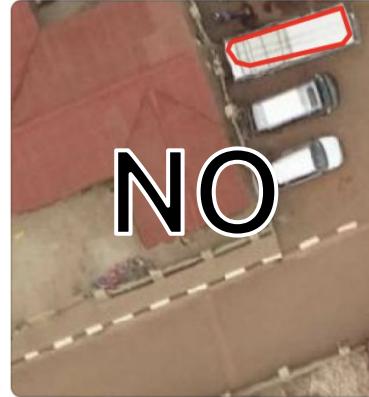
T

P



YES

F



NO

N



NO



YES

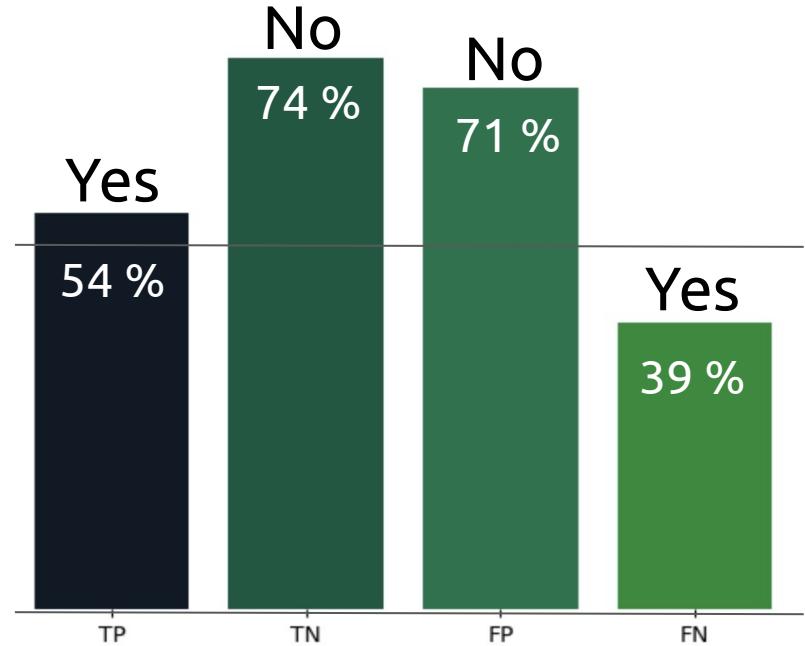


Image classification	No.	% of all images	False	True
TP	11158	56%	46%	54%
TN	6821	34%	74%	26%
FP	976	5%	71%	29%
FN	939	5%	61%	39%

User response



Images
ratio



Users responses



TP grid



TN swipe



FP grid

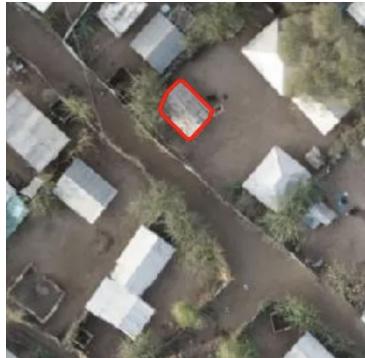


FN grid





TP swipe



TN swipe



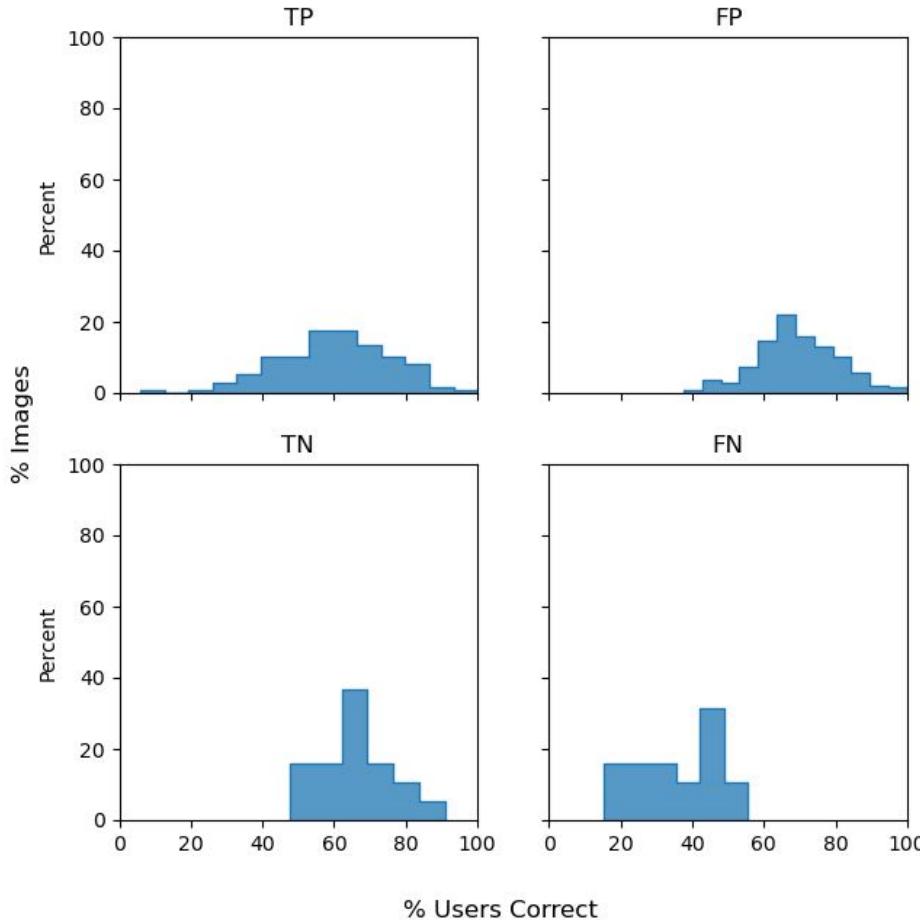
FP swipe



FN grid



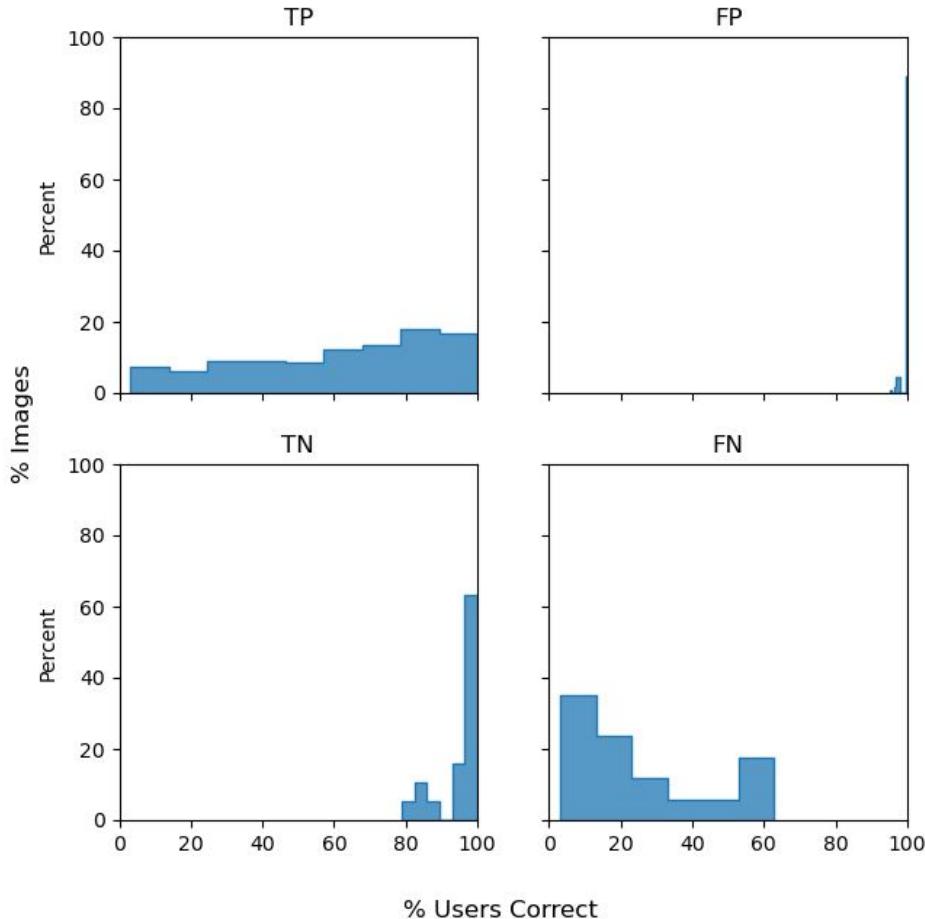
SWIPE



If we calculate for each image, the % of participants who got it correct, we can see which images are harder and easier for humans to distinguish

If we pick images that the computer got wrong (FP, FN) that a majority of participants got right, we can use them to identify humans.

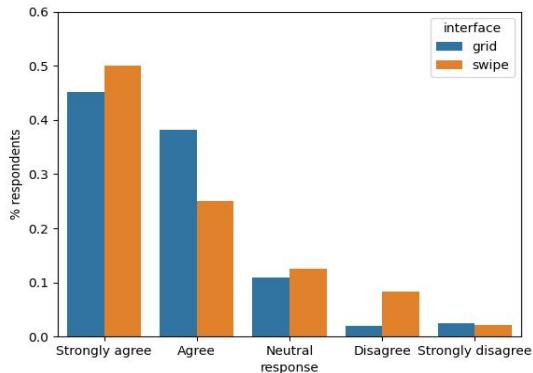
GRID



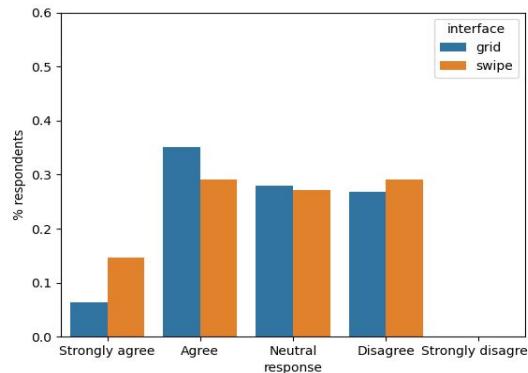
Participants using the grid interface seem to get almost all of the FP classifications correct.

For both the Grid interface and the Swipe interface, the FN class seems to be difficult for people to get across all images

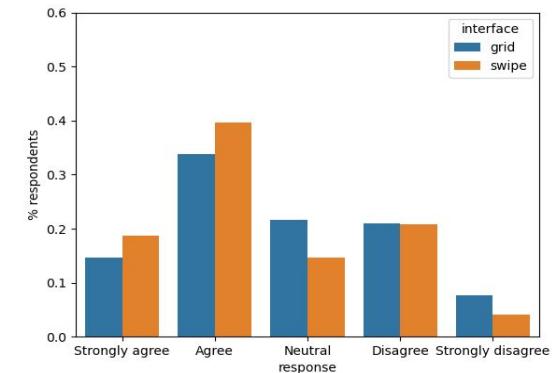
I find this CAPTCHA tool very cool



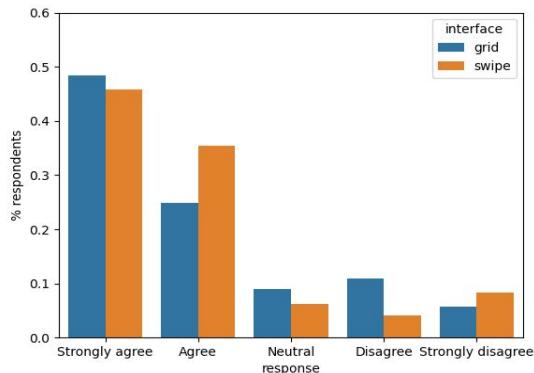
I could easily identify the detected building



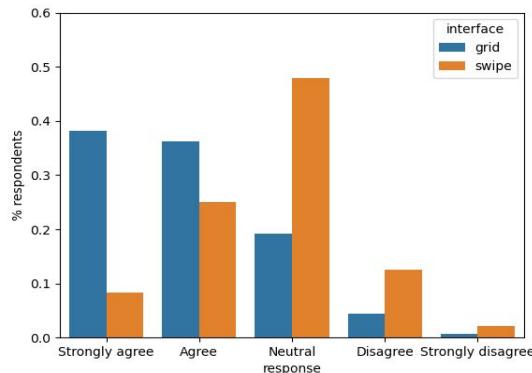
I would benefit from more instructions



I have identified features (like buildings) from satellite imagery before



I would like more/less zoomed imagery





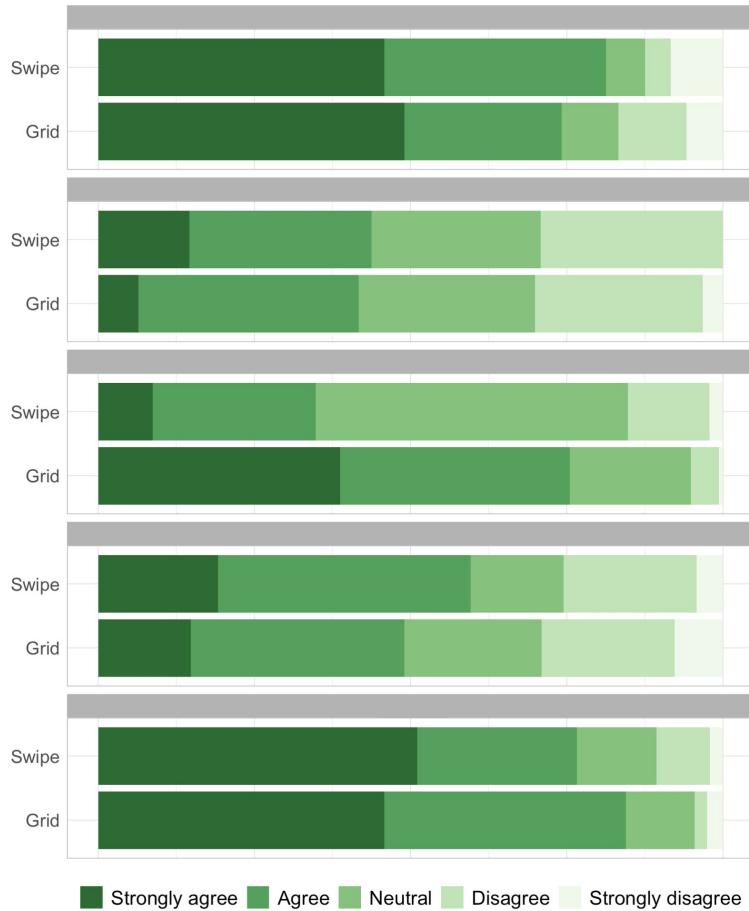
I have identified features (like buildings) from sat images before

I could easily identify the detected building

I would like more / less zoomed imagery

I would benefit from more instructions

I find this CAPTCHA tool very cool





The screenshot shows a Mastodon post by Anna Zanchetta (@ciupava@en.osm.town). The post content is:

Introducing 🌍 Maptcha 🌍
the #opensource CAPTCHA that improves #OpenStreetMap !

Maptcha is at its alpha stage, and we are testing it on potential users. To take part in the test, please follow this link:
maptcha.crown-shy.com

You have ~one week time to take part and give us some feedback.
We'll present the results at #fosdem2025 in the Geospatial devroom
with @grischard @soporificoctopus
#OSM #fosdem

Below the post is a screenshot of a browser window showing the Maptcha website (maptcha.crown-shy.com) with the text "Vite + Lit + TS".

Post statistics: Jan 15, 2025, 10:57 PM · 99 boosts · 89 favorites.

A vertical sidebar on the right contains icons for navigation and settings.

Accessibility

- Choice of the outline color (**RED!**)
- Visual impairment
- Translation

Clarity of the question

- Swipe right/left
- Tiles with no outline (TN)
- No instructions

Survey

- Didn't get to it
- Zoom level

<https://en.osm.town/@ciupava/113834842382266232>



Future work

- Improve images
 - Centered on building
 - Better outlines
- Introduce “unknowns”
- Add instructions
- Integrate validated buildings into the wider OSM dataset (MapRoulette? Self training?)
- Add “skip” or “load new” button
- Translate to other languages
- Accessibility?



THANK YOU



<https://maptcha.crown-shy.com>



https://github.com/ciupava/maptcha_dev



[@grischard](https://en.osm.town) [@ciupava](https://mastodon.scot) [@soporificoctopus](https://mastodon.scot)
[@en.osm.town](https://en.osm.town) [@mastodon.scot">](https://mastodon.scot)

