

State of the Map Europe 2023

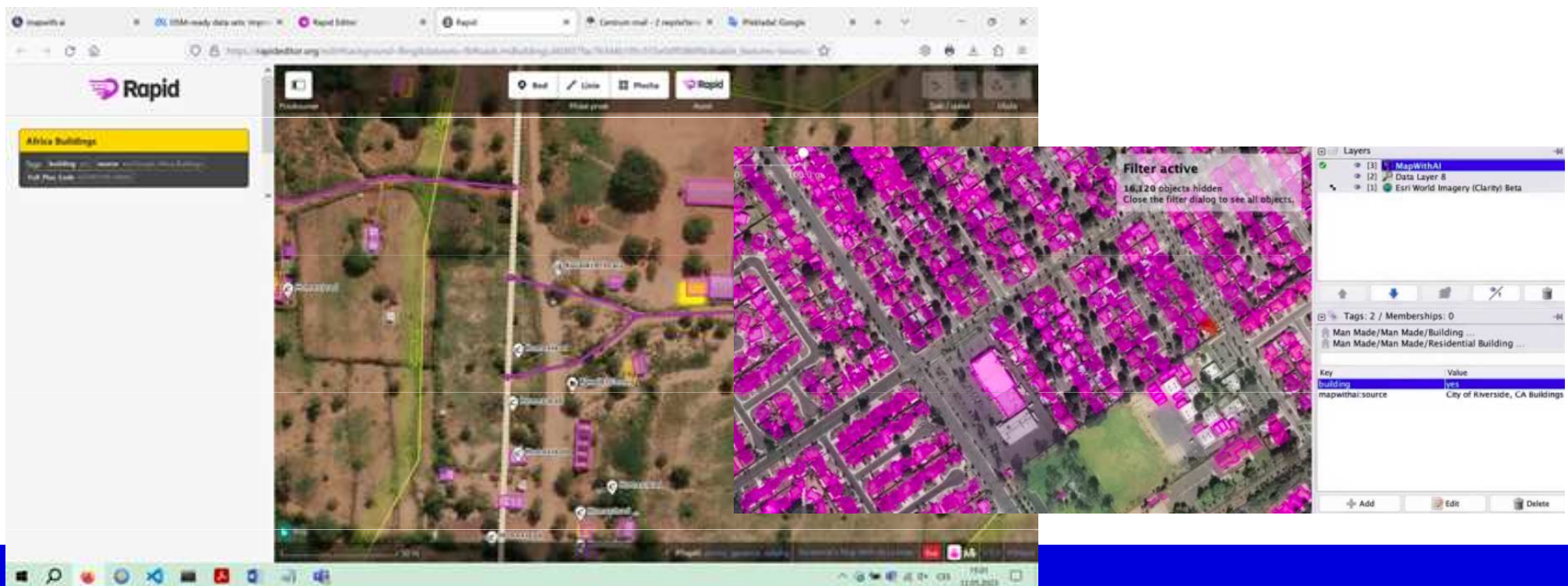
Global and regional level of use
of buildings and roads prepared
by AI for OSM mapping

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Mapping tools with AI data

- RapiD editor
- Mapwith.ai plugin for the JOSM editor
- HOT – fAIr project
- AI buildings – Microsoft, Google in cooperation with ESRI
- AI roads – Meta



Motivation

- Regions with medium and low HDI
→ 28% of buildings and 16% of roads in OSM,
home to 46% of the global population (2020)
- AI-assisted tools → possibility to fill data gaps
- Research the actual level of AI-assisted
mapping in OSM → global level and
differences between countries

Community reactions

- Community's reactions to the AI-assisted mapping are mixed
- Turkey-Syria Earthquake in 2023
- Using AI data for disaster response
 - beginners were automatically accepting all AI roads
 - extra work to validators and experienced mappers
 - organizers decided not to work with AI data further

Community reactions

- July 2023 – Webinar: Perspective on AI assisted OSM mapping (organized by HOT):
 - AI improves the speed but requires experience for data quality.
 - AI saves time spent in project delivery for humanitarian response.
 - AI triggers motivation for participation in OSM mapping.
- Carefulness is required especially when using AI in a complex environment – dense areas, informal settlements etc.
- Accuracy of AI data is often worse than production of inexperienced mappers. Due to bad quality of training data?
- AI predictions are often treated as a source of truth rather than predictions which need to be validated by mappers.
- There is a lack of open source models for AI. Models should be opened and offered to the community, not just data.

Research question

- **What are the differences between AI-assisted and traditional mapping concerning editing behaviour?**
- Editing pattern of AI and non-AI data
- AI-assisted mapping can lead to less community engagement and could undermine the contributor base of OSM in the long run
- OSM community attitudes toward imports and automated edits can be negative and cautious

Methodology

- All contributions made to OSM during **2021–2023** derived from a combination of the **OSHDB** developed by the HeiGIT and the **OSM changeset database**
- Three types of operations with objects in OSM: creating, editing (=modifying), and deleting
 - **creating and editing**
 - differences between buildings and roads mapped using AI and buildings and roads in general.

Methodology

- Building definition: building=*
- AI building definition: source=microsoft/BuildingFootprints, source=esri/Google_Africa_Buildings
- Road definition: tag highway: motorway, motorway_link, trunk, primary, primary_link, secondary, secondary_link, tertiary, tertiary_link, unclassified, residential
- AI road definition:
 - tag hashtags: #nsroadimport, #mapwithai, #MapWithAI
 - element tags: contain "RapiD"

Methodology – global level

Global level:

- created AI buildings / created all buildings in 2021–2023
- edited AI buildings / edited all buildings in 2021–2023
- length of created AI roads / length of created all roads in 2021–2023
- length of edited AI roads / length of edited all roads in 2021–2023

Results – global level

- The global level of using AI buildings and AI roads for creating new buildings and roads is generally low – not more than 16%.
- For AI buildings – increasing trend (created, edited).
- The level of AI buildings and AI roads is higher in the case of creating new objects than in the case of editing existing objects. AI objects are more created than actualised.

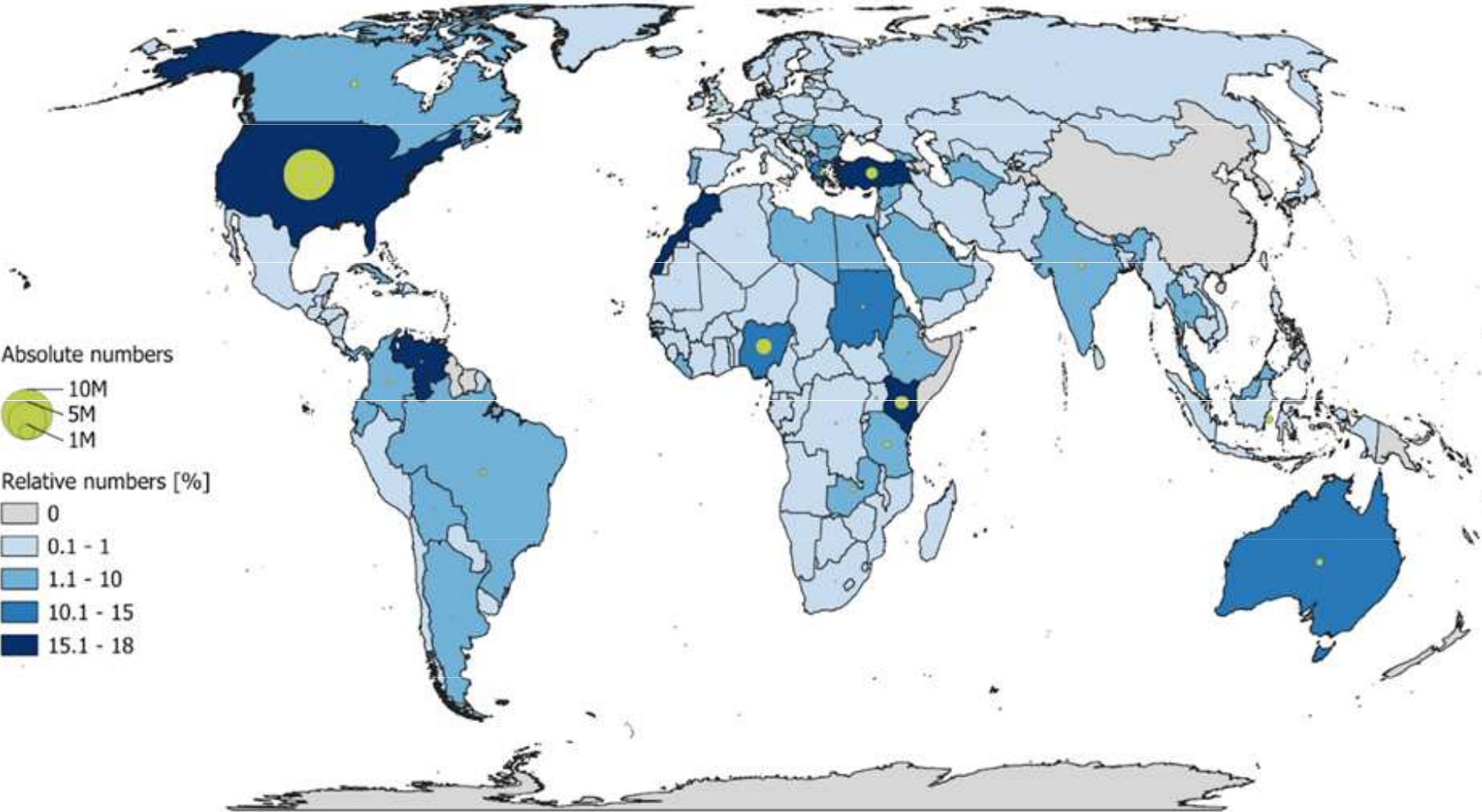
Year	AI Buildings/Buildings		AI Roads/Roads	
	Created [%]	Edited [%]	Created [%]	Edited [%]
2021	5.2	0.7	14.7	8.3
2022	12	3.2	15.1	5.7
June 2023	14.8	4.2	7.7	3.1

Methodology – local level

- The differences in using AI-assisted mapping between countries.
- The absolute numbers of AI buildings and the relative portion of AI buildings in all buildings.
- Ohsome API developed by HeiGIT (OSM history)
- June 30 2023

Results – local level – AI buildings

AI BUILDINGS IN THE WORLD 2023



Conclusion

- What are the differences between AI-assisted and traditional mapping concerning editing behaviour?
- The global level of using AI buildings and AI roads for mapping new objects is **less than 16%**.
- The **trend is increasing** in case of AI buildings.
- AI buildings and roads are **less often actualised than created**.
- AI buildings are significantly used only in countries where Microsoft coordinates AI assisted mapping (**USA, Kenya, Nigeria**) or where a humanitarian mapping using AI-assisted tools was held by HOT (**Turkey**).
- OSM community has **mixed reactions** about mapping with AI.
- They hope that **fAIr project will offer open source AI models**.

Thank you for your attention!

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