Transformation of an Anthropic Ecosystem

Essenburg Park between Physical Experience and Digital Representation

urban nature
societal engagement
reclamation
perception
digitalisation

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A partire dalla descrizione del Parco Essenburg di Rotterdam, il saggio racconta un luogo intrecciando aspetti legati alla sua percezione fisica a quelli relativi alla sua rappresentazione digitale. Il progetto è stato selezionato nell'ambito della ricerca dottorale dell'autrice, *L'incolto di Precisione*, per esplorare le potenzialità e criticità legate all'impiego di tecnologie emergenti nella rappresentazione di siti post-industriali. Dopo aver delineato la storia del parco, caratterizzata da conquiste e riconquiste sia antropiche che naturali, viene raccontato il processo di appropriazione di quest'area, originariamente occupata da uno scalo ferroviario, da parte di una comunità che lo ha trasformato in parco, mantenendo le tracce dei suoi usi passati e la biodiversità sviluppatasi nel periodo di abbandono, addomesticata solo per permetterne l'attraversamento. Alla descrizione del parco segue quella di un esperimento condotto in situ, finalizzato a valutare le potenzialità e le criticità di tecnologie emergenti per la mappatura del suo ecosistema. Facendo riferimento alla metodologia di mappatura attraverso transetti ecologici, tradizionalmente operata a vista dagli ecologi, sono stati effettuate scansioni Lidar ed elaborazioni digitali dei dati raccolti, con un progettista come stakeholder per le mappature eseguite dagli studenti di geomatica. Questo ha consentito una riflessione sulle potenzialità e limiti per le tecnologie emergenti nella rappresentazione e descrizione di un ecosistema, operata prima da remoto e poi in loco. La riflessione proposta, soffermandosi sulla descrizione di un processo più che di risultati, intreccia quindi la percezione e le narrative che circondano un luogo con le potenzialità offerte dalla raccolta di dati digitali dal punto di vista progettuale. Operando con questa modalità le analisi dell'esistente l'osservatore assume un ruolo attivo, che selezionando e interpretando il dato modifica la sua comprensione di un sito complesso e potenzialmente le modalità di concepirne la sua trasformazione.

The essay describes the Essenburg Park of Rotterdam, between its physical perception and digital representation. The site was chosen in the context of the author's doctoral research, *Precision Wildland*. It investigates the potentialities and shortcomings of using digital tools to represent the ecologies of post-industrial sites, providing at the same time a perceptual description of the place that complements the collected data. Tracing the site's evolution from polder landscape to freight yard to public park, with its alternating anthropic and natural reclamations, the essay highlights the site's ecological and cultural significance. The place embeds the rootedness of a community, maintaining traces of its past and the unique biodiversity, tamed only to allow visitors to traverse it. The park's description is followed by an experiment carried out on-site, aimed at evaluating the potentialities and criticalities of emerging technology in mapping its ecologically rich ecosystem. Referencing the traditional practice for botanical surveys of mapping sections of changing ecologies, which are traditionally done by sight, lidar scans and digital data interpretation are used. The survey's peculiarity was that a designer acted as the stakeholder for the geomatic students carrying it out, enabling a reflection on the potential and limits for spatially representing a chosen environment, first remotely and later on-site. This process of capturing, interpreting, and using spatial data to represent aspects not perceivable on-site is more relevant than the outputs produced, since it allows for testing the capabilities of chosen technologies and their potential use to describe overgrown sites. Ultimately, this fosters a reflection on perception and narratives surrounding a place, the collection of data and the active role of the observer in selecting and interpreting it, as a potential variable to account for in understanding a complex site and conceiving its transformation.

Beauty is discovered through a process of mediation between the mind and body, between seeing and touching/smelling/hearing, between reason and the senses, between what is known through past experiences and what is expected in the here and now (Meyer 2008,18).

Nowadays, in an era of unprecedented technological advancement, the physical experience of a place is increasingly enhanced by its digital representation, allowing us to discover and collect information that our individual physical bodies cannot hold. This influences the experience of the place at a moment and the storytelling surrounding it, emphasising the hidden beauty of its nature, making an ordinary place feel meaningful. An interesting case to explore these notions is the *Essenburg Park* in Rotterdam, a socio-ecological rich area located near the city's Central Station. This case was investigated within the framework of the author's doctoral research, *Precision Wildland*, exploring the potential connection between landscape architecture practice and the usage of emerging technologies in urban nature.

Initially, the site was a polder landscape, the *Blijdorpse polder*, a typical Dutch biotope where the marshlands were reclaimed for anthropic uses, first for agriculture and then rail transportation. This particular area was a freight yard belonging to the city's oldest railway, created in 1848. This function was abandoned following the optimisation of the railway network with embankments, leaving the space with an uncertain future. During this time, citizens started to reclaim parts of the area, with vegetable gardens created by the Turkish-Dutch community. In 2008, the citizens constituted the Pluktuin, now *Essenburgparkgroep.* This association aimed to recognise this place as a park officially and to contest the proposed housing development planned for the area by NS Rail[1], which held the ownership of the plot. The site's original condition as a polder landscape and its potential to become an inexpensive water collection area with use as a public greenspace was another aspect used as leverage against the housing project. In 2017, pressured by the public, the city of Rotterdam acquired the land from NS Rail, appointing the Essenburgparkgroep to look after its upkeep, with the park officially opening in 2018.[2] The principle was to intervene as little as possible, preserving the site's biodiversity and the spontaneous nature that had emerged while it was abandoned. This is a post-anthropic landscape, with nature developed on grounds altered by human uses, particularly rich in biodiversity, as ProRail's dossier reported[3], presenting a mix of spontaneously occurring plants favoured by seed dispersal carried by trains.(Koster, 1991) The preservation of this site's condition was made possible through a bottom-up approach, where the physical appropriation of the space was led by the citizens, who defined different spatial configurations within the park. The work was also supported by a designer, a resident of the neighbourhood, who was able to translate the community visions into drawings and mediate with the public authorities.[4] Leveraging the site's tendencies and the need for water retention basins, the design played with heights and pathways to create different experiences, crossing the park and traversing different habitat types whilst moving through it. One pathway is an external loop in concrete on the lower side of the park which becomes compacted ground on the railway embankments. This linear and straightforward connection allows visitors to appreciate the park while moving at different speeds: using bicycles, running or even walking in a straight line. Then, there is a system of informal pathways, moving between trees and traversing different heights, generating a sense of displacement in the urban setting. Along these paths, it is possible to appreciate a more variable experience of natural succession, with thicker assemblages of trees, open clearings and wetlands. Small bridges are placed over the water ponds; self-built with wooden elements, quite precarious but constituting a playful element to engage with the park conditions.[5] This physical way to experience the park has been complemented in time by an online platform[6], which hosts voluntarily sourced data from across the Netherlands, that translates virtually the unique character of this place's biodiversity. This digital archive of the animals and plants present on site, is created thanks to the users' inputs via their smartphones. This entails a perceptual shift in the visitors, who don't look only for the "nice" plants and animals but who also observe and record the "uglier" or more banal side of nature, with its mould, insects, and weeds. Traditional herbaria, created by ecologists by collecting samples on-site, are nowadays transformed into virtual herbaria, where scans or pictures of the samples are uploaded to an online database. This is an evolution of such a concept, an open-access platform sourced from experts and citizens' data. One limitation of these tools is that the catalogue shows only singular specimens and not the interactions between them.

After learning about the site's characteristics, I worked with students[7] to use *Essenburg Park* as a case study to test the creation of a digital ecological cross section.[8] The idea was to evaluate the potential and limits of the digital representation of such an environment, to better understand how designers could benefit from this type of data, both to build narratives and use the information to drive the spatial design. Assuming the site's character and its preservation to be a fundamental goal for the transformation project, the aim was to reflect on potential ways to consider such characteristics. In this sense, thinking of this more than simply as the actual images produced, it is interesting to account for this process of gathering information about the site, first through remote work, then on-site and finally looked at through data analysis.

Starting from the aerial Lidar maps available on the AHN

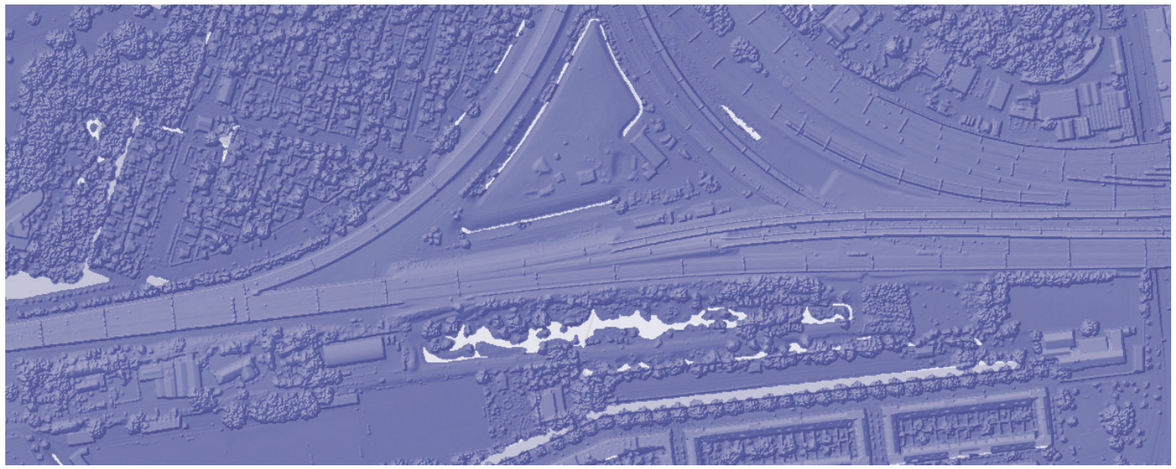

Fig.1 - The Essenburg Park from Above, Satellite Lidar Scan, 2022, Rotterdam. Open access data acquisition of the Netherlands retrieved January 2024. Source: https://app.pdok.nl/ (last accessed 14 January 2024).

database (Fig.1), the students estimated the vegetation density from above, to identify points to carry out terrestrial scans. After the visit on-site, relying on both our physical experience of the place and considering the requirements of the Lidar survey, we found an open area to carry the scans. (Fig.2) This allowed us to represent different conditions characterising the site: clearings, forests, and intermediate vegetation. Two scans of different resolutions were carried out on the same day to study the relationship between the time needed to produce them and the resolution obtained, evaluating the effect of different settings on the end result and on data management necessities. This scan represents a moment in time, showing the complexity of the vegetation structure and the variation in section.

Often whilst designing, it is common to abstract nature, without reflecting on plants' actual behaviour or the interrelationship of species. Ideally, if repeated, the scans could emphasise the variations in the vegetation and, if inferred with species recognition (Nitoslawski and others, 2019), render a more precise representation of the site's flora that would also be geo-referenced. This may be useful to construct a narrative around the site through time, arguing for the importance of its biodiversity and accounting for its changes, mirroring on a bigger scale changes in the whole city, especially in relation to vegetation's adaptations to climate changes (Kowarik, 2023).

This experience is situated in a broader research frame, the author's PhD research "Precision Wildland", developed at Politecnico di Milano with a research stay at TU Delft, which investigates the current and potential uses of emerging technologies for landscape architecture, considering abandoned railway yards as a specific typology of sites. Looking at other applications that intertwine technologies and nature, with a focus on precision agriculture and urban forestry, the research moves between the city's physical spaces and its digital representation, to stress the importance of design when considering existing ecologies as drivers, mainly to argue for the current praxis in transformation processes. As also shown by other research[9], this process of using repeated campaigns in time may allow the designer to account for the specific condition of a site's vegetation, not only the abstracted architectural representation made with symbolic natural elements. This knowledge potentially allows designers to consider the exact site conditions not only in the analysis phase but also to account for its dynamic changes throughout design conception, implementation, and management. Considering the

Fig.2 - The mapping campaign with the students and teaching assistant of the course Open Urban Data. Photo by the Author, 2022, Rotterdam.

common occurrence of tabula rasa design practices which erase the site's existing conditions because they are too complex to be addressed, the availability and integration of this data can offer alternatives to preserve the site's history, retaining its cultural and ecological significance.

In this frame, the case of *Essenburg Park* served as a field test to directly explore the potentialities and shortcomings of selected mapping instruments. However, the uniqueness of the case itself, was able to inform the research on the potentialities for design in such places, not only engaging with the aspects linked to ecology and natural development but also to the experiences within a specific space.

In this park, technology wasn't crucial to the design conception or realisation, which was more linked to a bottom-up approach, but it was pivotal in the storytelling surrounding wild nature. The physical alterations of the site were accompanied by the use of technology to boost social engagement, showing the potential for technology as a storytelling agent. After all, through time, the area has already undergone three types of transformation: anthropic reclamation of a wetland for productive uses, natural reclamation after the abandonment stage and social reclamation as public space to preserve its biodiversity.

Additionally, it could also be further integrated with the use of emerging technologies to monitor the site's changes and to facilitate the place's upkeep, now carried out by citizens, through minimal interventions targeted at maintaining the site's condition. The digital representation can, therefore, allow us to appreciate and account for multiple aspects both in a descriptive way and as data to design with. In this testing experience on-site, it was interesting to evaluate the potential and limitations of emerging technologies in relation to the site's actual condition, realising the importance of properly setting up a data survey

Fig.3 - Preview of the Lidar scan through a monitor, showing the observer and the students seated on a bench. Photo by the Author, 2022, Rotterdam.

and the difference it entails in terms of resolution and final outputs. However, for the time being, this data collection is only limited to a visual experience (Fig.3) and lacks the other sensorial inputs.

Instead, the experience of the body moving in the space engages all the senses with the park. It is an immersive experience but limited to fewer users and to a given moment in time. It is also a subjective perception, dependent on the individual and the capacity to perceive the environment, with significant differences between humans and the rest of the biotic community (Uexküll,1934).

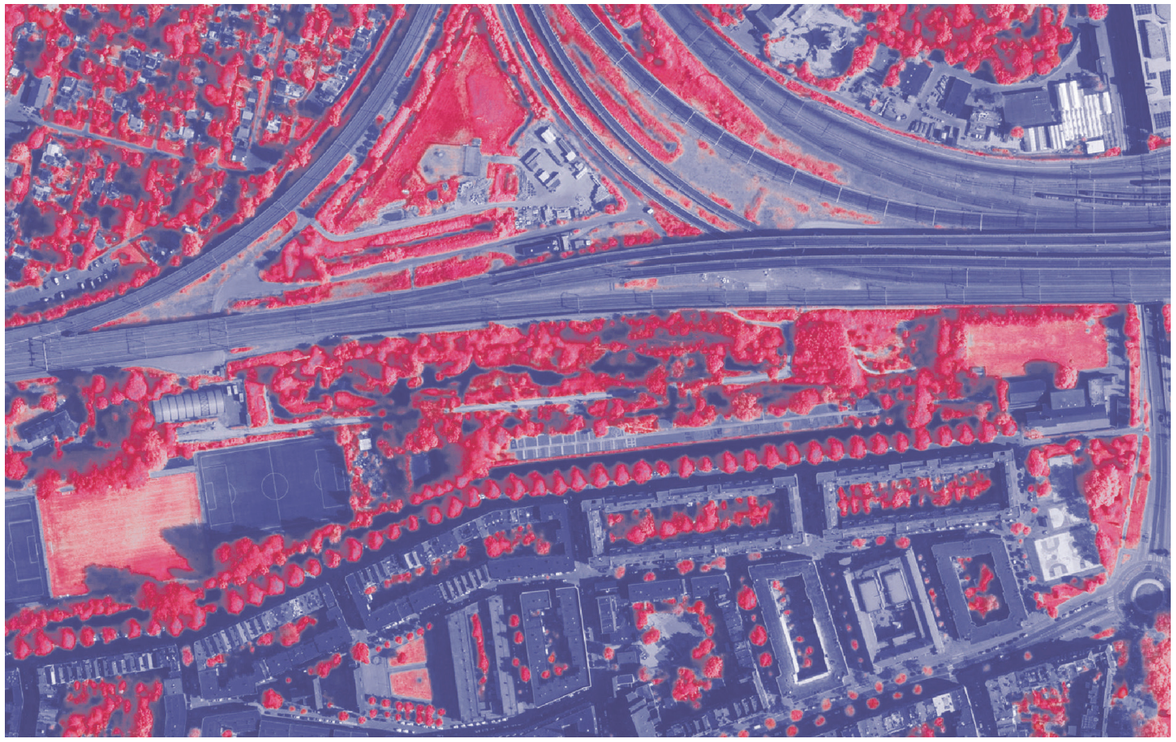

Fig.4 - The Essenburg Park and its vegetation. The intensity of the colour, obtained through infrared imagery, renders the vegetation vitality. Satellite Lidar Scan, 2022, Rotterdam. Open access Airborne Lidar data acquisition of the Netherlands retrieved January 2024. Source: https://app.pdok.nl/ (last accessed 14 January 2024).

Fig.5 - Representation of the park vegetation. Image as output of the lidar scan elaborated by the students using Cloud Compare, 2022. Rotterdam.

For instance, as humans, we perceive plants as still. Using external tools, like photographs or videos, we can shift perspective to appreciate their movements (Mancuso, Viola, 2013) or to perceive aspects of reality invisible to the naked eye, such as the tree vitality, that can be understood through infrared imagery (Fig.4), or the representation of natural dynamics within the site at a given moment in time (Fig.5).

In this sense, technology could also play a role in bridging the gap between the different physical perceptions of a site, otherwise limited by the possibilities of the anthropic gaze. Ultimately, the Essenburg Park precedent showcases an example of different possible perceptions of a place, both in the physical realm and in its virtual representation, opening up alternative perspectives to understand our cities' public spaces and conceive their future.

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NOTES

1. *Nederlandse Spoorwegen,* NS rail, is the Dutch railway company that nowadays manages the train wagons and their movement.

2. Historical data was sourced from the park website (in Dutch). See https://www.essenburgpark.nl/blik-terug/ (last accessed 14 January 2024).

3. ProRail, the Dutch company managing the rail infrastructure, both physical and in terms of digital grid, commissioned a report to map and evaluate the Dutch rail landscape, establishing the biodiversity richness of its verges. See De Groene Ruimte, 2014.

4. See the database website: https://waarneming.nl/locations/613795/photos/ (last accessed 14 January 2024).

5. Catherine Visser. See to further expand: www.dafarchitecten.nl/projecten/essenburgpark/ (last accessed 14 January 2024).

6. Interesting mapping work of the different soil types with diverse habitats, plant and animal species in the master thesis Awakening, by Fremke Lokhorst, accessible on: repository.tudelft.nl/islandora/object/uuid%3Aa8f347a1-ff22-4327-8cbb-4bba3fd9c23a (last accessed 14 January 2024).

7. Jildou Wassenaar and Vlad Costantiniescu, two students of the course Open Urban Data, held by professor Roderik Lindenbergh at TU Delft, with the assistance of Lina Hagenah.

8. The section was taken using the ecological transect method, typically used by landscape architects to evaluate the site's composition. It consists in the definition of a 10-meter section in a vegetated area, to intercept a profile of changing ecologies. An example can be found in (Gustavsson, 2009).

9. A notable exploration in this sense is the research conducted at ETH by Christophe Girot's Chair and described in (Urech, von Richthofen, Girot, 2022).