Traiblazing, Object-Oriented Navigation in nodegoat

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ABSTRACT
Following an object-oriented approach to mapping (historical) networks, people, events, artefacts, and sources are treated as equal: objects, and hierarchy depends solely on the composition of the network: relations. This object-oriented approach advocates the self-identification of individual objects and maps the correlation of objects within the collective.

Categories and Subject Descriptors
H.5.2 [**Information Interfaces and Presentation**]: User Interfaces – *Theory and methods, Graphical user interfaces (GUI).*

General Terms
Algorithms, Design, Human Factors, Theory.

Keywords
Object-oriented, Methodology, Network Analysis, Relational, Diachronic, Spatial, GIS, Database, Visualisation, Management.

1. INTRODUCTION
In the discussion on the exploration of digital cultural collections we want to introduce a methodological substantiation on user experience strategies. This method transforms users into active agents where users engage with the collection dynamically by constantly negotiating and renegotiating their selections and selection parameters. We relate this approach to the work of Vannevar Bush and his concept of trailblazing and are able to implement this in various scenarios by means of the online research environment nodegoat (http://nodegoat.net). We will first introduce nodegoat and secondly set out how we foresee the implementation of explorative user experience strategies based on the concept of trailblazing.

2. NODEGOAT
nodegoat is a web-based data management, analysis and visualisation environment. Using nodegoat, users define, create, update, query, and manage any number of data sets by use of a graphic user interface. A custom data model autoconfigures the backbone of notegoat's core functionalities. Within nodegoat users are able to instantly analyse and visualise datasets. nodegoat allows users to enrich data with relational, geographical and temporal attributes. Therefore, the modes of analysis are inherently diachronic and ready-to-use for interactive maps and extensive trailblazing.

nodegoat follows an object-oriented approach throughout its core functionalities. Borrowing from actor-network theory this means that people, events, artefacts, and sources are treated as equal: objects, and hierarchy depends solely on the composition of the network: relations. This object-oriented approach advocates the self-identification of individual objects and maps the correlation of objects within the collective.

The conceptualisation and realisation of nodegoat was fueled by the goal to give scholars a tool that would allow them to transfer their skills in tackling complex research questions to a digital environment. Instead of focusing on a number of algorithms that would help scholars to crunch large sets of data, nodegoat sets out to give them the opportunity to formulate new research questions, to design their own data model, populate their research environment, perform analyses and visualise the results.

This approach has had a number of implications for the development of nodegoat as a research environment. First of all, we did not focus on one research topic or field of research, but aimed to develop a generic tool that would be useful for a broad range of scholars with varying needs and diverse research questions. This generic approach makes nodegoat different from tools like the SNAC project (Social Networks and Archival Context)[1], RoSE (Research Oriented Social Environment)[2], SEASR (Software Environment for the Advancement of Scholarly Research)[3], or Prosop[4]. nodegoat can not only be employed to navigate (aggregations of) collections and analyse social networks or prosopographical spheres, but can also analyse correlations between literary themes in classical texts or co-occurrences of allegorical iconography in early modern paintings. The methodological basis of nodegoat does not limit itself to one field only, but gives scholars of varying backgrounds new means — or more precise its object-oriented approach — to work with their data.

Secondly, we decided to equip nodegoat with data management capabilities, modes of analysis and visualisation functionalities. nodegoat dynamically combines functionalities of a database management system (e.g. Access/FileMaker) with visualisation possibilities (i.e. Gephi or Pajek) and extends these functionalities (e.g. with in-text referencing) in one GUI. As this is all run in a web-based environment, nodegoat can be used in a collaborative manner with multiple scholars working together on one dataset.

Since 2012, nodegoat has been used by the University of Amsterdam to produce diachronic mappings of correspondence

[1] http://socialarchive.iath.virginia.edu/home_prototype.html

[2] http://liu.english.ucsb.edu/rose-research-oriented-social-environment/

[3] http://www.seasr.org/

[4] http://www.prosop.org/

networks of nineteenth century intellectuals. The goal of the project is to ‘map the dissemination of cultural nationalism across Europe by charting cultural patterns and networks as they evolve over time’ (http://spinnet.eu/spintimemappings/). The final products show how networks of the intellectuals, all trying to establish clearly defined national communities, transcended existing or newly created national/cultural boundaries.

Together with Dutch research institute Huygens ING, we use nodegoat to map artist networks in 17th century Rome based on existing datasets of ECARTICO (UvA, http://www.vondel.humanities.uva.nl/ecartico/) and HADRIANVS (KNIR, http://hadrianus.it/). nodegoat will be used to connect these databases and to analyse and visualise co-occurances of objects in time and space (http://cdh.uva.nl/projects-2013-2014/knaw---mapping-notes-and-nodes-in-networks.html).

3. OBJECT-ORIENTED

nodegoat is able to achieve all this as it is built to be an object-oriented research platform, equipped to deal with diachronic, spatial and relational attributions. Moreover, users can specify numerous (conflicting) sources for each piece of evidence that is entered into nodegoat. Our object-oriented approach challenges users to take a rhizomatic perspective to their material as any object can be connected to any other object. This means that existing typologies have a secondary function as new groups or classifications may arise based on relational structures and/or temporal and geographic nearness. Due to the object-oriented nature of nodegoat, the networks that can be produced are inherently ‘hybrid’ and ‘multi-modal’. The visualisations of nodegoat are dynamically connected to the underlying data, which makes the distinction between analysis and visualisation mostly artificial.

4. TRAILBLAZE

As a research environment, nodegoat has shifted the focus from an predominating algorithmic approach towards an approach in which the user occupies the pivotal position. This shift is also reflected in the user interfaces that are developed using nodegoat. In these interfaces, users act like trailblazers within bodies of associative data in which the new paths they create function as the starting point of new explorations. This approach can be connected to the primordial concept of trailblazing, as envisioned by Vannagar Bush in 1945. A user trailblazers by creating trails in a maze of intrinsically associative objects. The trails allow one to interact, annotate and collaborate on any type of data, making it a practice of active transclusion; a continuous distribution of authority between the author and the maze.By means of this process we can positively state that search is over. We are finally able to leave this one dimensional approach behind as we do not need to limit ourselves to the dogma of 'keyword' -> 'query' -> 'result'. Instead we can offer users an experience in which they start from their field of interest or a specific question. They continue to browse by means of dynamic filtering that is continuously updated based on the users' behaviour. This process produces a path, or trail, which is a tangible product of the users' behaviour, making the process of exploration also a process of creation.

As the object-oriented ground infrastructure is set up by means of a multitude of multi-modal relations, the ways in which new objects can be discovered are limitless. This allows for the exploration of direct and indirect (spanning numerous levels) relations like the co-authorship of pamphlets, master-pupil relationships, patronages, geographical nearness of birth locations or places of residence, and co-occurrences of iconographic classifications. Should a user be interested in, for example, artefacts created during a specific period in time, a filter will produce all objects and relations associated with this period, giving the user new opportunities to expand or limit the selection. From there on, the exploration continues by iconographic classifications or personal relationships. Moreover, geographical patterns can be discerned and analysed — or even mapped — in this selection as well. These geographical patterns can also be applied to study the geographical range of artefacts within one collection, or analyse how one geographical area is represented in a collection. When dealing with paintings, filtering on the provenance of one or more paintings will provide users with an overview, over distance, of how one collection relates to other collections or institutes.

These tasks are obviously difficult or even impossible to perform by means of a search interface. Using our object-oriented approach, we want users to be able to navigate collections and artefacts with a high level of agency. This process makes the distinction between the level of the artefact and the level of the collection irrelevant as the user is engaged in a continuous navigation and exploration process between the two.

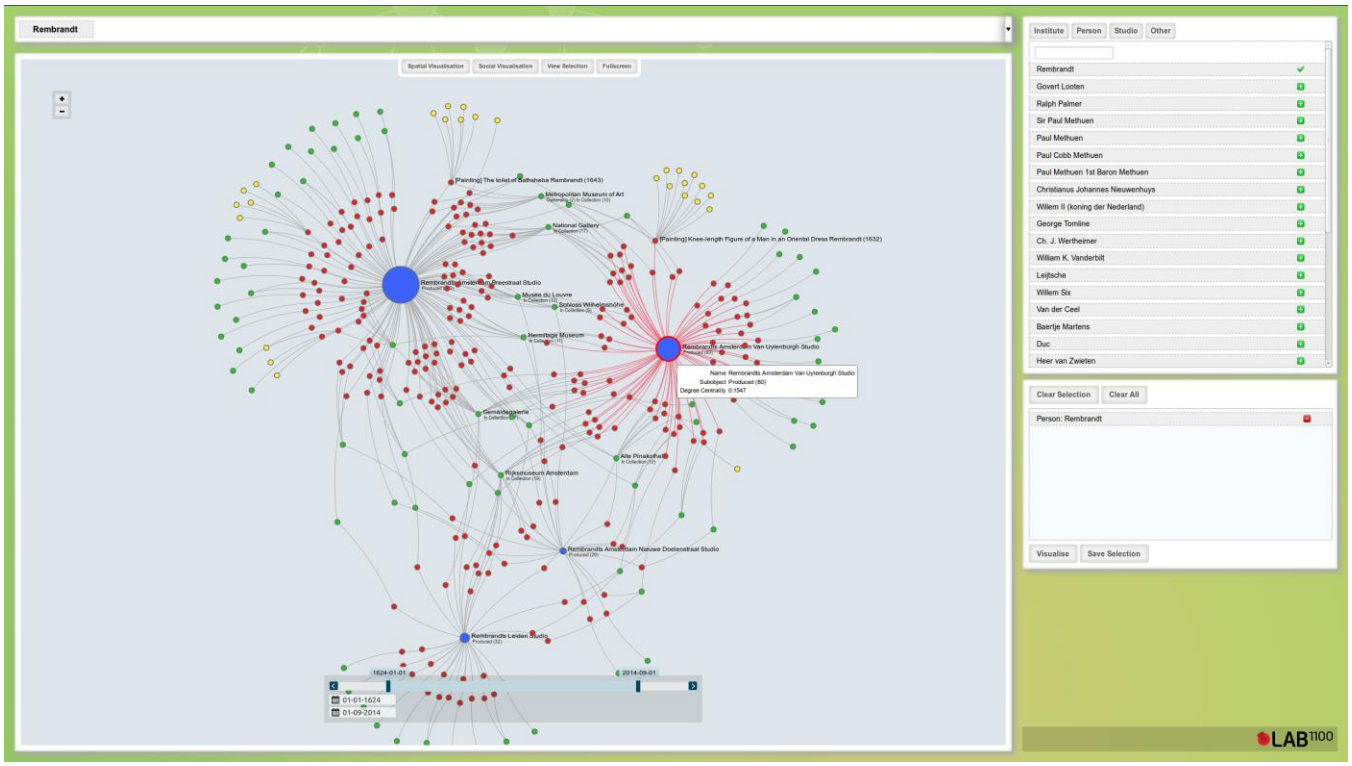

Figure 1

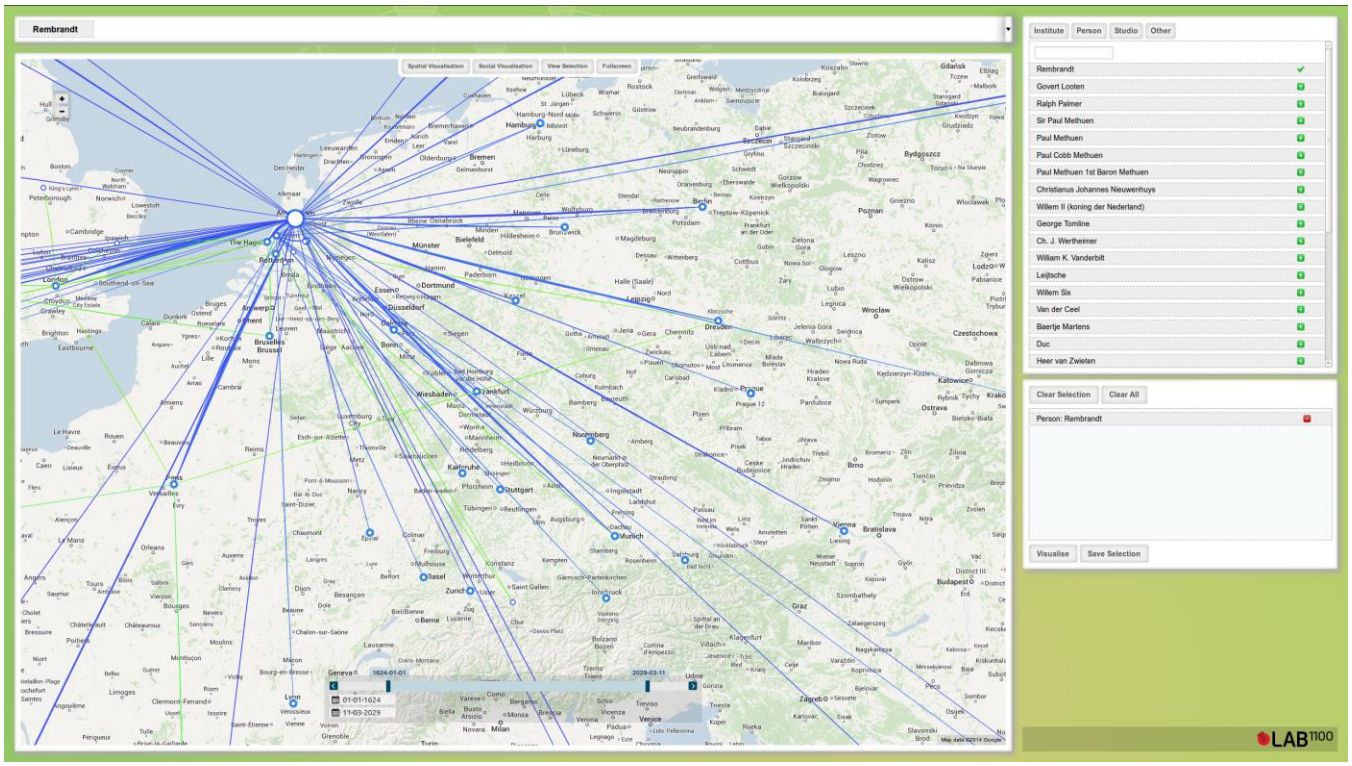

Figure 2

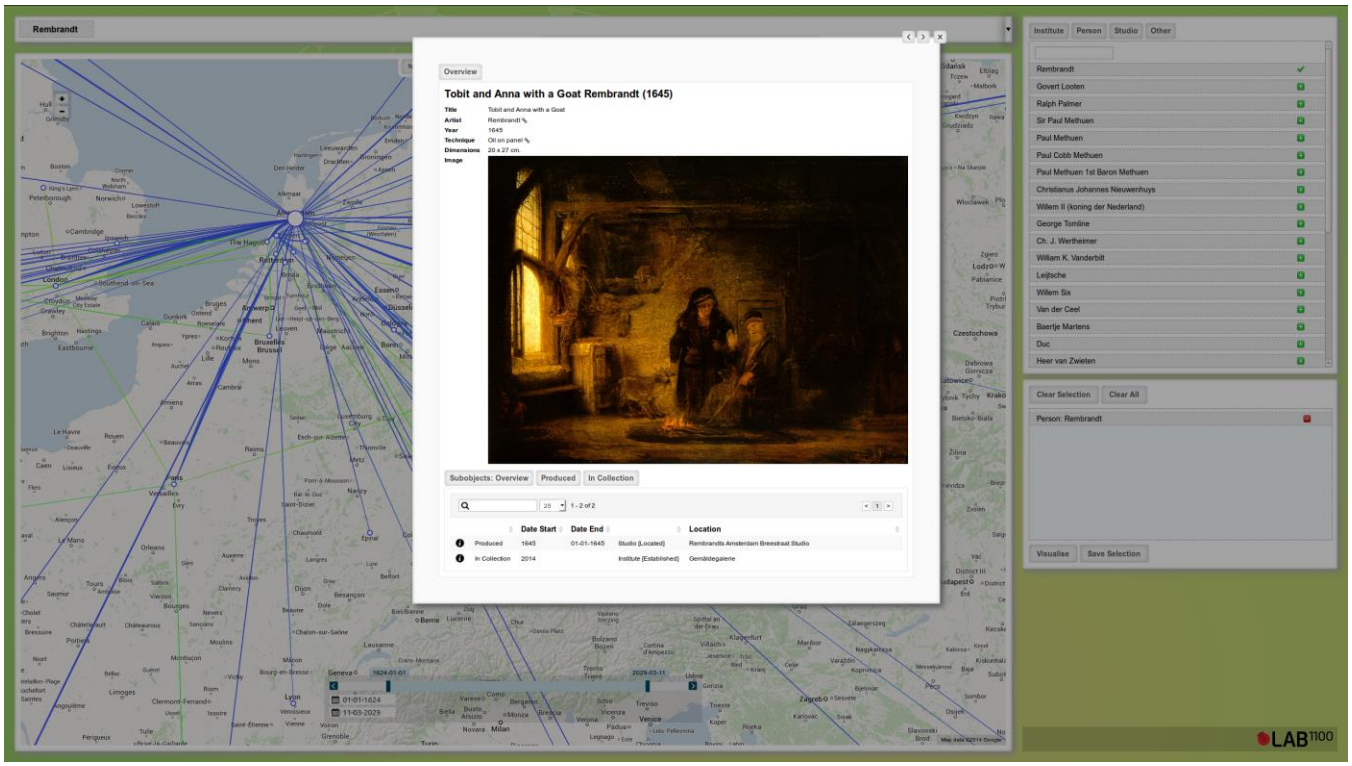
Rembrandt
Overview
Tobit and Anna with a Goat Rembrandt (1645)
Title Tobit and Anna with a Goat
Artist Rembrandt
Year 1645
Technique Oil on panel
Dimensions 20 x 27 cm
Image
Subobjects: Overview
Produced
In Collection
Date Start
Date End
Location
Produced 1645 01-01-1645 Studio (Located) Rembrandts Amsterdam Breestraat Studio
In Collection 2014 Institute (Established) Gemäldegalerie
Institute
Person
Studio
Other
Rembrandt
Govert Looten
Ralph Palmer
Sir Paul Methuen
Paul Methuen
Paul Cobb Methuen
Paul Methuen 1st Baron Methuen
Christianus Johannes Nieuwenhuys
Willem II (koning der Nederland)
George Tomline
Ch. J. Wertheimer
William K. Vanderbilt
Leijtsche
Willem Six
Van der Ceel
Baertje Martens
Duc
Heer van Zwieten
Clear Selection
Clear All
Person: Rembrandt
Visualise
Save Selection
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Figure 3