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AI for land valuation: The GLIST Project by Genius Loci

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Collaboration with FBK to develop new data-driven approaches to land valuation

In the real estate valuation sector, land valuation plays a key role in supporting strategic investment decisions, risk management, and land-use planning.

Land value depends on a wide range of factors, from geographic location and intended use (agricultural, buildable, or industrial) to specific crop characteristics, including vineyards, orchards, and pastures. This high level of variability makes it difficult to develop reliable and scalable predictive models, especially when large, homogeneous, and structured datasets are not available.

This is the context behind the GLIST (**Genius** Loci Real Estate Valuation) initiative, developed by **Genius Loci** in collaboration with the **Data Science for Industry and Physics (DSIP**) Unit at FBK's Center for Digital Industry. The project was launched to extend the use of advanced Artificial Intelligence techniques to land valuation, making the process more efficient, accessible, and data-driven.

As part of the **EDIH-SoE InnovAction** project, and specifically within the framework of its "*Test Before Invest*" services, Genius Loci launched an innovation initiative aimed at enhancing and expanding its digital services for the real estate sector. The company operates nationwide in the valuation of movable and immovable assets, providing banks, insurance companies, investment funds, and utilities with access to data, analyses, and indicators through a proprietary platform. Among its main services, Genius Loci Stima Immobiliare (GLISM) enables fully digital real estate valuation by integrating cadastral data, satellite imagery, and geographic maps.

Data and models: the core of the project

The project activities were carried out in two main phases. In the first phase, Genius Loci and FBK jointly defined the project scope, including the types of land to be analyzed, the geographic reference units, and the available variables. Particular attention was given to selecting homogeneous data suitable for large-scale use.

Genius Loci managed the preparation and anonymization of the dataset, while FBK supported the analysis of variables by identifying correlations and outliers and applying preprocessing techniques to create a clean dataset suitable for training.

In the second phase, several machine learning and deep learning models were developed and compared. The approach combined supervised regression models with unsupervised techniques, such as clustering, to improve generalization performance.

A key aspect of the project was the use of Explainable AI (XAI) techniques, which made it possible to understand which variables had the greatest influence on valuation estimates and in which direction. The models were also designed to provide confidence intervals alongside point estimates, offering an additional measure of reliability.

Results and outlook

Initial results showed that cadastral value is strongly influenced by the province, confirming the importance of the geographic dimension in predictive models. The developed models were trained both on the full dataset and on specific subsets for regression and classification tasks, demonstrating the feasibility of the approach and its practical application potential.

The project enabled Genius Loci to lay the foundation for more advanced land valuation solutions, further expanding its portfolio of digital services. At the same time, it represents a concrete example of how "*Test Before Invest*" services can support companies in adopting artificial intelligence technologies, reducing risks and accelerating innovation processes.

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- #artificialintelligence
- #clustering
- #data-driven
- #digitalindustry
- #dsip
- #EDIH-SoE
- #Explainable AI
- #Genius Loci
- #GLIST
- #innovaction
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- #Machine Learning; Deep Learning
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