



NLS
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Vector ML

Case: Gaze-Aware Interactive Map System

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TUGEVA PROJECT

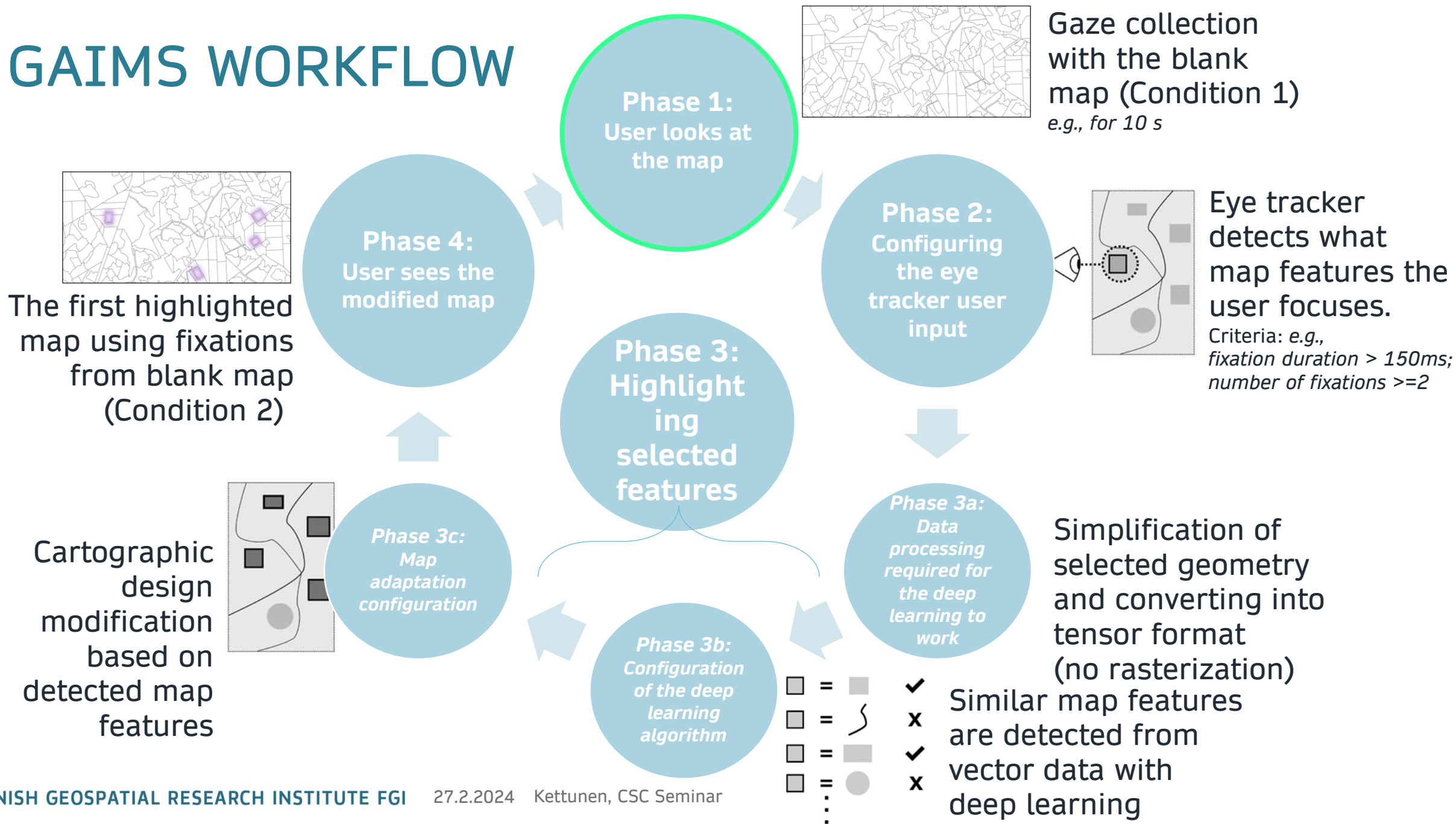
Enabling map readers to understand phenomena/dynamics/actions of **unfamiliar** and **unstructured** geospatial data

Providing user insights in something new

Vision: Gaze-Aware Interactive Map System: GAIMS

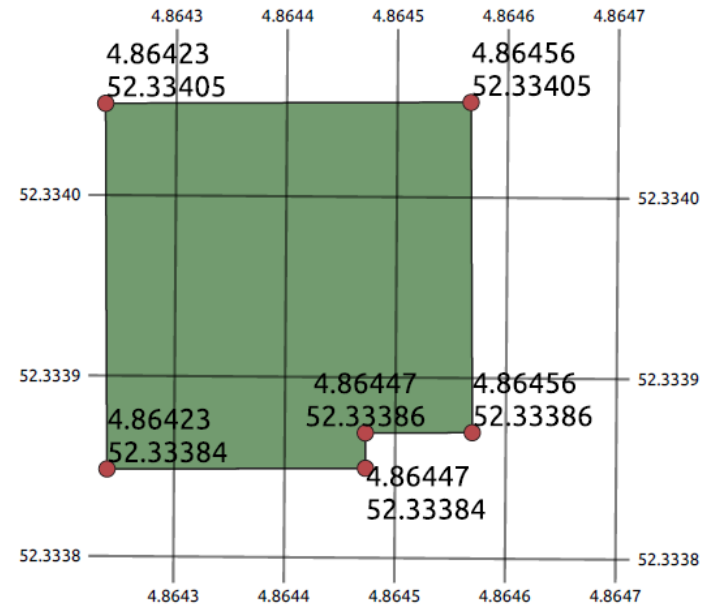
A map refinement system that **learns** from and **adapts** to its **users' eye movement behaviour** and **revisualizes the map content** based on this individual attentional data

GAIMS WORKFLOW



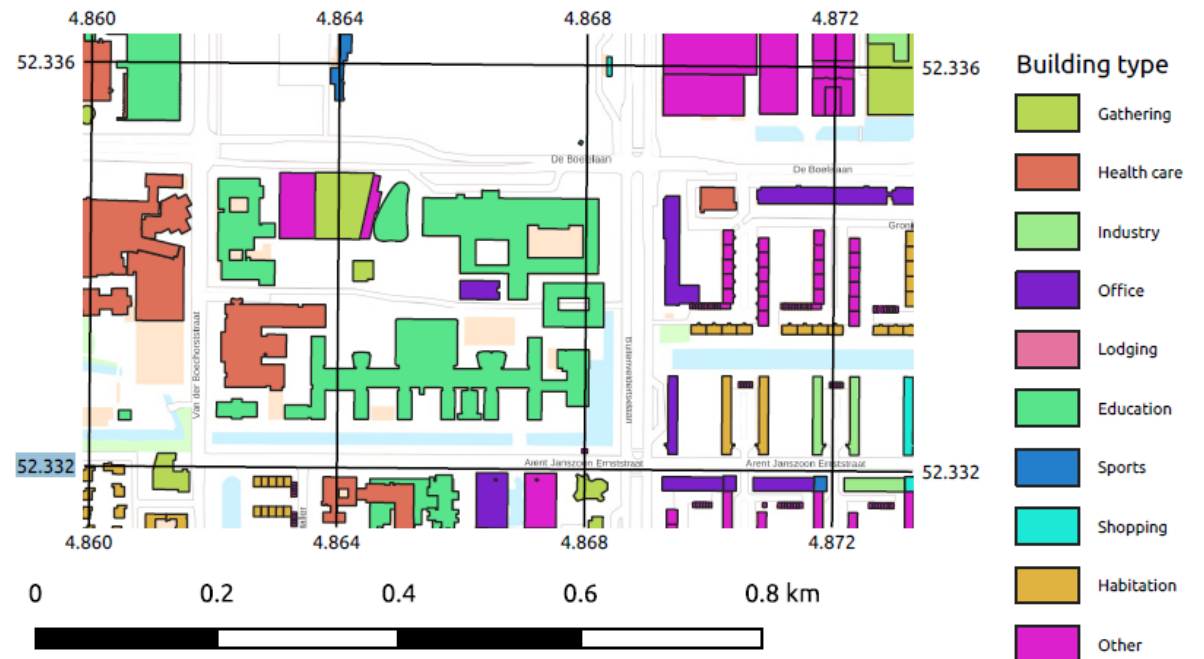
VECTOR ML

- Drawbacks of raster data
 - size
 - rasterization process
- Deep learning for vector geometries
 - *geometry learning*
 - polygon to tensor transformation
 - e.g. classification of buildings shapes
 - Veer et al. 2019
 - Knura 2023



Tensor representation

[0.16198, -0.24845, 1, 0, 0],
 [0.16198, -0.17283, 1, 0, 0],
 [0.50229, -0.17283, 1, 0, 0],
 [0.50229, 0.54550, 1, 0, 0],
 [-0.74534, 0.54550, 1, 0, 0],
 [-0.74534, -0.24845, 1, 0, 0],
 [0.16959, -0.24845, 0, 0, 1]



Publications

Keskin, M., Rönneberg, M. and P. Kettunen, 2022. Cartographic adaptation through eye tracking and deep learning: Gaze-Aware Interactive Map System (GAIMS). Abstracts of the ICA, Volume 5, 107. European Cartographic Conference – EuroCarto 2022. <https://doi.org/10.5194/ica-abs-5-107-2022>

Kettunen, P., Keskin, M. ja M. Rönneberg, 2023. TUGEVA: Tuntemattoman paikkatietoaineiston ymmärtäminen tekoälyavusteisella geovisuaalisella analytiikalla. MATINE - Maanpuolustuksen tieteellinen neuvottelukunta, tutkimusten tiivistelmäraportit 2021, 2021/2500M-0134. https://www.defmin.fi/files/5665/2500M-0134_TUGEVA_MATINE_Summary_Report_final.pdf

Keskin, M. and P. Kettunen, 2023. Potential of eye-tracking for interactive geovisual exploration aided by machine learning. International Journal of Cartography, 9(2): 150–172. <https://doi.org/10.1080/23729333.2022.2150379>

Knowing the Earth – Securing the future

