

# Rebuilding the Cadastral Map of the Netherlands: the Artificial Intelligence Solution

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**Key words:** Digital cadastre; cadastral map, geometric quality, Artificial Intelligence, data modeling

## SUMMARY

The Dutch Cadastral Map does fit its design goal; it is a complete and topologically correct index to the cadastral registration. However, its graphical quality of about 0.5 meter doesn't seem to be accurate enough in a future where people want to zoom in and establish the exact location of their boundaries themselves. The related uncertainty of the parcel size is also becoming a problem.

After a market survey, the Dutch Cadastre started a research project in 2017 where many different aspects (legal, communication, geodetic, organizational, etc.) of rebuilding the map were studied. The focus however was on the most critical aspect: the question whether the millions of field sketches could be read automatically. Two companies (KPMG and Sioux LIME) realized a proof of concept in which they have proven that it is possible up to a certain level of accuracy. We continued by contracting experts from both companies who, together with our own staff, succeeded in building a prototype that is capable of reading the documents and connecting them together to a new geometry of a cadastral map. In the solution artificial intelligence is widely used.

The content of a field sketch is very complex, usually handwritten and with a flexible map scale. Extracting structured information from such documents demands several algorithmic steps: image quality improvement, line and point detection, recognition of measurement numbers, actually reading these numbers, and linking these numbers to two points (begin & end). The numbers represent tape measurements between these points. The result of this process is a drawing on scale and structured measurement data. In this process manual checking and correction is needed.

A second large process is that of positioning the resulting line pattern in the national reference system and connecting the different line patterns to each other. The resulting network of sketches can be re-calculated with every new extension and forms the basis of the new cadastral map. The

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architecture of the solution will be shown and discussed.

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