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From individuals to collective spatial truth: data characteristics in digital participatory mapping

Mariana Vallejo-Velázquez * | Ourania Kounadi* | Andrea Pődör**

*Department of Geography and Regional Research, University of Vienna
** Institute of Geoinformatics, Obuda University

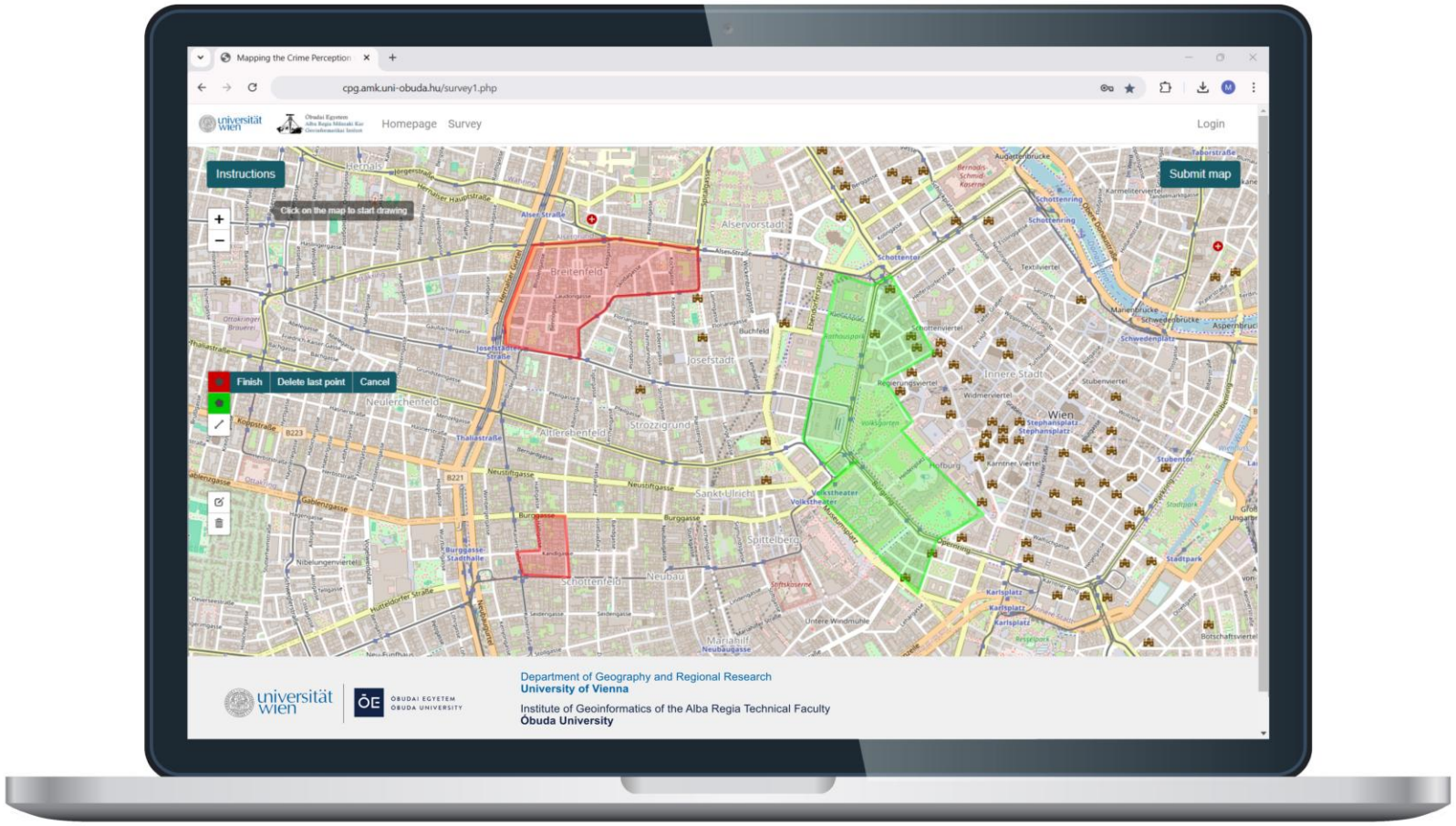
Content

Geo-questionnaires & structured digital sketch mapping

Subjective spatial data characteristics

- From individual inputs to collective narratives
- Participation-related biases
- Data attributes shaping spatial data assessment
- Multiscale mapping
- Spatial representation uncertainty

SWOT



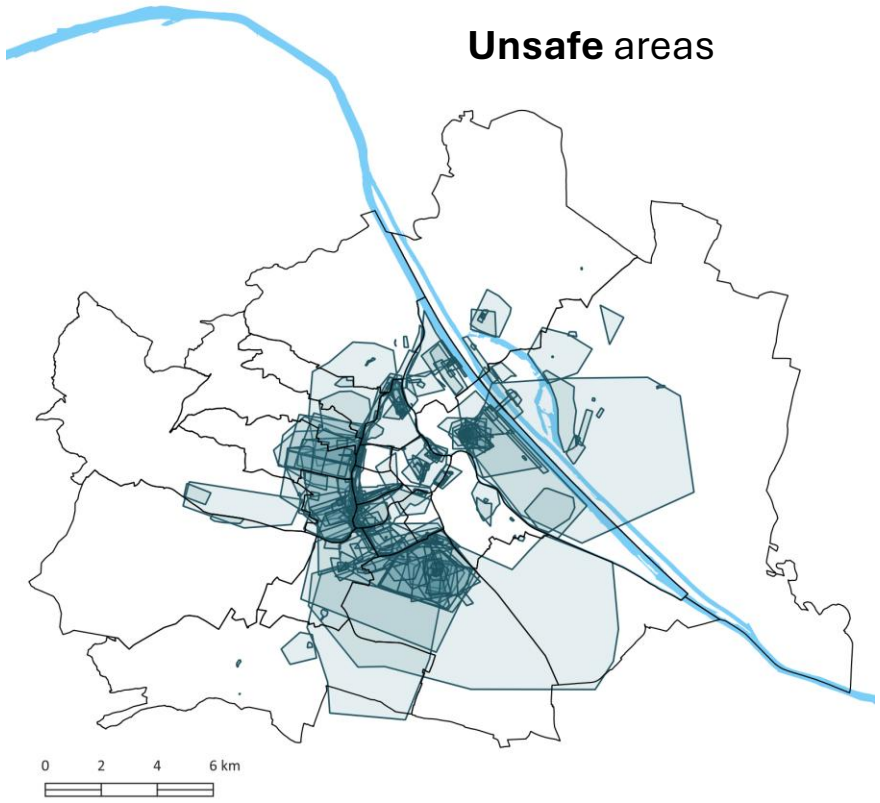
Computer base image designed by D3images/Freepik

Content

Perception of crime in Vienna

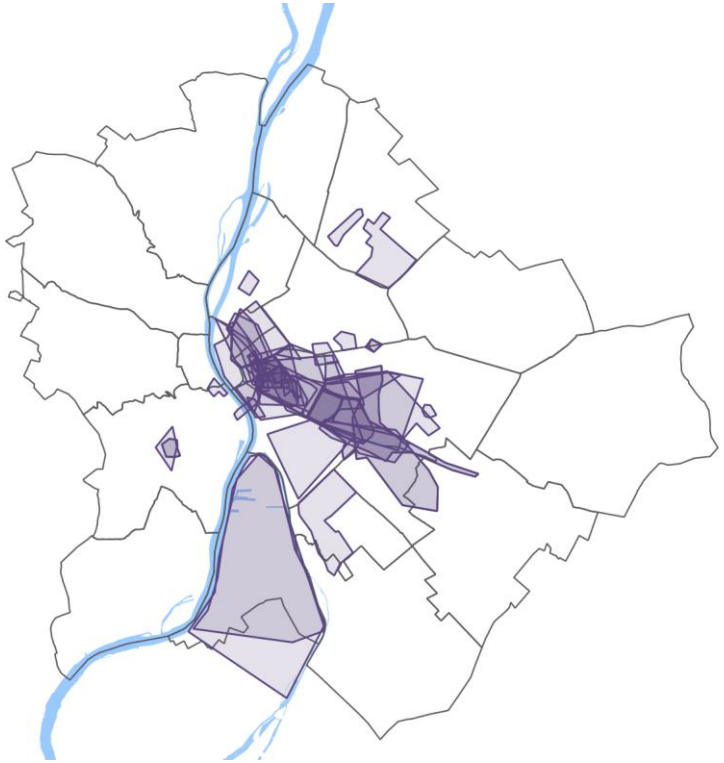
Safe areas

Unsafe areas

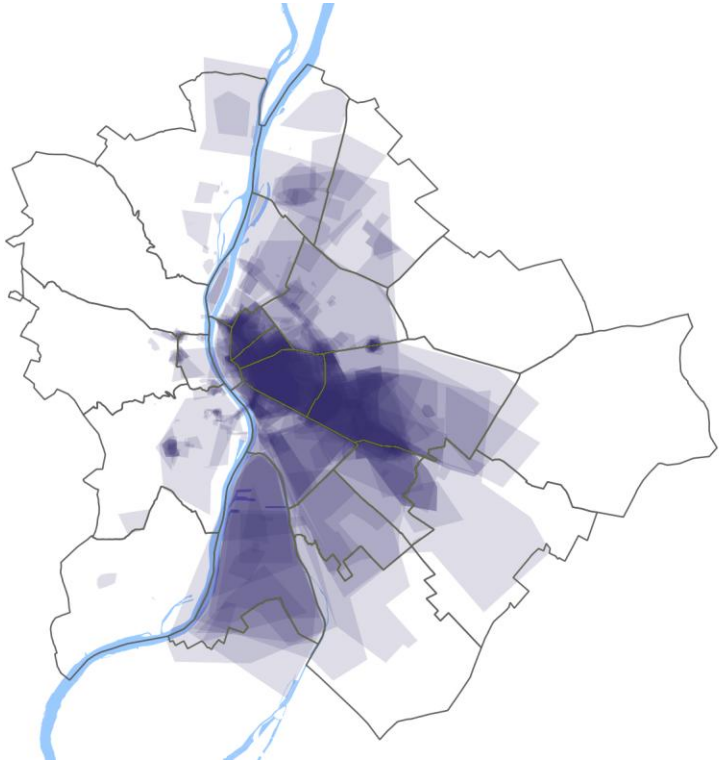


Each input is valued for unique content; however, its true significance emerges through the aggregation of all responses → ***collective truth***.

This process enables the identification of patterns and areas of consensus, while also highlighting variations and outliers.



Individual sketches of perceived unsafe areas



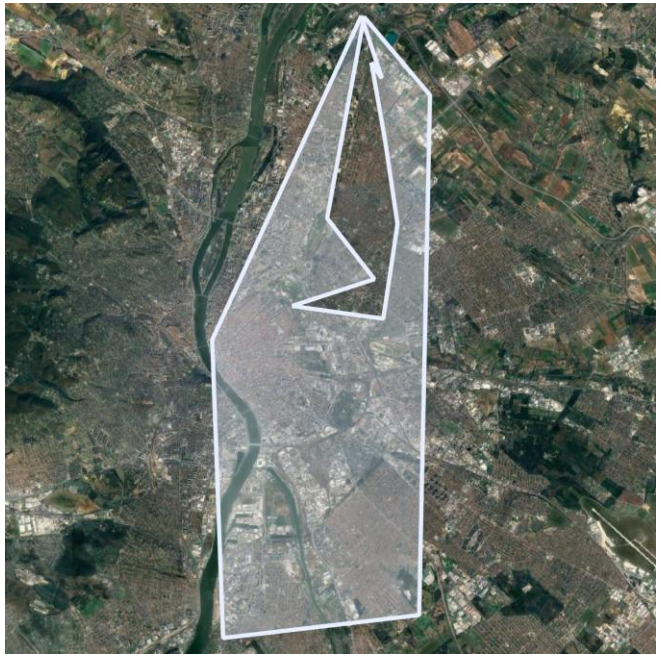
Aggregated perception of unsafe areas

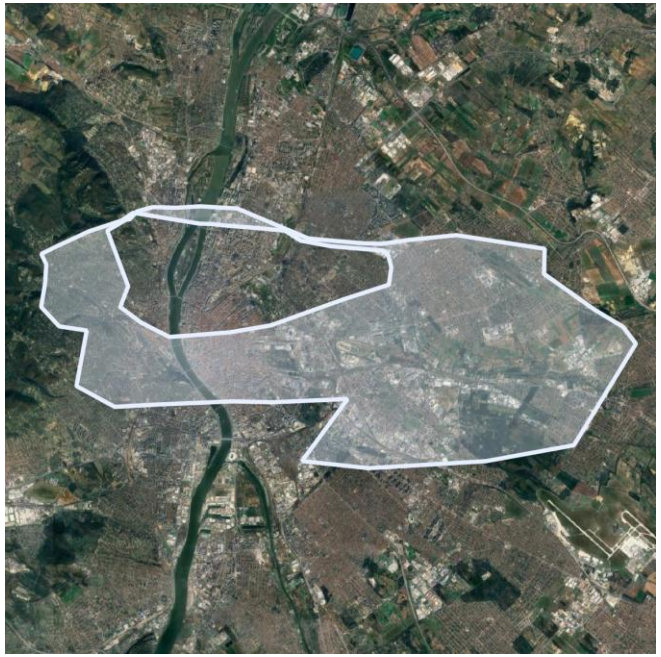
Digital participatory mapping is subject to multiple levels and types of biases, which can influence the quality and representativeness of the collected data.

Participant engagement	**effort, attention and interaction**
Self-selection of participants	**individuals driven by personal interest, motivation, or topic familiarity**
Technological proficiency and digital divide	**exclusion of those lacking digital skills**
Internet connectivity	**underrepresentation of certain groups**

Subjective spatial data is personal and unique, unlike objective data, which is measurable and verifiable. Its reliance on individual perceptions and experiences makes traditional **quality assessment challenging**.

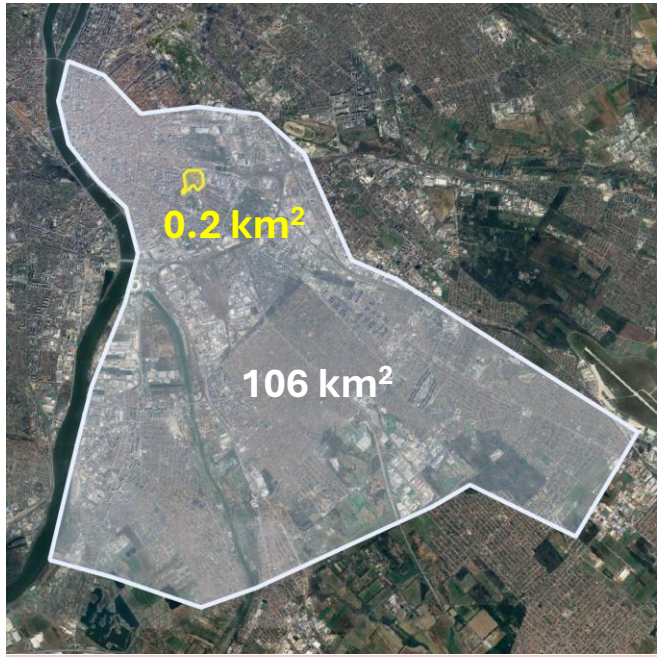
Geometries can reveal mapping tools misuse, especially in polygons and lines, where **shape irregularities can indicate user difficulties**.





Digital participatory mapping allows navigation across multiple zoom levels and geographic scales. Participants sketch at **different scales**, shaped by how they perceives and interpret space. This creates variation and uncertainty in what sketches represent, especially with large polygons.

Multiscale information captures varying level of generalization and detail .



Large differences in polygon size

Variation in delineation detail

Mapped features reflect individual perception, shaped by personal experience, culture, and **interaction with the mapping tools**.

As Goodchild (2008) notes, maps are realizations of a **stochastic process**, each **sketch is a unique expression of spatial understanding**.

This variability, driven by differences in perception, scale, and precision, means each feature is an **approximate representation of a person reality**.

Goodchild, M. F. (2008). Statistical perspectives on geographic information science. *Geographical Analysis*, *40*(3), 310–325. https://doi.org/10.1111/j.1538-4632.2008.00728.x

Content

S Strengths

This method is **widely accepted** and produces spatial datasets enriched with attribute data, **"easily" integrated into GIS** workflows.

W Weaknesses

Limitations include the digital divide, self-selection bias, and uncertainty in both geometry and interpretation—shaped by participants' skills, engagement, and varying scales—**making analysis challenging**.

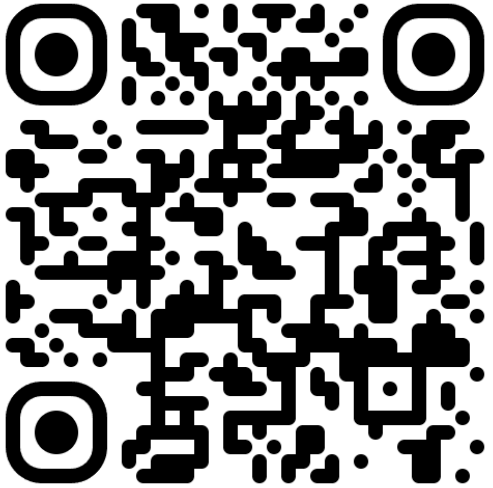
O Opportunities

Opportunities lie in improving platform design—through careful planning, clear instructions, and usability enhancements—and in **developing quality assessment frameworks** for subjective spatial data.

T Threats

Limited integration of participatory mapping data into **decision-making** and **persistent privacy concerns**.

Thank you for your attention.



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