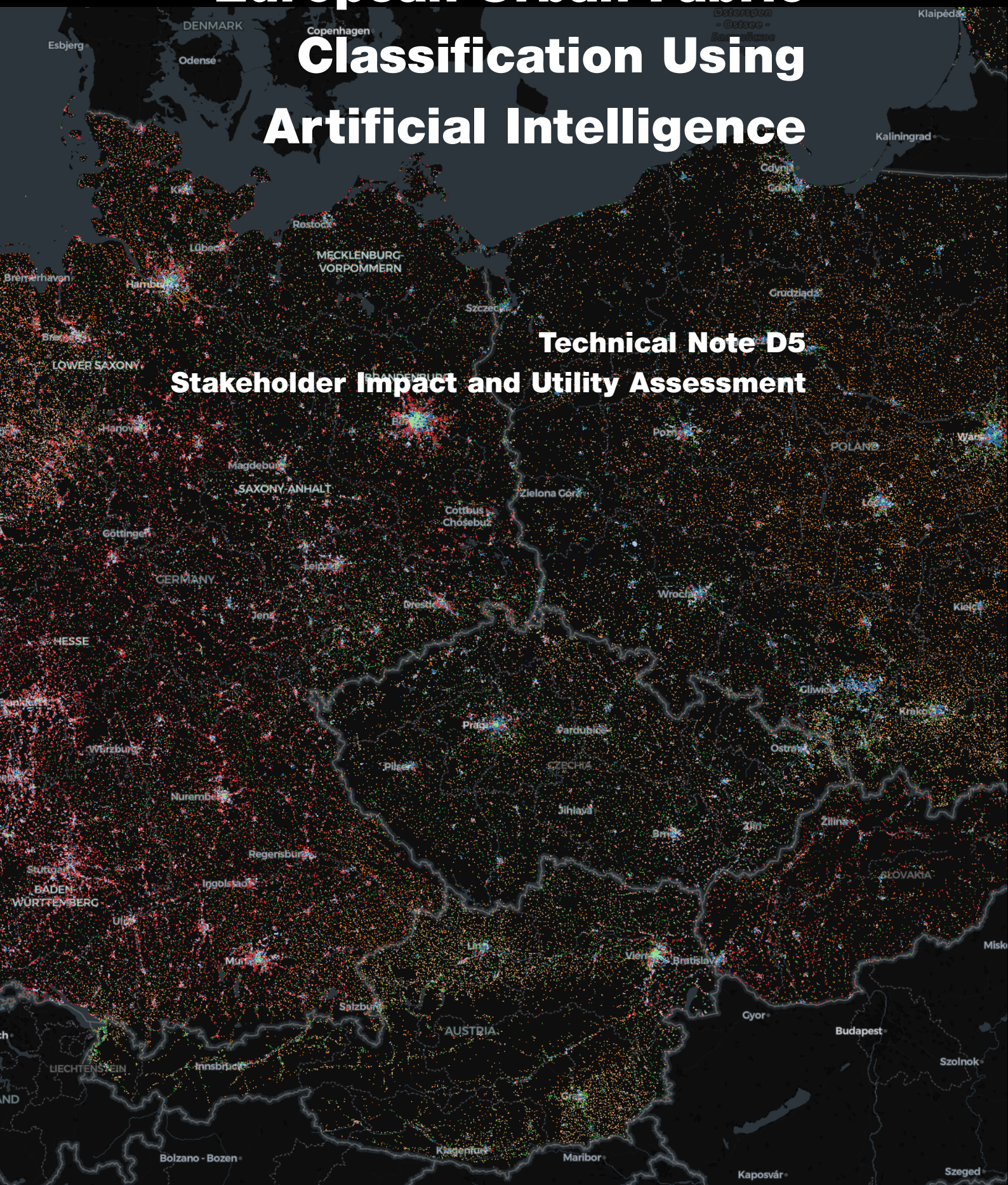# European Urban Fabric Classification Using Artificial Intelligence

Technical Note D5
Stakeholder Impact and Utility Assessment

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Krasen Samardzhiev[1], Barbara Metzler[2], Martin Fleischmann[1,*] and Daniel Arribas-Bel[2]

1. Faculty of Science, Charles University, Social Geography and Regional Development, Albertov 6, 128 00, Praha, Czechia
2. The Alan Turing Institute, Science of Cities and Regions, British Library, 96 Euston Road, London NW1 2DB, UK

* *Correspondence:* Martin Fleischmann martin.fleischmann@natur.cuni.cz

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1 Executive summary

This technical note summarises the impact and utility assessment of the pilot study data by three different types of stakeholders. The Construction Sector Development Agency of the Ministry of Environment, Lithuania (SSVA) - a national organisation, 4ct - a private company in the urban planning sector, and the Prague Institute for Planning and Development (IPR) - a local planning body, were the primary organisations that carried out in depth analysis of the results. Key strengths included the unprecedented detail and scale of the work and the numerous potential applications. Some of the identified limitations were the classification naming conventions and the large volume of data.

The pilot focused on gathering user requirements and a key positive outcome was the widespread appreciation for open-source tools, reinforcing EuroFab's commitment to openness as a strategic asset for long-term impact and sustainability. Future work requires larger-scale development and extended stakeholder collaboration to develop specific products and enable quantitative impact assessment.

2 Performance and Quality

There are no standard performance metrics that can be used to evaluate the quality of the pilot study results. This is because, first, the target applications are numerous and varied, and second, a comprehensive dataset for urban form classification at a large scale and detailed level currently does not exist. Consequently, stakeholder engagement primarily focused on qualitative assessments and expert analysis. In the below report we focus on the three types of stakeholders who performed the most in depth analysis of the pilot study data. More information about potential use cases and user requirements are available

The Construction Sector Development Agency of the Ministry of Environment, Lithuania (SSVA) appreciated the scale and the purely morphological aspect of the work. However, for their specific use cases, they identified a significant need for more integrated functional data. To effectively support SSVA's requirements, the development of secondary indicators derived from the core data is essential. Furthermore, SSVA provided a detailed report specifically highlighting areas of misclassification. Key challenges identified during this analysis included issues related to building data quality and the misclassification of specific urban areas. The naming of the clusters also emerged as a point of discussion, with a suggestion that incorporating functional information could significantly improve their descriptive accuracy and utility. SSVA also expressed interest in accessing the raw morphological data, which is an intermediary output of the current morphological pipeline.

4ct found the data valuable for their primary focus - comparing larger-scale urban areas and deriving summary results to support urban planning and design initiatives. Similar to SSVA, and as specialized users, they also requested direct access to the underlying raw data.

The Prague Institute for Planning (IPR) expressed interest in integrating the new classification into their urban planning materials. They also sought to extend their analytical scope beyond official administrative boundaries to encompass surrounding commuter-heavy suburban areas. Additionally, there was interest in leveraging this classification to automate certain manual processes involved in the production of new land use master plans.

In summary, the key strengths observed included:

- The detailed classification achieved at the building level.

- The morphotope hierarchy's ability to provide more granular and detailed classes compared to existing large-scale urban fabric classifications.
- The extended geographical scope beyond traditional administrative boundaries, enabling analyses that more accurately reflect on-the-ground urban reality.
- The large volume of raw morphometric data available at the building level covering characteristics such as number of adjacent buildings, street network meshedness, building-street orientation and others.

Conversely, areas identified for improvement included:

- The current nomenclature of clusters and identified misclassifications of specific buildings. However, it is important to note the absence of readily available ground truth data to definitively confirm these instances.
- The classification's suitability varied; while well-received by 4ct and IPR for their applications, it presented limitations for SSVA in certain contexts. SSVA specifically identified that these issues stemmed from the omission of land-use information, suggesting that a secondary, derived product integrating such data could effectively mitigate these concerns.

3 Benefits and impacts

As this was a pilot study, a comprehensive large-scale impact assessment was not conducted. Instead, the primary focus was on gathering user requirements. To conduct a quantitative assessment, a significantly larger scale of work and more extensive collaboration with stakeholders are necessary to develop specific products based on the detailed urban classification. Potential approaches to achieve this are outlined in the recommendations section.

4 Relevant regulations and legislation

A notable positive outcome from stakeholder engagement was the strong appreciation for the use of open-source products as both data input and for generating final results. Stakeholders emphasized that this enables to them to avoid potential problems related to licenses or regulations. This outcome supports EuroFab's foundational commitment to openness represents a key strategic asset for ensuring its long-term impact, widespread adoption, and overall sustainability. This includes maintaining the public GitHub repositories (e.g., `eurofab-project/morphometrics`, `eurofab-project/eo`) for all relevant code, tools, and documentation. The scope of the open-source work can also be extended to establish and maintain online forums, mailing lists, and developer channels (e.g., Slack, Discord) to provide support to users and foster a collaborative environment for contributors.

4.1 Recommendations

The stakeholder work in the pilot study confirmed the need for a detailed urban classification at a granular level. The engagement also resulted in multiple feature requests for secondary indicators, specific functionality and reports. The new pan-European detailed urban classification has the potential to serve as a foundational dataset for a multitude of derived data products, each adapted to particular use cases and stakeholder requirements. Examples of requested applications included: comparative analyses between countries at various spatial scales (neighbourhoods, cities, regions); direct access to building-level morphological data for micro-scale studies; and predictive classification capabilities to assess how newly designed or planned urban areas might be categorised before construction. Furthermore, stakeholders expressed strong interest in combining the EuroFab classification with other complementary datasets, such as socio-economic data, environmental hazard maps, or transport network information.

The expanded geographical scale and enhanced detail of the new pan-European results will enable us to continue and enhance the stakeholder work in several ways.

- **Workshops and conference work:** Experience from the pilot phase demonstrated that workshops and conference presentations are highly effective mechanisms for fostering collaborations and gathering valuable insights. The pan-European scale of the new product will increase the number of relevant and interested stakeholders. Therefore, sustained engagement through targeted workshops

and active participation in key European conferences is expected to continue delivering substantial value to the project as a whole.

- **Engagement with Specific Cities and Regions:** Stakeholders consistently expressed interested in their local areas or countries, as well as larger pan-European data. Even the pilot study extent of five Central European countries and the UK proved limiting. For example, the inclusion of SSVA (Construction Sector Development Agency of the Ministry of Environment, Lithuania) as one of the key stakeholder engagements, necessitated the inclusion of Lithuania in the some parts of the pilot's research. The comprehensive pan-European scale of the operational product will significantly streamline the process of onboarding new interested stakeholders, as their specific geographical areas of interest will inherently be covered.

- **Collaborations & co-development:** The focus of the current stakeholder work was on establishing relationships and gathering feedback. Extended collaborations on specific applications and data products was not possible due to the short duration of the pilot. The expanded scope and duration of the pan-European classification project will lead to stakeholder engagement beyond simple feedback collection. This can involve establishing formal partnerships where stakeholders actively contribute resources – such as local datasets for training/validation, domain expertise, or personnel for joint validation campaigns – and, in return, share in the benefits and responsibilities of the new data products. Such collaborative ventures are designed to deeply embed the EuroFab service and its outputs into the stakeholders' existing operational workflows and critical decision-making processes, thereby maximising its real-world impact.

- **Developing derived products:** For specific, strategically important use cases (e.g., monitoring progress towards Sustainable Development Goal 11 on sustainable cities), the project can extend its stakeholder engagement to actively guide the co-development of tailored derived products. This work will also result in detailed examples and documentation of how to use the foundational space-time urban classification product for the development of derived indicators in different policy areas. Some desirable indicators that came up during the development work were combining the classification with land use data and geodemographic factors, generating summaries of the morphometric character of cities, access to the full taxonomy, as well as raw morphometric characters data at the building level.

- **Supporting Third-Party Development of Derived Products:** The pilot study also revealed interest from commercial entities and research groups in developing their own derived products for specific niche applications. These were local consultancies and private companies operating in sectors such as urban planning, real estate analytics, and environmental management. A framework for ongoing engagement and technical support can be established to facilitate and encourage these third-party developments, potentially through API access or developer toolkits.