Monitoring of Cadastral Cartography through the Use of Artificial Intelligence Aimed at Protecting Public Assets

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Keywords: Cadastal; GIS; land management; pubblic assets management; AI; cadastral cartography

SUMMARY:

The advent of artificial intelligence will certainly influence our world, so its incorporation into our professional practice will be inevitable. Our paper aims at highlighting how, through the use of artificial intelligence, we can intervene to correct or underline the current mistakes in cadastral cartography, notably those concerning public property, such as the location of public and private roads, their layout and boundaries.

1. INTRODUCTION:

In the specific case of our cadastral cartography, there are numerous imperfections, including the failure to census some roads, both private and public, which means that they are not recorded in the road registers of the municipalities to which they belong. Not being aware of their existence creates quite a few problems during the first planning phase and subsequently also during the implementation of complementary works related to them. Some difficulties may also be encountered in the simple management of their ordinary or extraordinary maintenance.

2. SUBTITLE:

The key goal focuses on trying to raise awareness and facilitate control, but also to create greater networking between the Land Agency, municipalities, road authorities and surveyors. The constant overlap between GIS cartography and the existing cadastral cartography, through the use of targeted algorithms generated by Artificial Intelligence, would guarantee a constant control and consequently a possible correction and registration in the appropriate registers. All this would be achieved thanks to the intervention of surveyors, who would be activated by municipalities, and who would correct the cadastral cartography on behalf of the same authorities.

2.1 The Italian Cadastral System:

The Italian Cadastral System was set up in 1886 following the Italian unification. It was created with the idea of being probative for the recognition and identification of private property, but that was not the case. Today the cadastral system is divided into the Land

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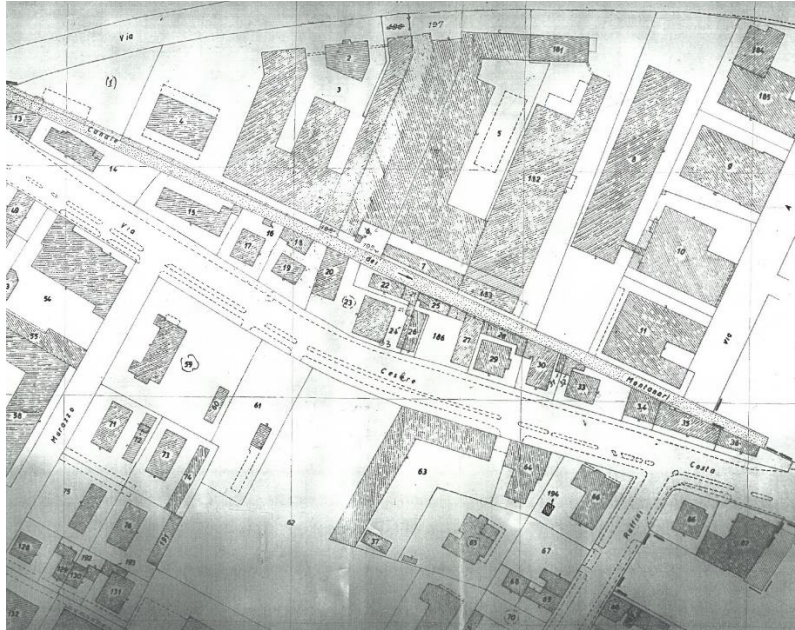Accra, Ghana, 19–24 May 2024

Cadastre and the Buildings Cadastre, in the former all existing lands are registered, while in the latter all buildings are listed. Our study will focus on the Italian Land Cadastre.

2.2 The History of the Italian Land Cadastral Cartography:

The cartography of the Italian land cadastre began in the late 1800s and early 1900s with the first cadastral map of a place


They were updated manually following the implementation of updating acts such as Fractionation acts (cadastral divisions), Map Types and Parcel Types (the latter two procedures were assumed in the second half of the 1900s). In the 1940s the method of census and grouping of the various areas was changed from open-perimeter maps to closed-perimeter maps, giving rise to the view scripts

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They too were constantly manually updated following the execution of updating acts such as Fractionations, Map Types and Parcel Types.

Finally, in the last two decades of the 1980s, the computerised Land Cadastre was introduced, which is the one we use today, i.e. cadastral updates are no longer recorded by hand on paper, but are sent online by technicians, then checked and approved by the cadastre that automatically update the computerised map.
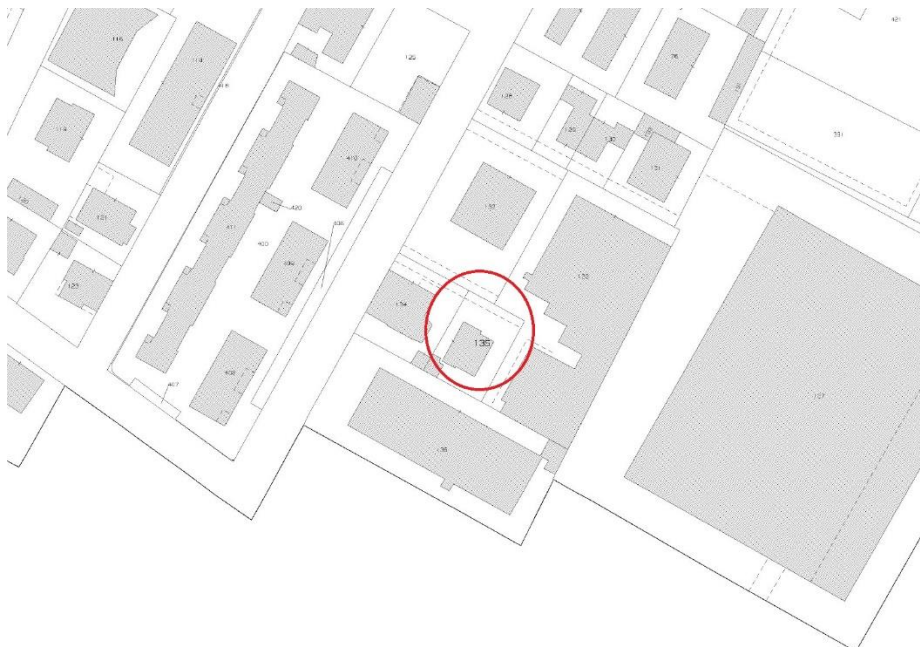
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2.3 Importance of cadastral cartography:

Whenever a building project is carried out, town planning regulations oblige us to comply with several basic parameters in order to ensure its approval by the responsible bodies (public administration). Specifically for new constructions or enlargements of buildings they define the minimum distances from property boundaries. These are defined and surveyed only and exclusively at the land register, therefore this cartography has a strategic and fundamental role in urban regeneration and in the success and approval of the building project. The biggest problems arise when there is no certainty about the correct positioning of the boundaries or they are inconsistent with what is physically on site.

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3. DISCUSSION:

Our study aims at bringing to the scientific community's attention the possibility of using artificial intelligence in tracing and, above all, reporting the main and macroscopic cartographic discrepancies to the competent bodies, which will in turn correct and/or refer these corrections to surveyors. The constant overlap between the GIS cartography and the existing cadastral cartography, through the use of an alert generated by targeted algorithms of artificial intelligence, would guarantee a constant control, and consequently a possible correction and inclusion in the specific registers. This would be achieved through the involvement of surveyors, who would correct the cadastral cartography on behalf of the competent bodies.

4. CONCLUSION

More than ever before, in this historical period of great technological change, the collection and accuracy of data are fundamental. We are facing the beginning of an era in which algorithms capable of processing them autonomously will carry out procedures, even those that seem difficult today. In conclusion, the specific case of cadastral cartography rectification will open up an enormous professional possibility and will put the surveyor back at the center of the constant cartographic updating required, commissioned and managed by public administrations, allowing greater flexibility and cooperation with the various provincial and national boards.

REFERENCES CONTACTS:

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