



Projet Belle Epoque

Géocodage historique

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All details: WORKING PAPER : <https://arxiv.org/abs/1703.07138>



Plan

Historical Geocoding?

Context

Building historical gazetteers

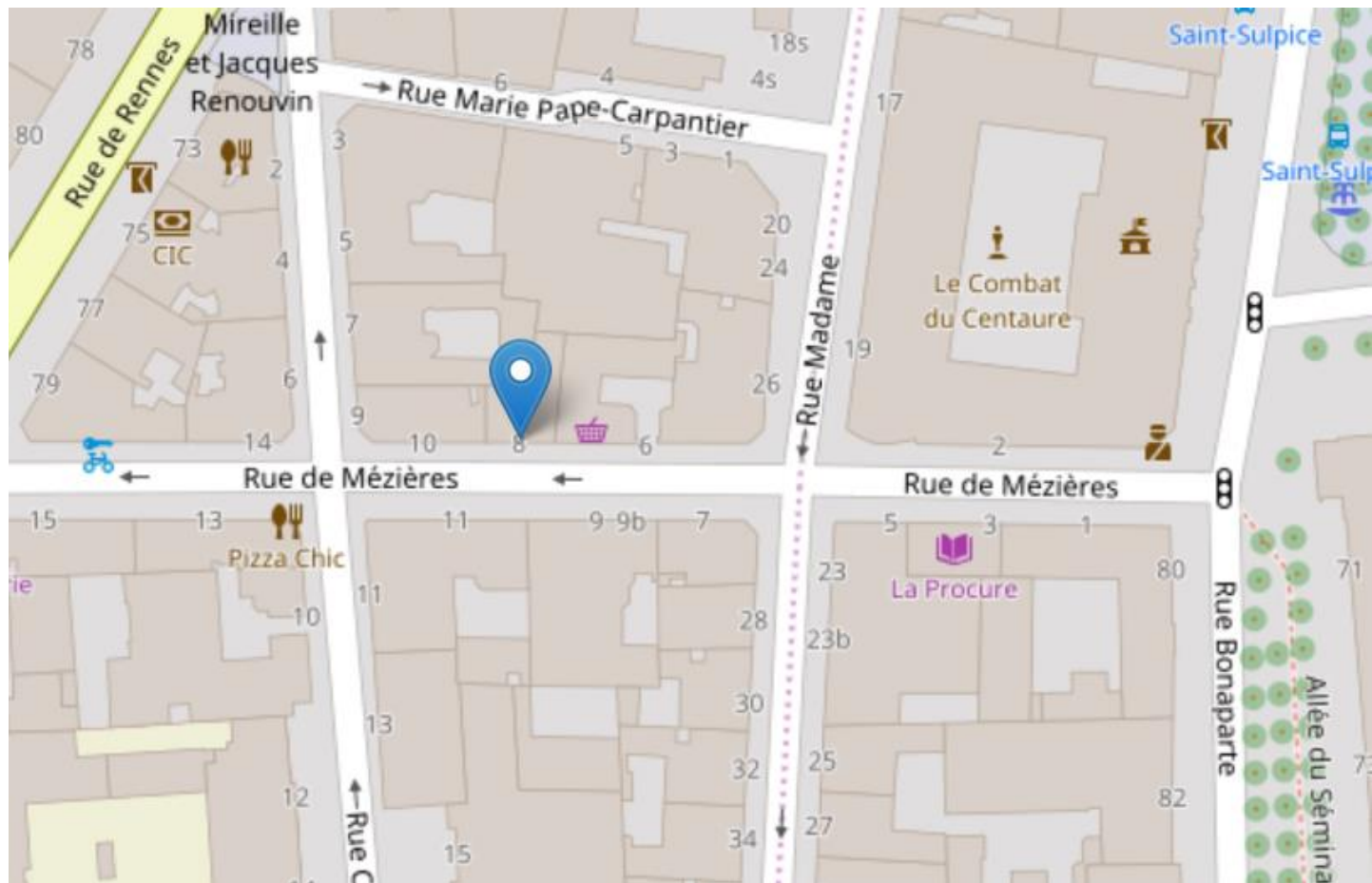
Geocoding is matching

Web interface and collaborative editing

conclusion/perspective

Geocoding

- What is geocoding?
- “8 rue de Mézières, Paris”



Historical geocoding

- What is **historical** geocoding?
- “5 rue de Jérusalem, Paris” ; 1846
→



A historical map of Paris, France, from the 19th century. The map shows the city's layout with streets, rivers, and landmarks. Numerous blue and red dots are plotted across the map, likely representing geocoded locations. The word 'Quai' is visible in the top left corner.

Historical geocoding

- OK, I have a map from 1820-1840
 - Got to Bibliothèque Historique de la Ville de Paris
 - Start searching (for each address!)....

Historical geocoding

- 54 large sheets, good luck



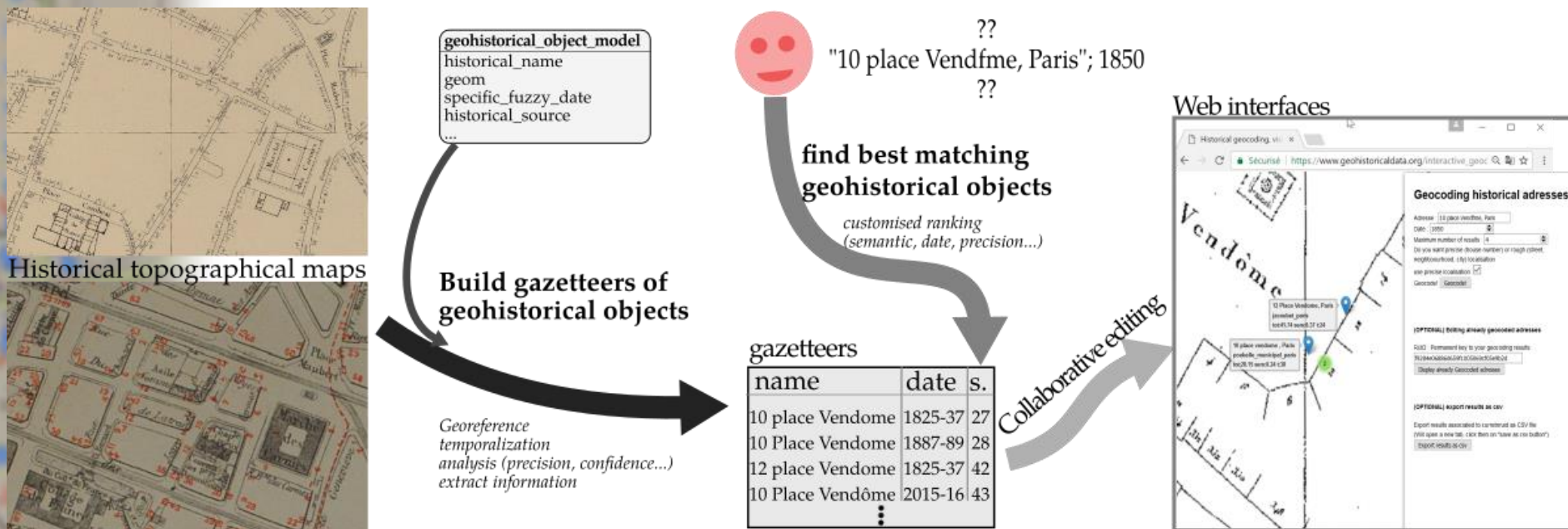


Our method

- Extract information from historical maps (street name, building number)
- Construct gazetteers (**geographical index**) (at this period, this street is here...)
- Build a search function
- A nice web interface for collaborative control and edit of results

Our method

- Proposed solution



Our method

- Proposed solution



Historical topographical maps



geohistorical_object_model
historical_name
geom
specific_fuzzy_date
historical_source
...

**Build gazetteers of
geohistorical objects**

*Georeference
temporalization
analysis (precision, confidence...)
extract information*



??
"10 place Vendôme, Paris"; 1850
??

**find best matching
geohistorical objects**

*customised ranking
(semantic, date, precision...)*

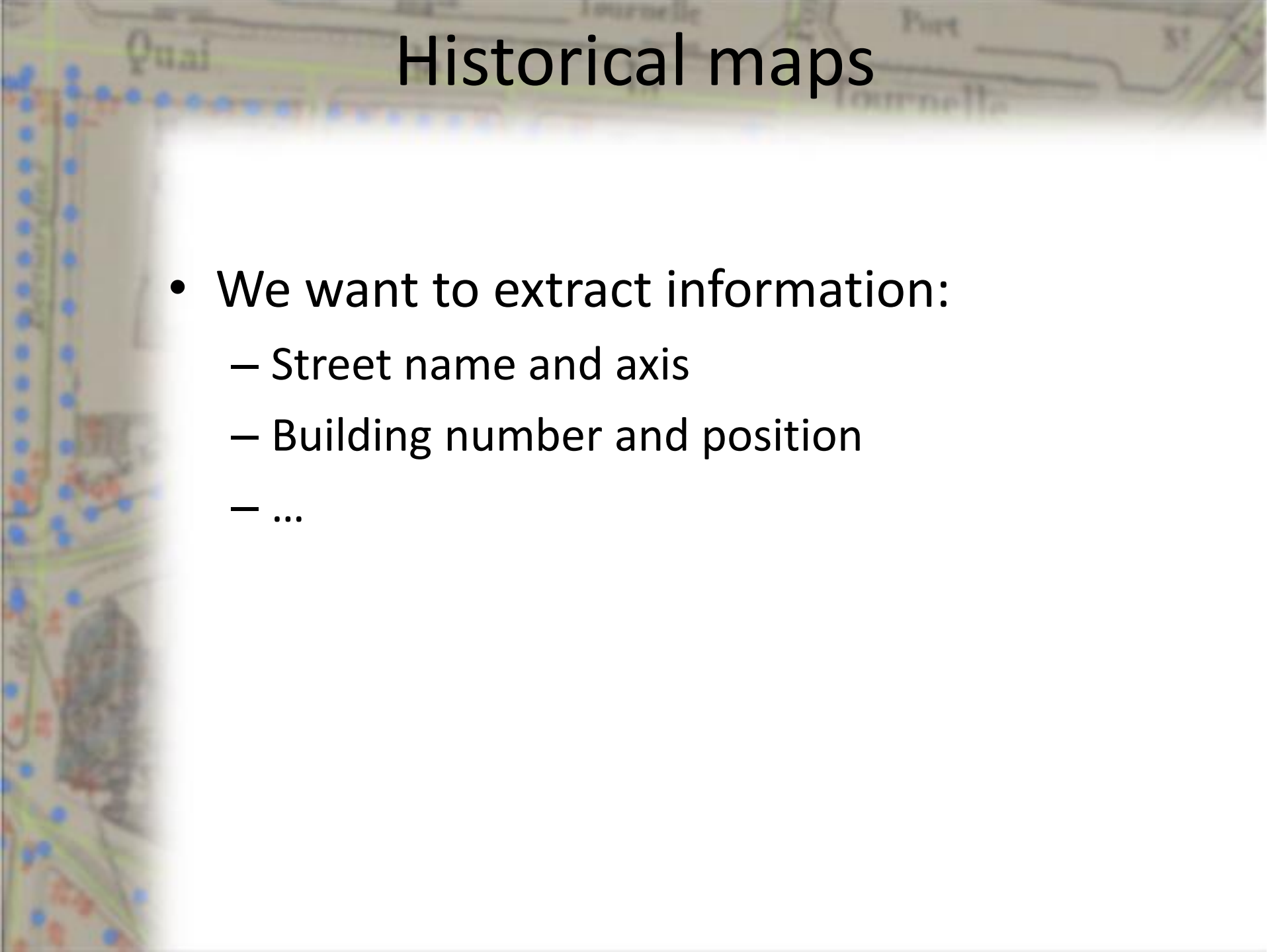
gazetteers

name	date	s.
10 place Vendôme	1825-37	27
10 Place Vendôme	1887-89	28
12 place Vendôme	1825-37	42
10 Place Vendôme	2015-16	43
...		

Collaborative editing

Web interfaces



A historical map of a coastal area, likely a harbor or port. The map shows a network of streets and buildings. A prominent street runs vertically on the left side, marked with blue dots. Other streets are labeled, including 'Quai' at the top left, 'Port' at the top right, and 'Tourneffe' below 'Port'. The map is rendered in a sepia or aged tone with various colors used for different features like water, land, and buildings.

Historical maps

- We want to extract information:
 - Street name and axis
 - Building number and position
 - ...

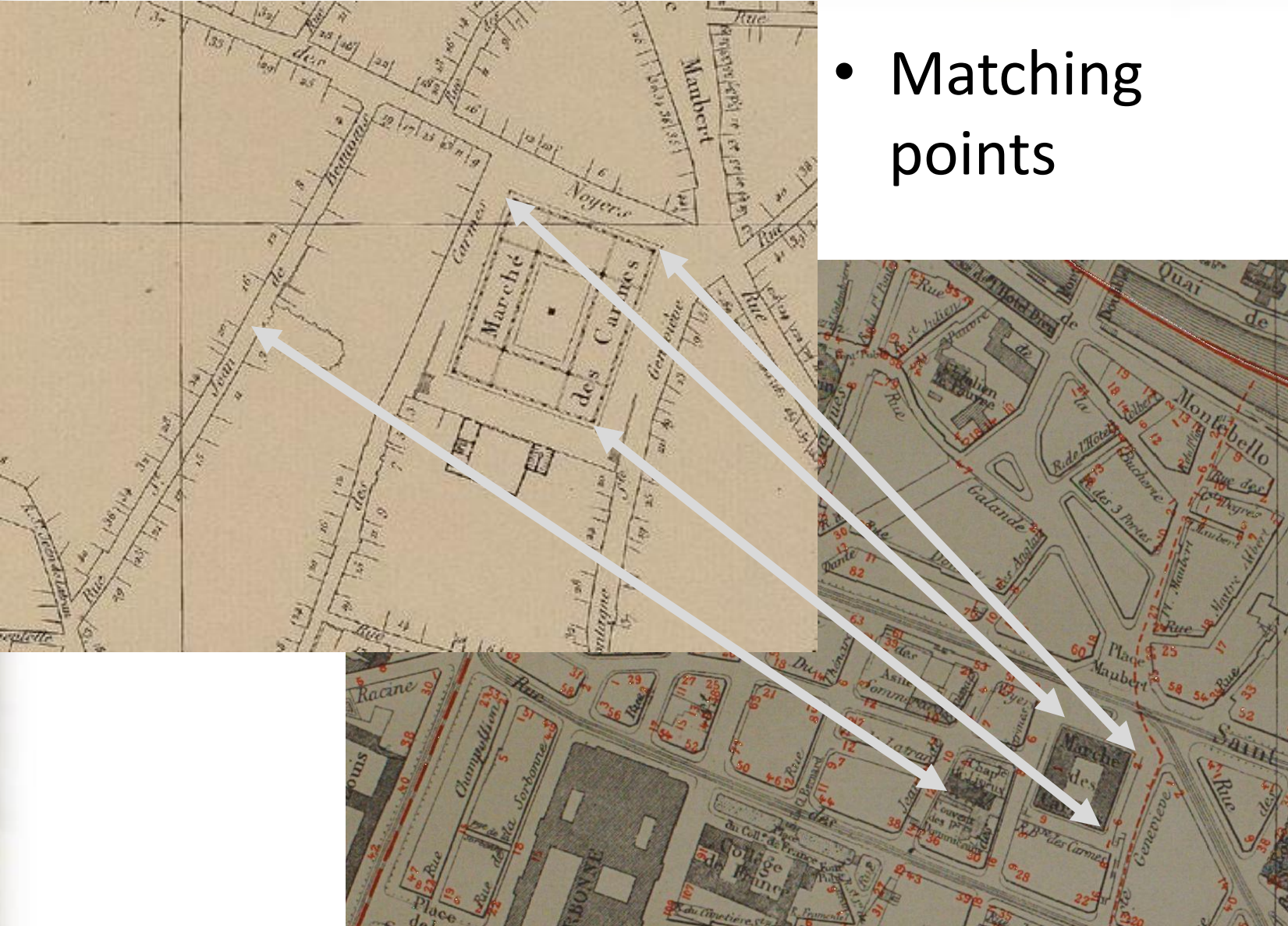


Historical maps

- Maps have to be georeferenced
→ can be used with other data.
- Ex: for this room
 - Local : 200m SW of building entry
 - Georeferenced: **48°50'27.8"N 2°35'17.1"E**
- How does it work for historical map?
 - Complex
 - full PHD : Bertrand Dumenieu

Historical maps

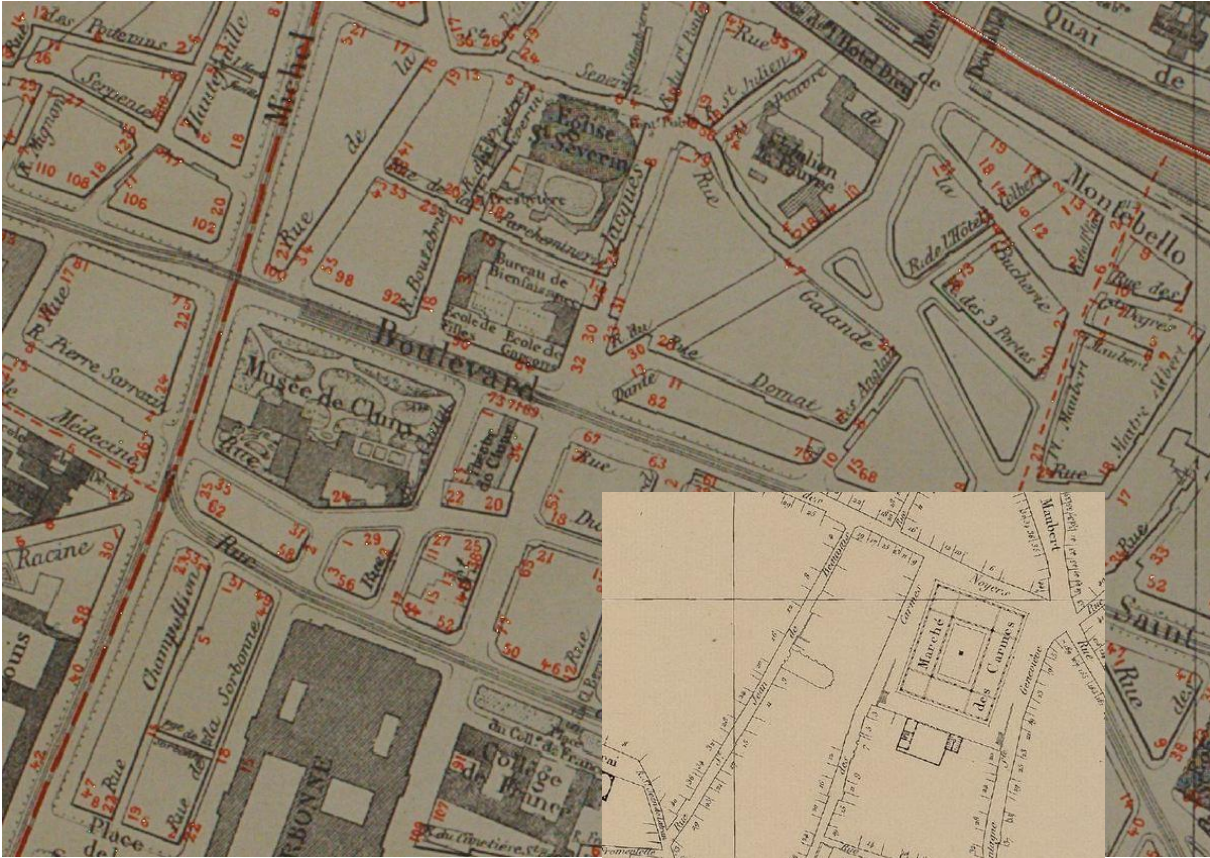
- Matching points



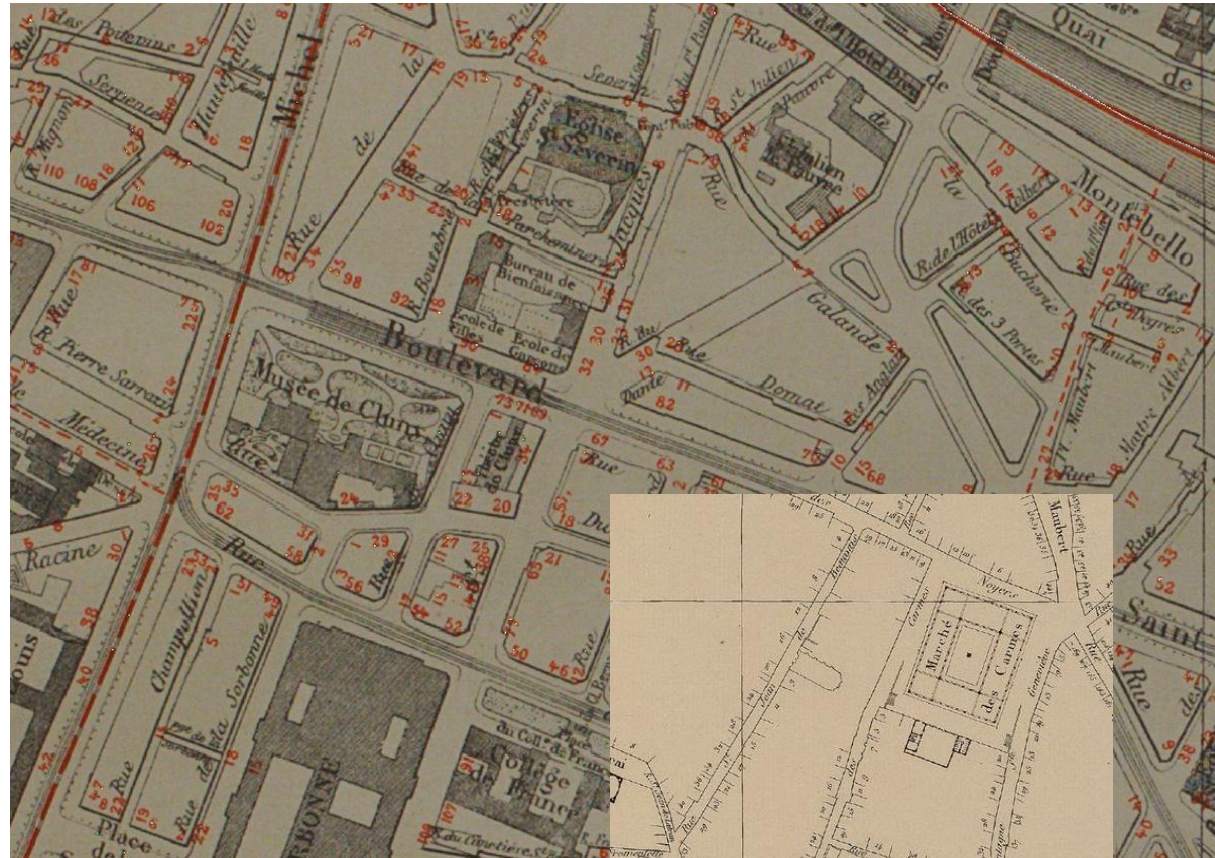
- [illegible]

Historical maps

- Appropriate warping

A detailed historical map of a section of Paris, France, likely from the 19th century. The map shows a dense grid of streets and buildings. Key landmarks include the 'Musée de Clugny' and the 'Boulevard de la Chapelle'. The map is color-coded with red and blue lines, and various street names are visible, such as 'Rue de la Chapelle', 'Rue de la Harpe', and 'Rue de la Vierge'. A small inset map in the bottom right corner shows a different view of the same area, illustrating the concept of 'warping' or distortion in historical maps.

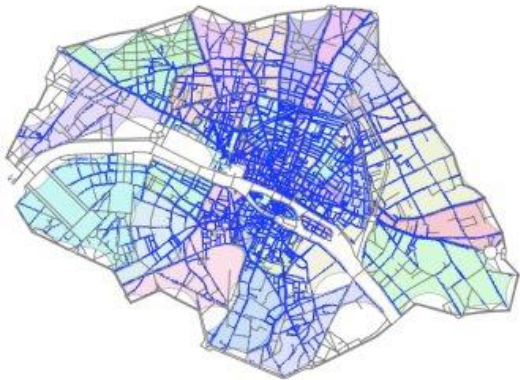
- Appropriate warping



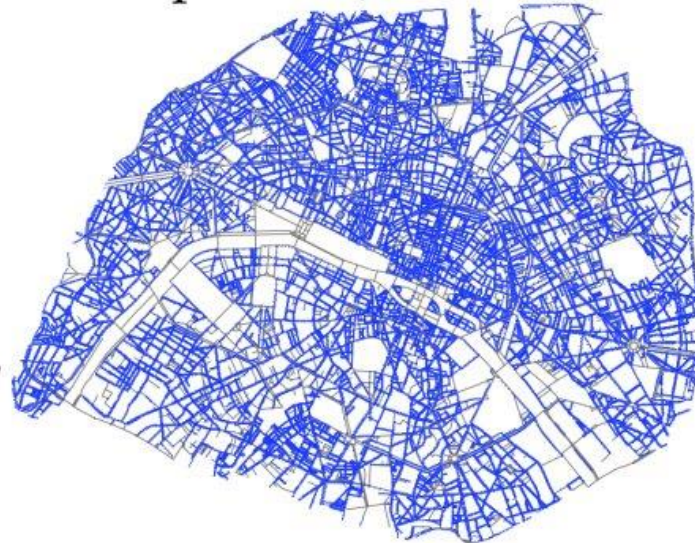
Historical maps

- Extracting information
 - Mostly manual (collaborative)
 - Complex again : Full Phd : Benoit Costes

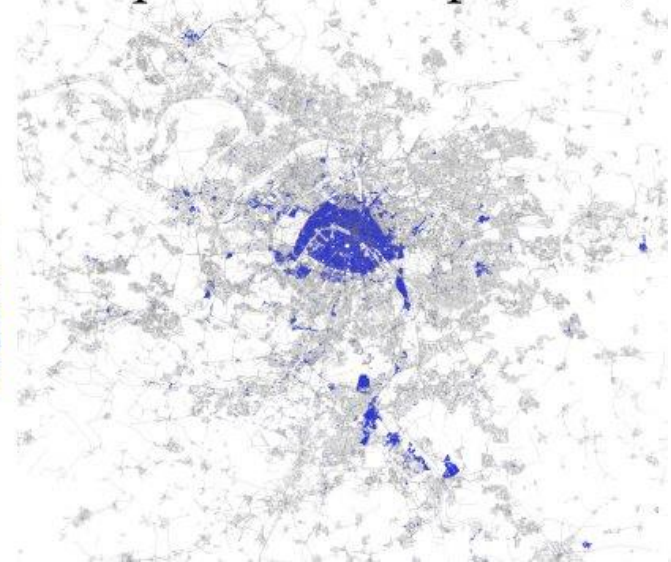
Jacoubet (1825-37)



Alphand (1887-89)

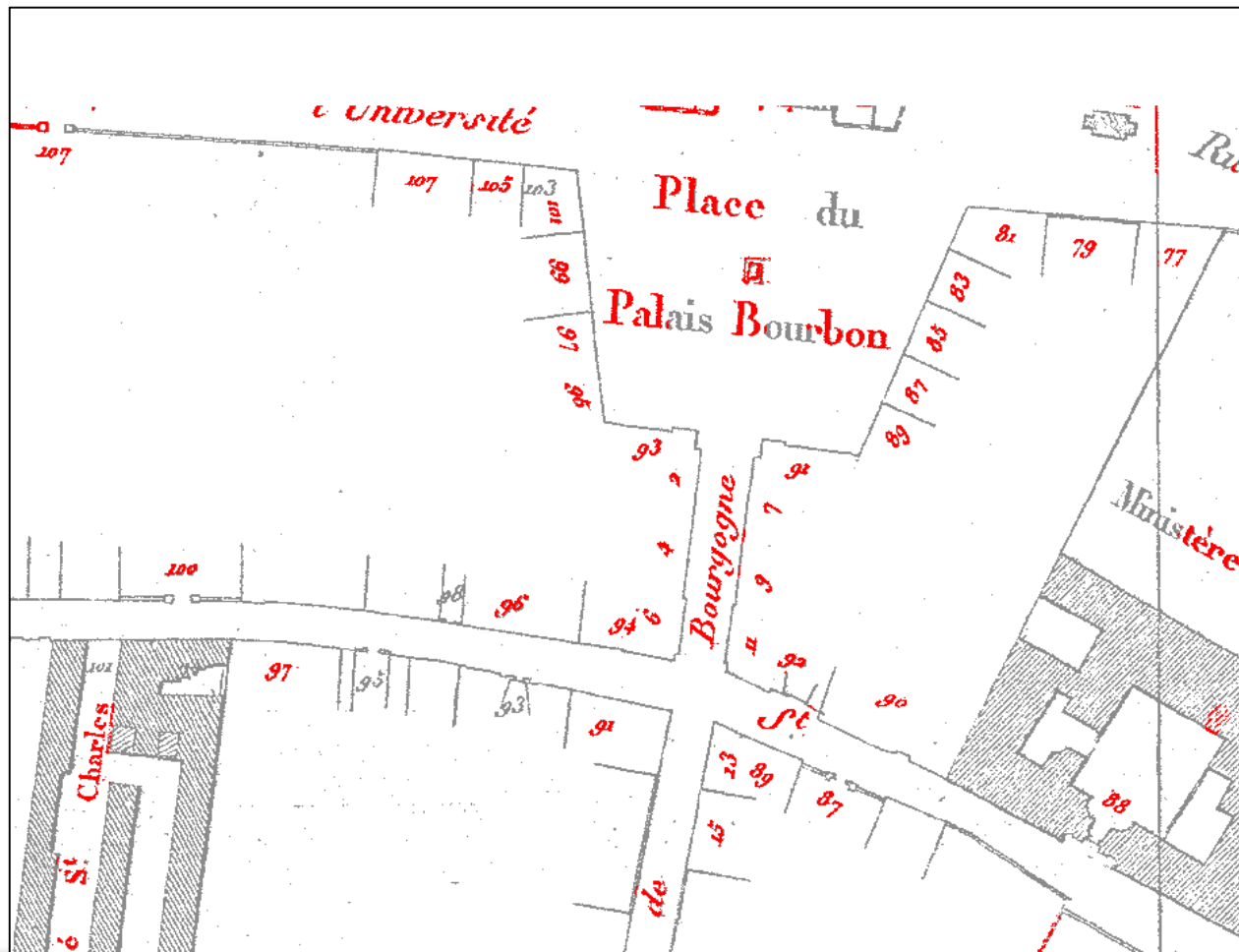


OpenStreetMap (2016)



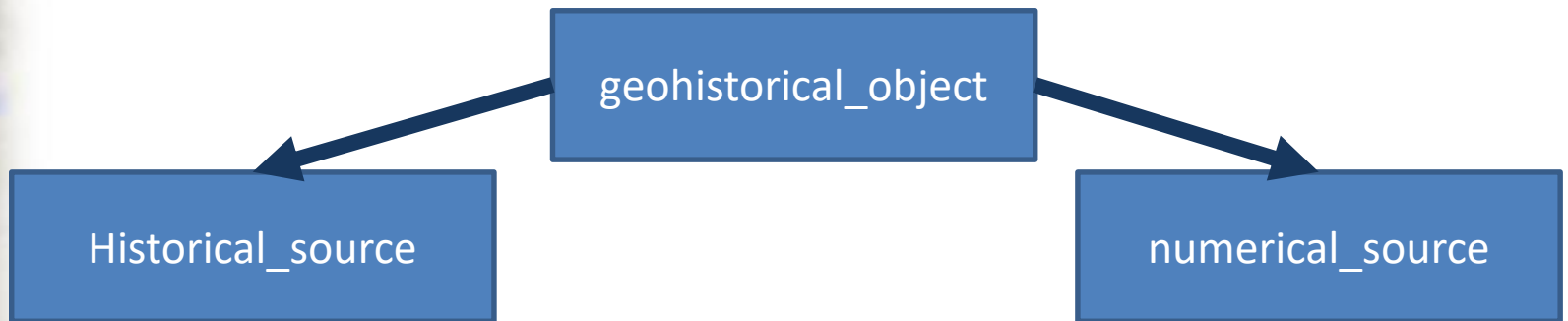
Historical maps

- Extracting information
 - Some test for automatic extraction : hard



GeoHistorical object

- Model for extracted information :
- Geohistorical object



GeoHistorical object

- Model for extracted information :
- Name + position

8 rue des Noyers, Paris



GeoHistorical object

- Model for extracted information :
- Historical source



GeoHistorical object

- Model for extracted information :
- Geohistorical object



GeoHistorical object

- Model for extracted information :
- Digitizing process



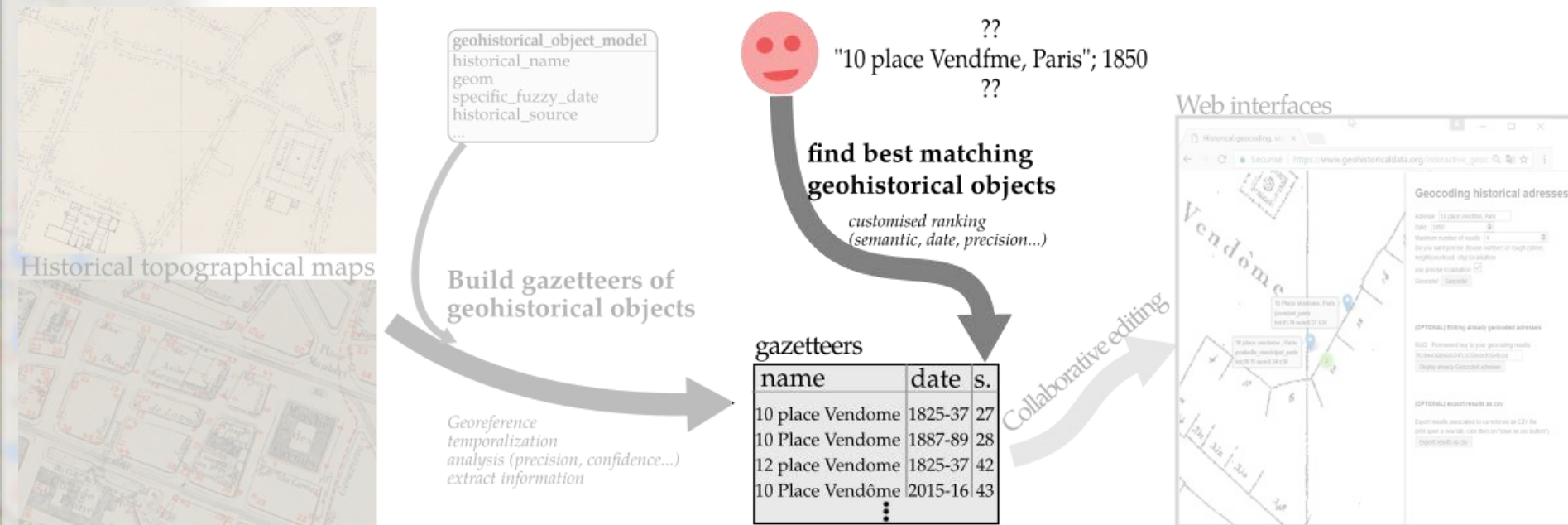
GeoHistorical object

- Model for extracted information :
- Full Geohistorical object



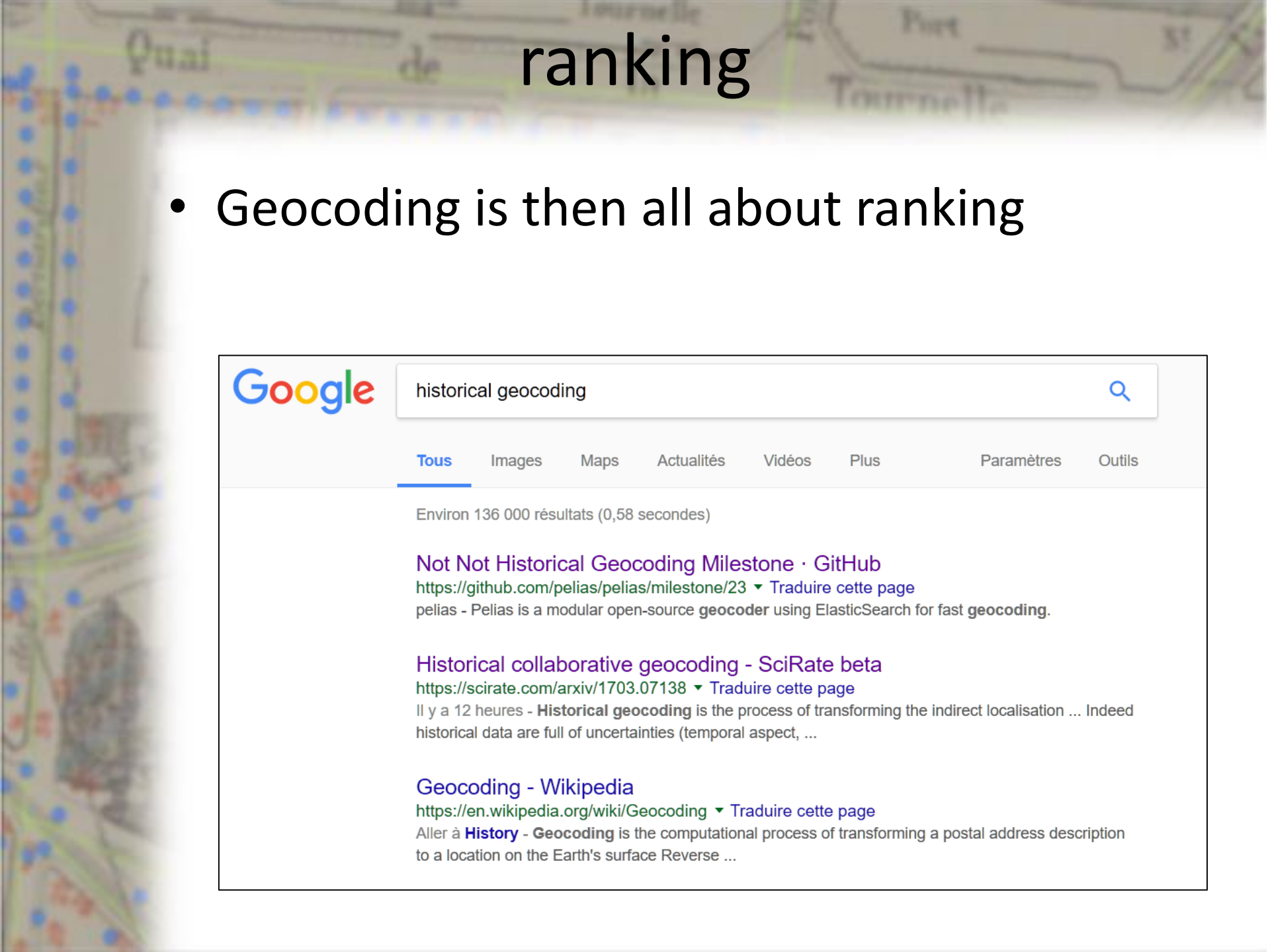
Our method


- Proposed solution



ranking

- Geocoding is then all about ranking



Google historical geocoding 

[Tous](#) [Images](#) [Maps](#) [Actualités](#) [Vidéos](#) [Plus](#) [Paramètres](#) [Outils](#)

Environ 136 000 résultats (0,58 secondes)

Not Not Historical Geocoding Milestone · GitHub
<https://github.com/pelias/pelias/milestone/23> ▾ [Traduire cette page](#)
pelias - Pelias is a modular open-source **geocoder** using Elasticsearch for fast **geocoding**.

Historical collaborative geocoding - SciRate beta
<https://scirate.com/arxiv/1703.07138> ▾ [Traduire cette page](#)
Il y a 12 heures - **Historical geocoding** is the process of transforming the indirect localisation ... Indeed historical data are full of uncertainties (temporal aspect, ...

Geocoding - Wikipedia
<https://en.wikipedia.org/wiki/Geocoding> ▾ [Traduire cette page](#)
Aller à **History** - **Geocoding** is the computational process of transforming a postal address description to a location on the Earth's surface Reverse ...

ranking

- Ranking metrics?

10 place Vendôme, Paris ; 1850



Semantic : how close are the text
(trigrams)?

12 pl. Vendome, Paris ; 1870

ranking

- Ranking metrics?

10 place Vendôme, Paris ; 1850



temporal : how close are the (fuzzy) dates?

12 pl. Vendome, Paris ; 1870

ranking

- Ranking metrics?

10 place Vendôme, Paris ; 1850



Building number: distance including parity?

12 pl. Vendome, Paris ; 1870

ranking

- Ranking metrics?

10 place Vendôme, Paris ; 1850; precision=10m



Spatial precision of source

12 pl. Vendome, Paris ; 1870; precision=2m

ranking

- Ranking metrics?

Quartier Vendôme, Paris ; 1850;

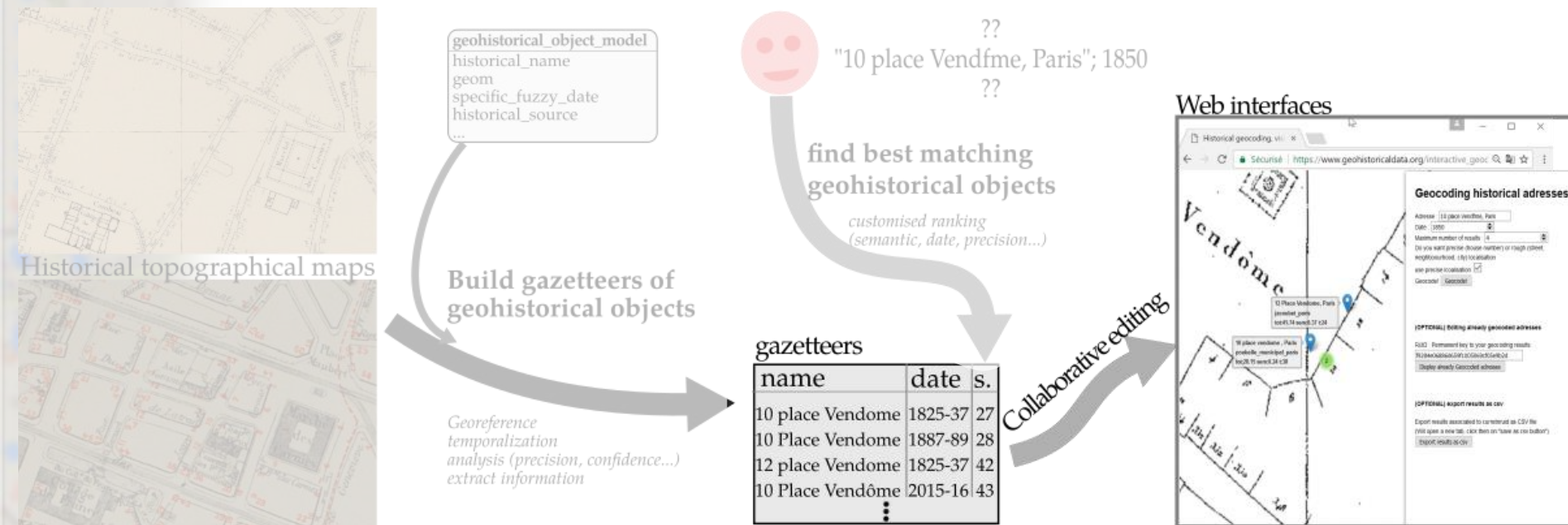


Geographique Scale

12 pl. Vendome, Paris ; 1870;

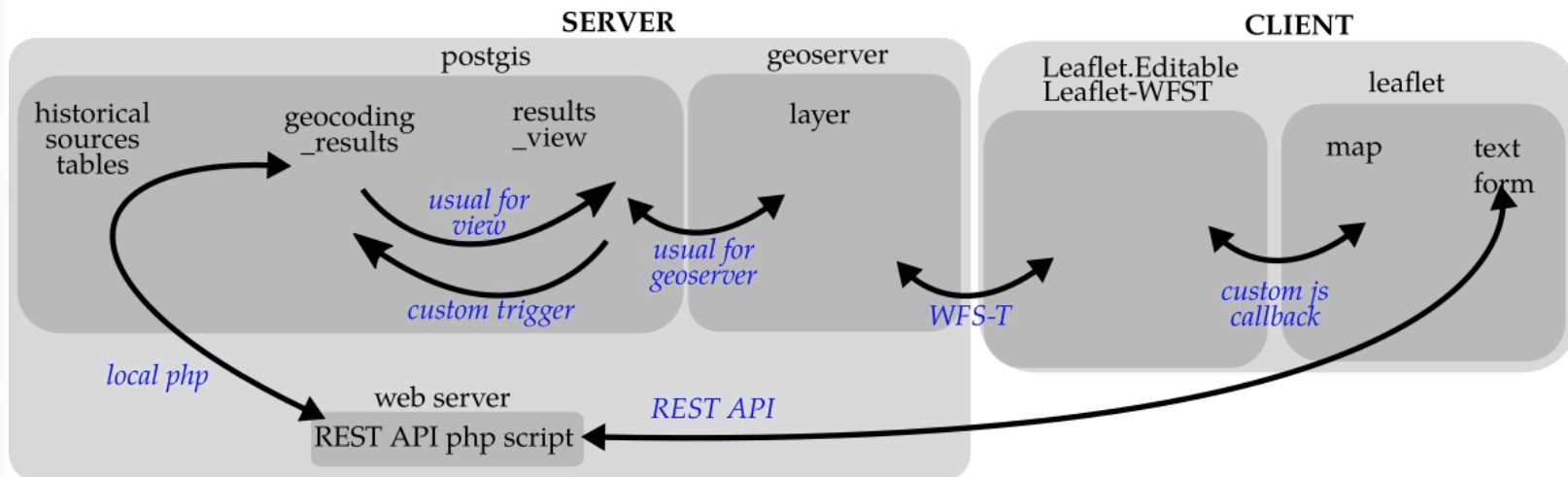
Collaborative editing

- Proposed solution



Collaborative editing

Whole web stack ...



Collaborative editing

Edit are stored and used by geocoder

The screenshot displays the 'Historical geocoding, vis' web application. The browser address bar shows the URL https://www.geohistoricaldata.org/interactive_geoc. The main map area shows a historical street map of Paris, with 'Vendôme' street clearly visible. Two blue location pins are placed on the map, each with a tooltip box. The first pin is at '12 Place Vendôme, Paris' with a tooltip containing 'jacoubet_paris' and 'tot:41.74 sem:0.37 t:24'. The second pin is at '10 place vendome , Paris' with a tooltip containing 'poubelle_municipal_paris' and 'tot:28.15 sem:0.24 t:38'. A green circle with the number '2' is also visible on the map. To the right of the map is a sidebar titled 'Geocoding historical addresses'. It contains a form with the following fields and controls:

- Adresse : 10 place Vendôme, Paris
- Date : 1850
- Maximum number of results : 4
- Do you want precise (house number) or rough (street, neighbourhood, city) localisation: ☒ use precise localisation
- Geocode!

Below the form, there are optional sections:

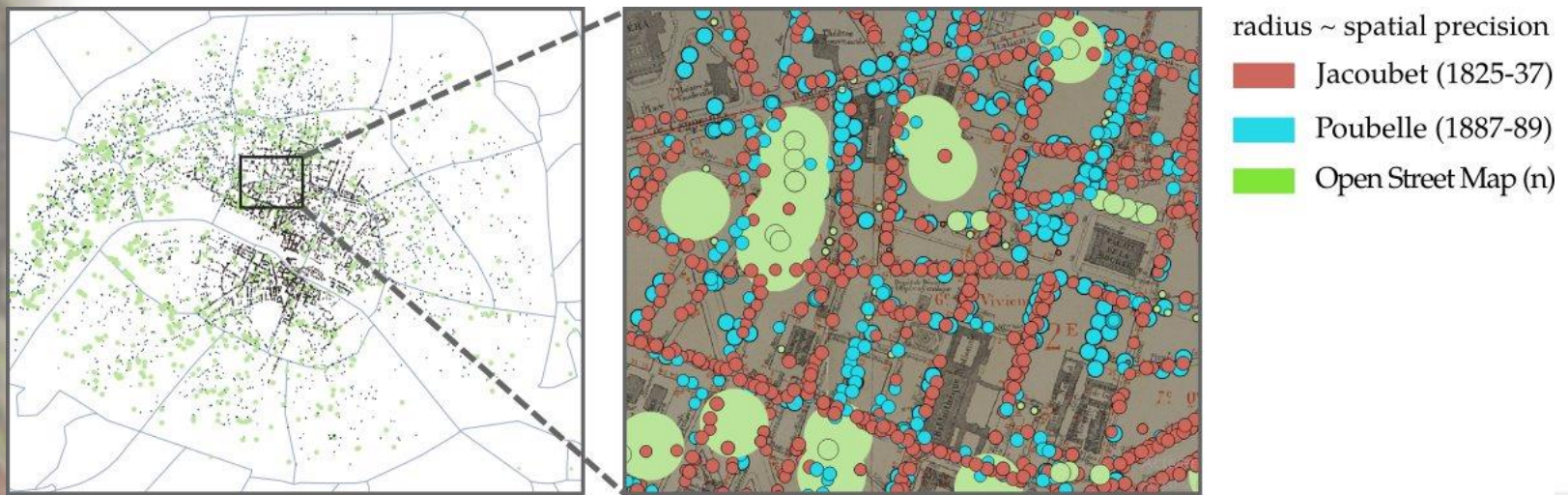
- (OPTIONAL) Editing already geocoded addresses**
RUID : Permanent key to your geocoding results:
f9284e06886d659f1005069cf05e9b2d
- (OPTIONAL) export results as csv**
Export results associated to current ruid as CSV file
(Will open a new tab, click then on "save as csv button")

Results

Thousands of historical addresses geocoded

Table 1. All geocoded historical datasets facts.

Dataset name	input addresses	found addresses (rough)	second per k addresses
South Americans	13991	13743 (250)	138
Textile	5777	5688 (16)	135
Textile 2	3070	3053 (2)	110
Artists accommodations	13907	10215 (2955)	244
Health administrators	1887	1698 (171)	316
Belle epoque (0.3)	6467	3880(337)	280
Belle epoque (0.5)	6467	6000	351

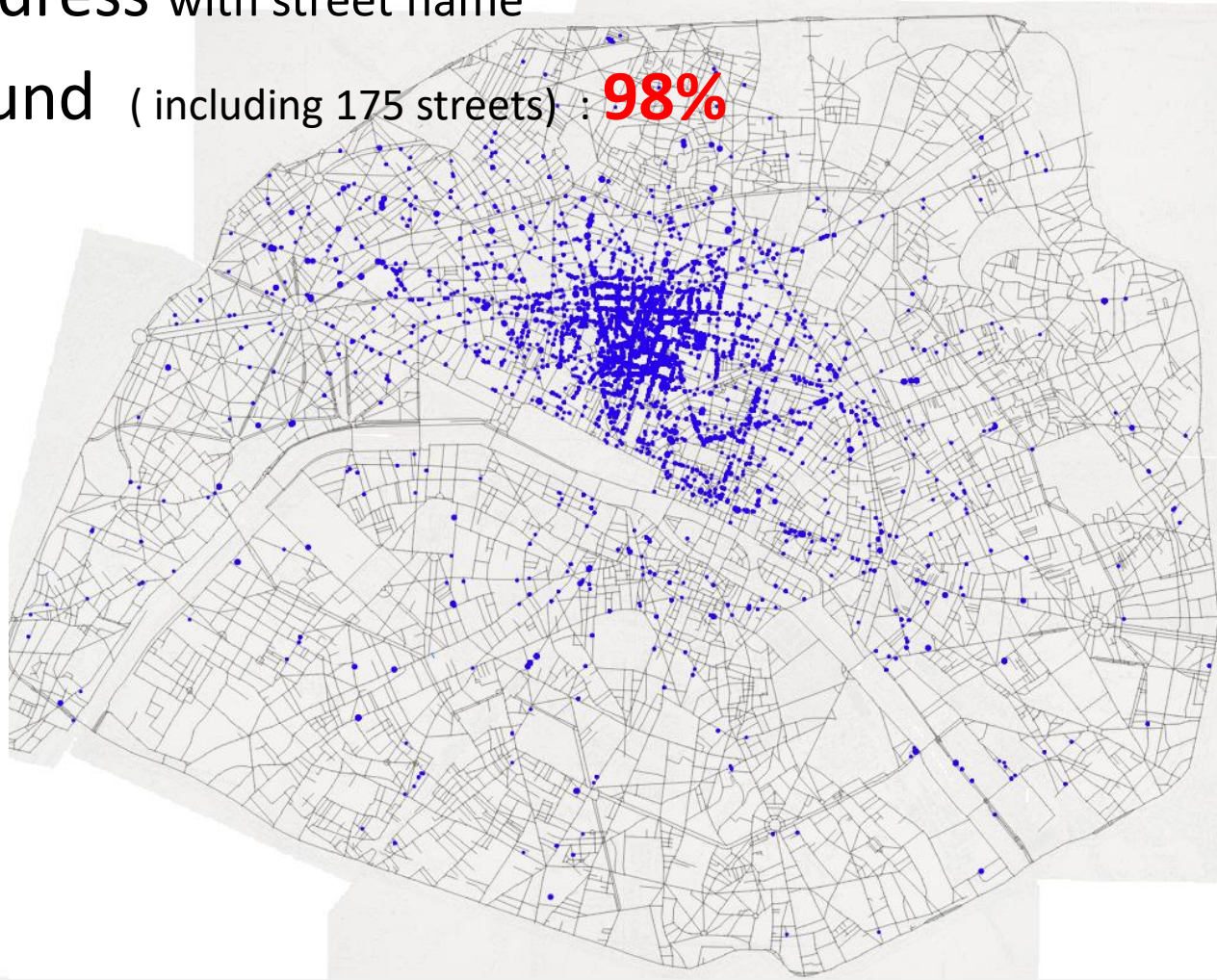


Results

Example : Bottin by Theo

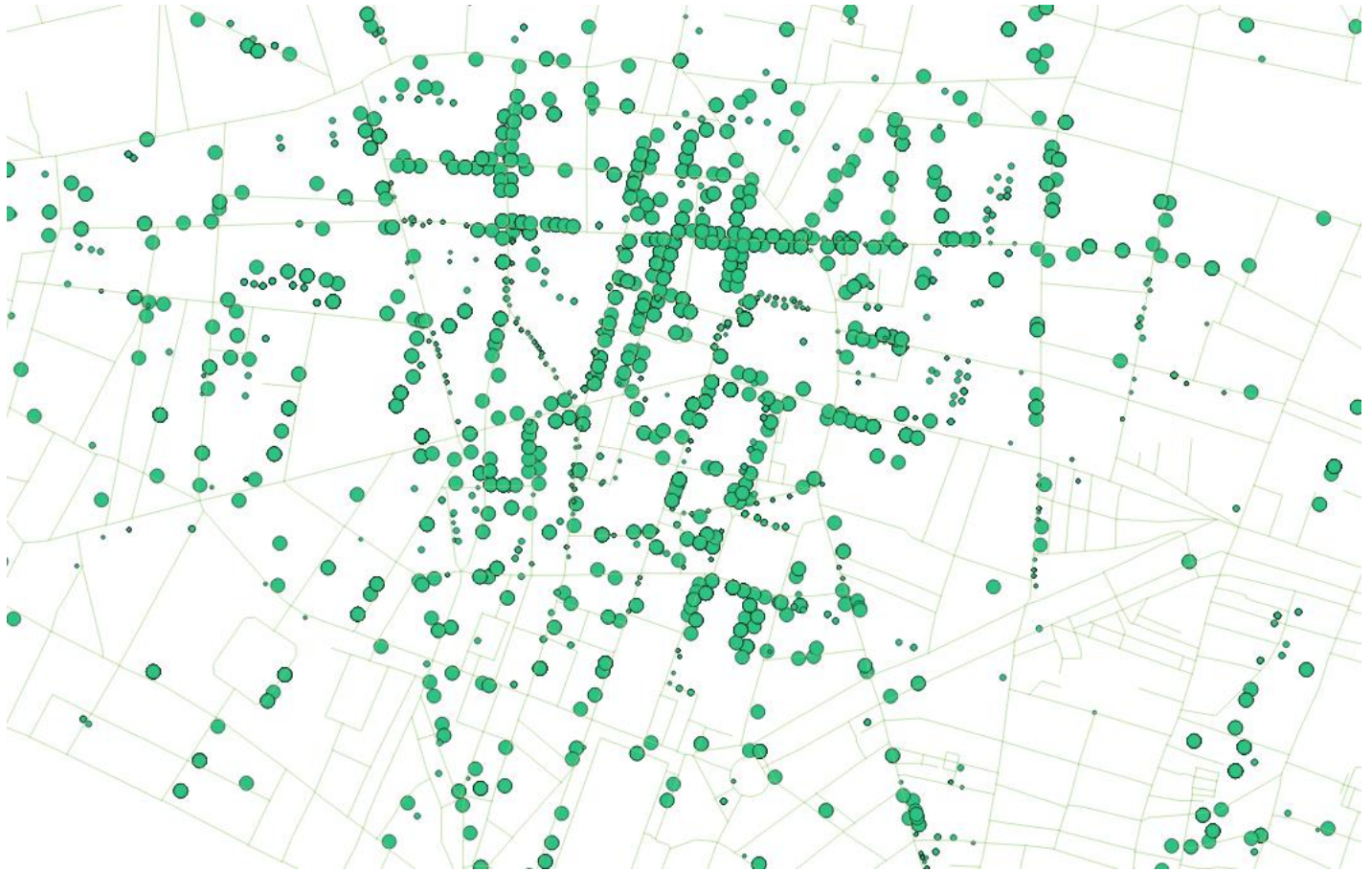
17878 address with street name

17474 found (including 175 streets) : **98%**



Results

- Full bottin : fuzzy results



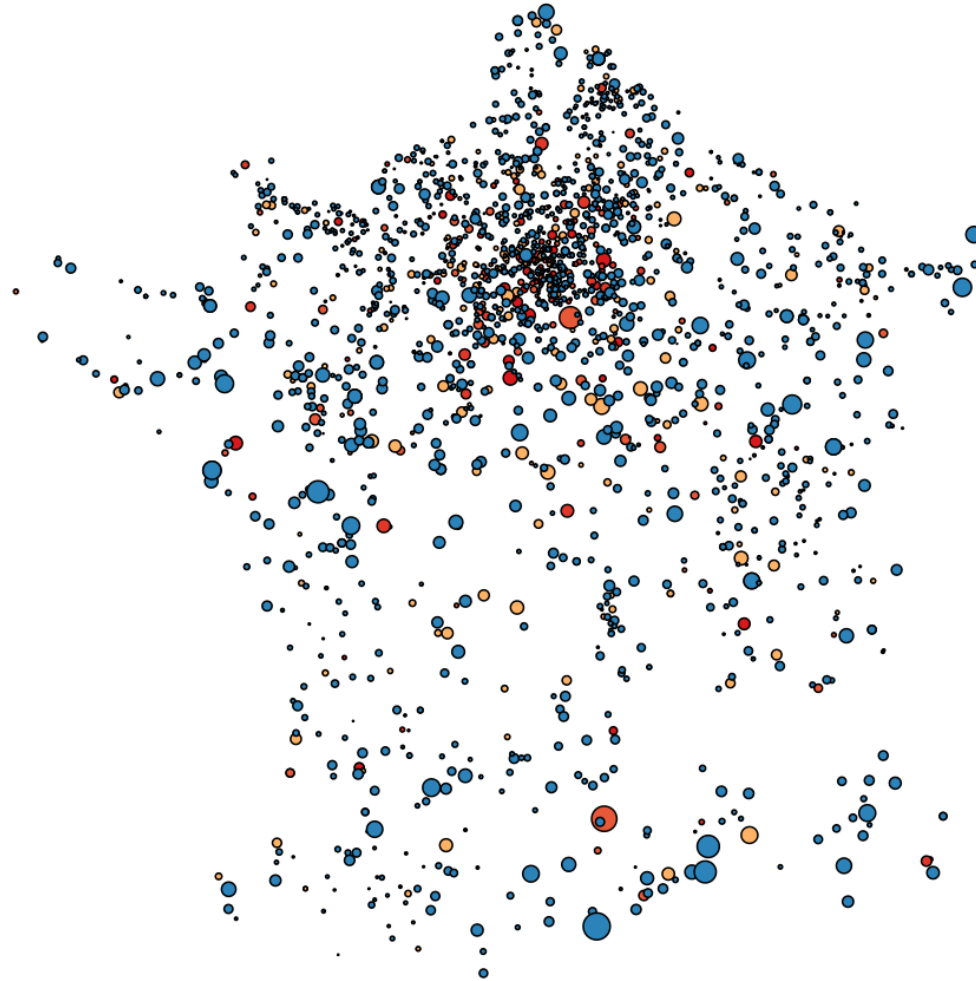
Results

- Using various EHESS datasets
 - People arrested in 1848




Results

- Also works on other scales



Conclusion

- After this:
Historian work!



- After this:
Historian work!

