



# 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

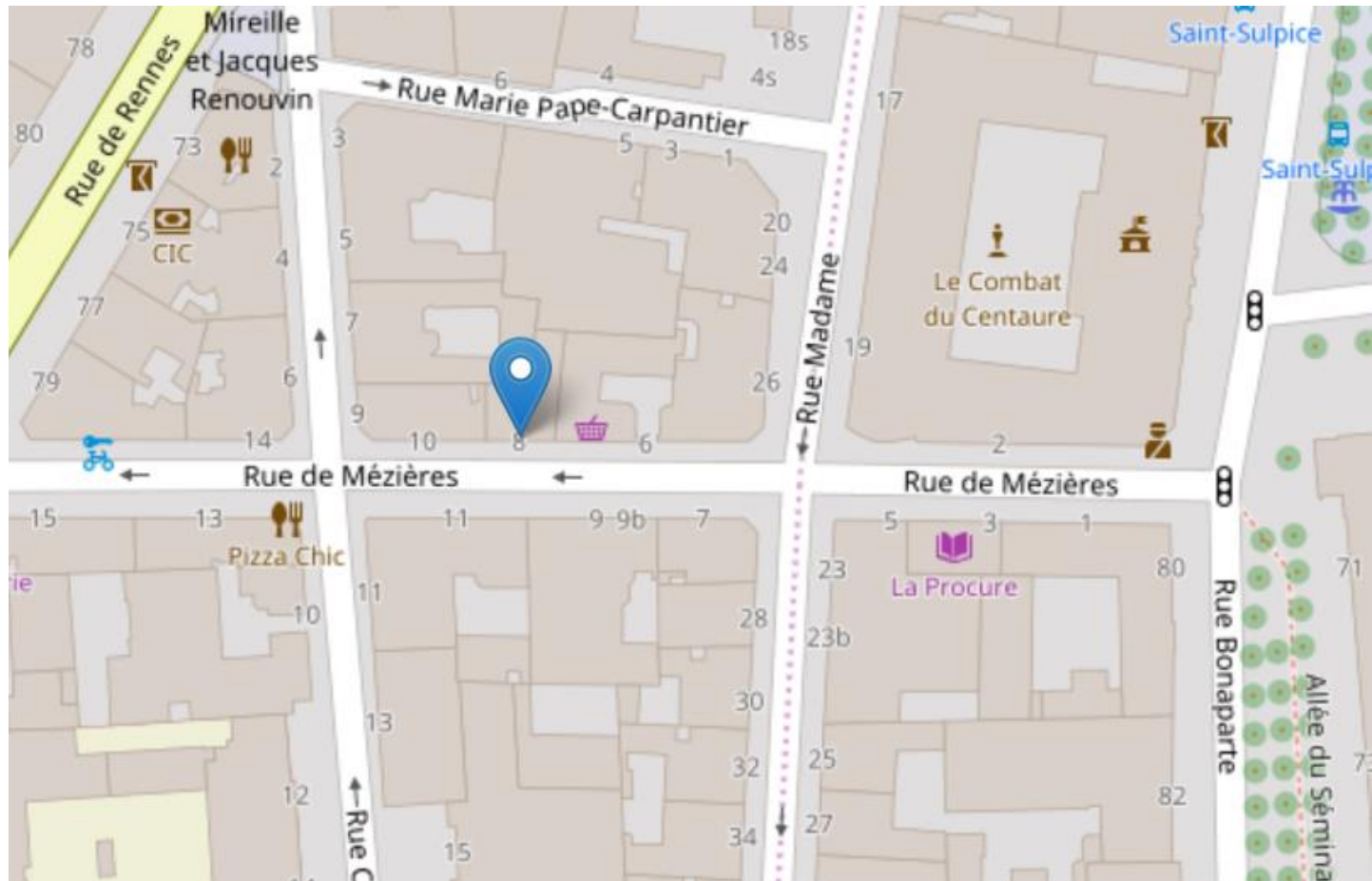
Geocoding is matching

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  
→



Street doesn't exist anymore

- 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. The word 'Quai' is visible in the top left, and 'Port' is visible in the top right. The map is overlaid with a grid of blue dots, likely representing geocoded locations.

# 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



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





# Our method

- Proposed solution



Historical topographical maps



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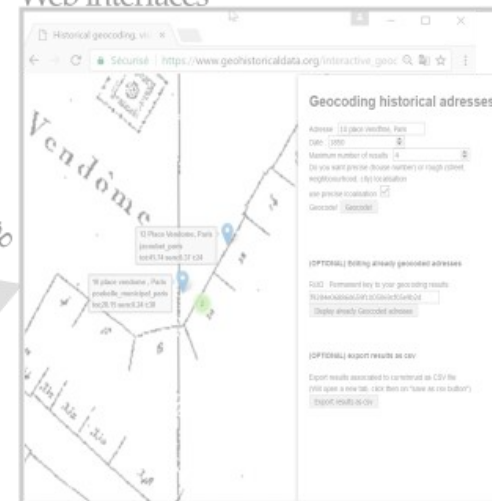
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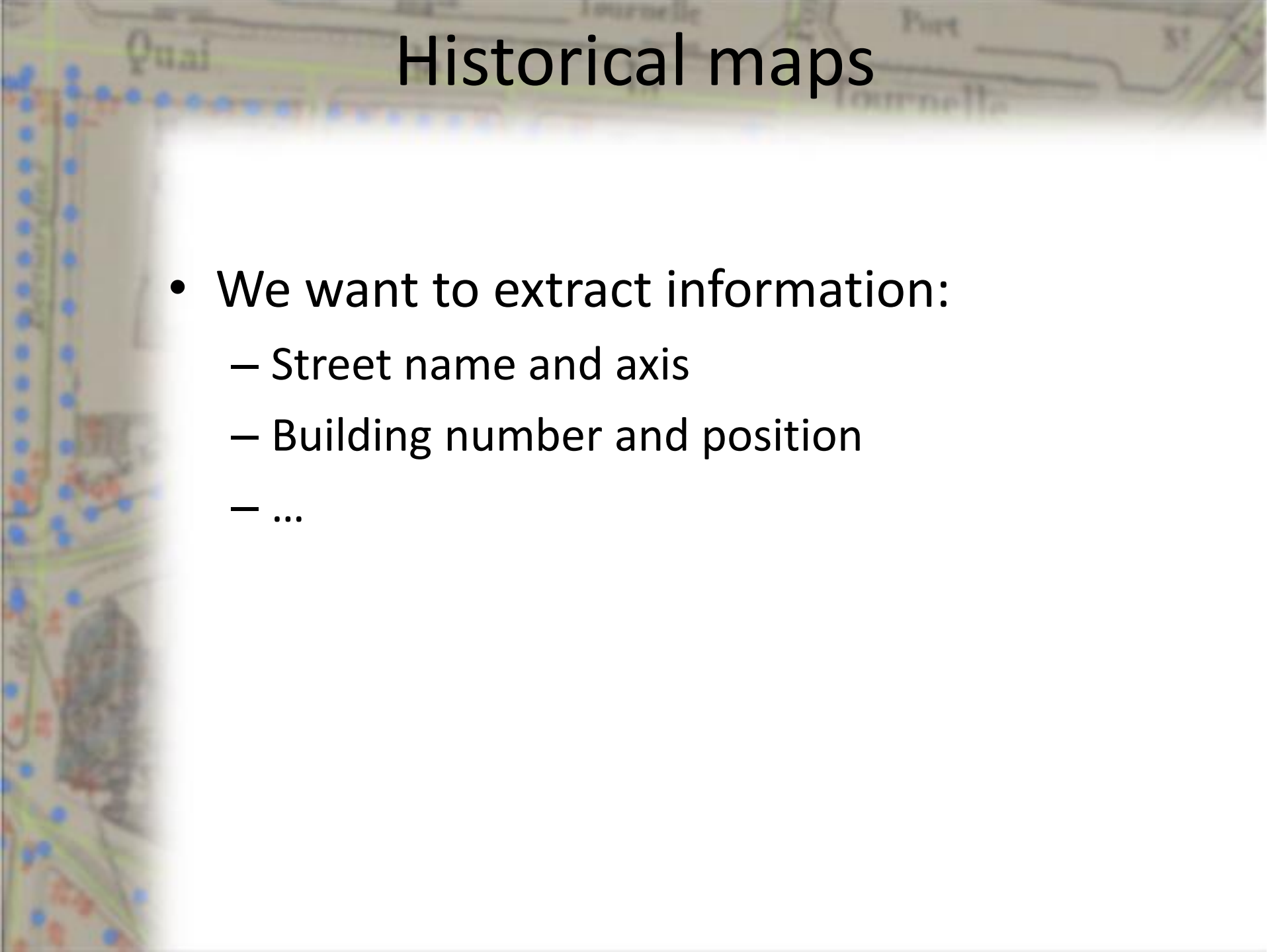
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*Collaborative editing*

Web interfaces





# Historical maps

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



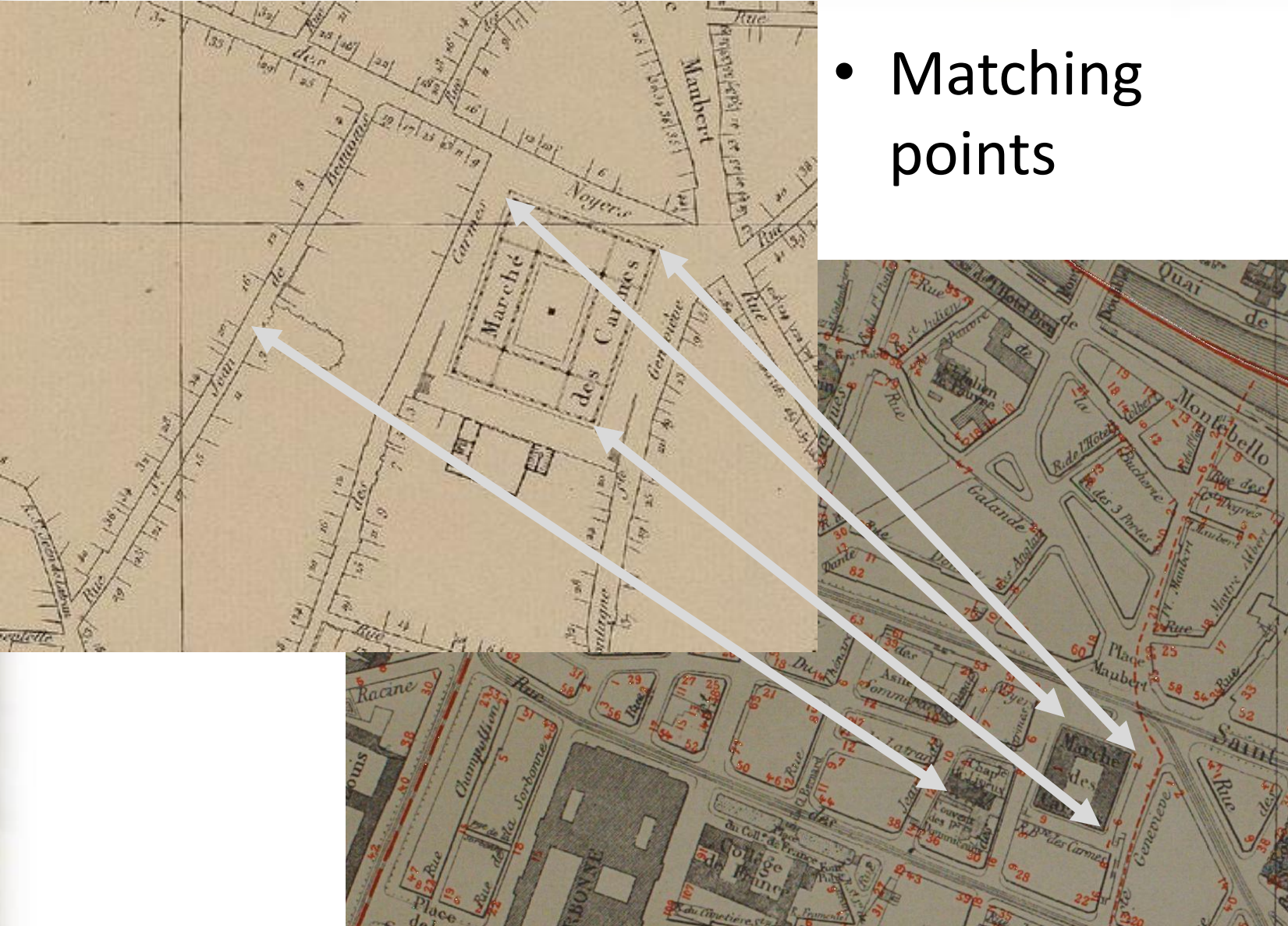
# Historical maps

- 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

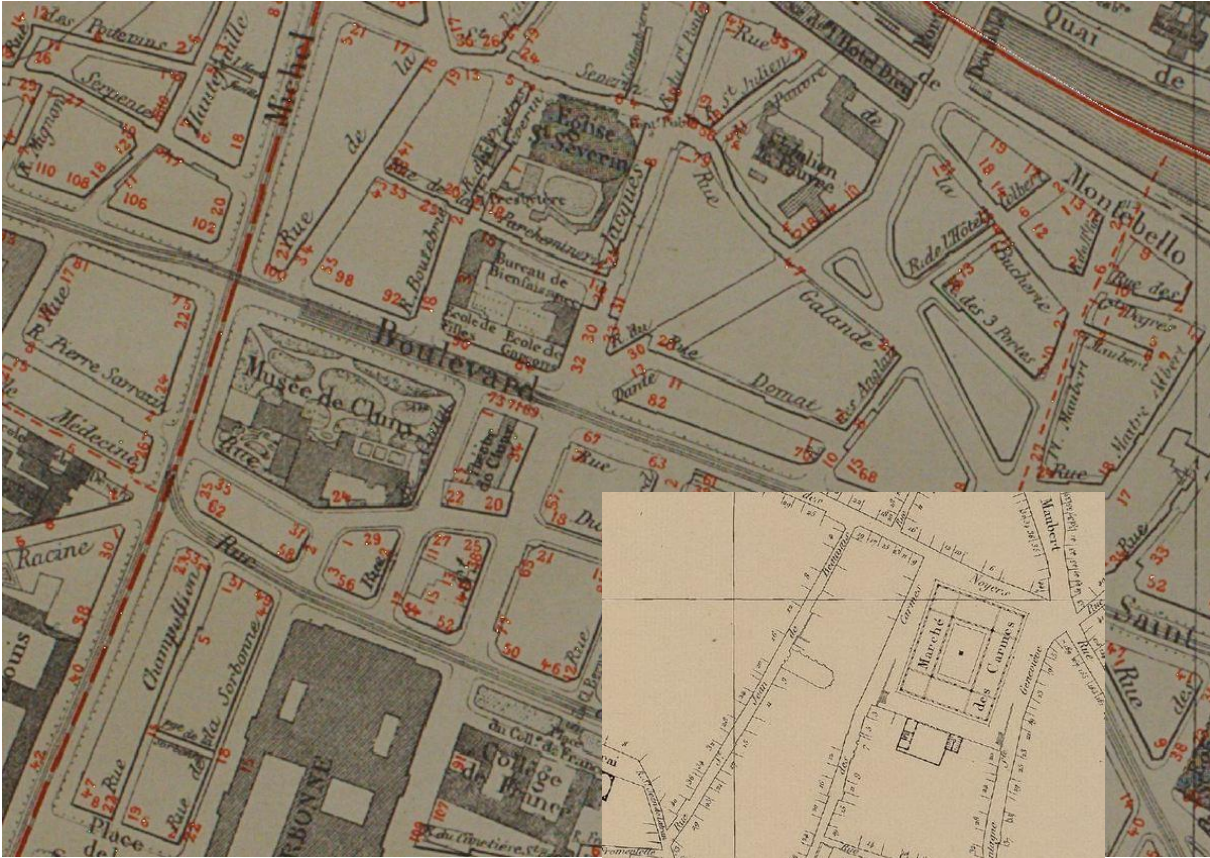


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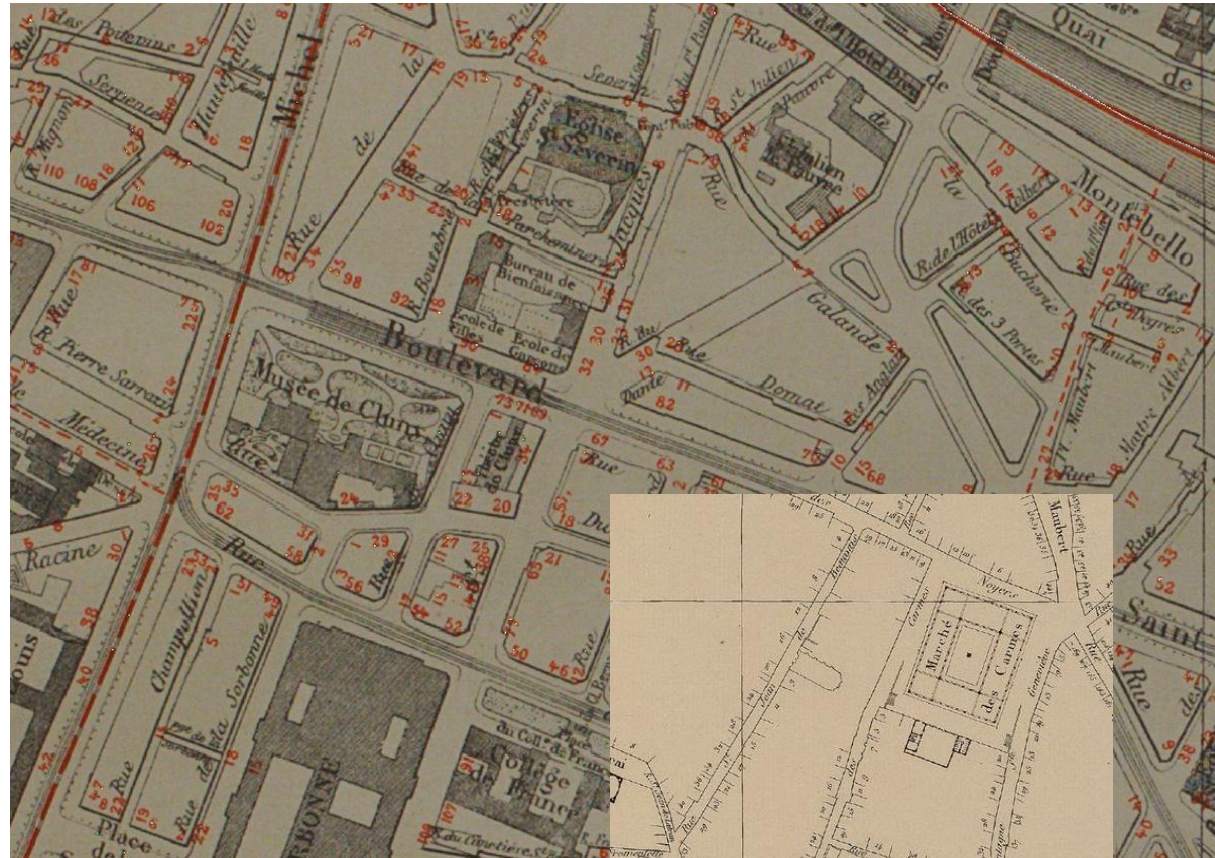


# Historical maps

- Appropriate warping



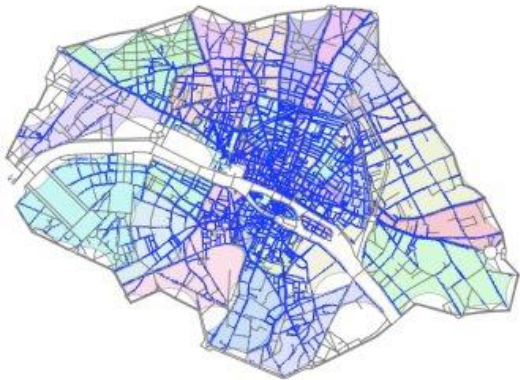
- Appropriate warping



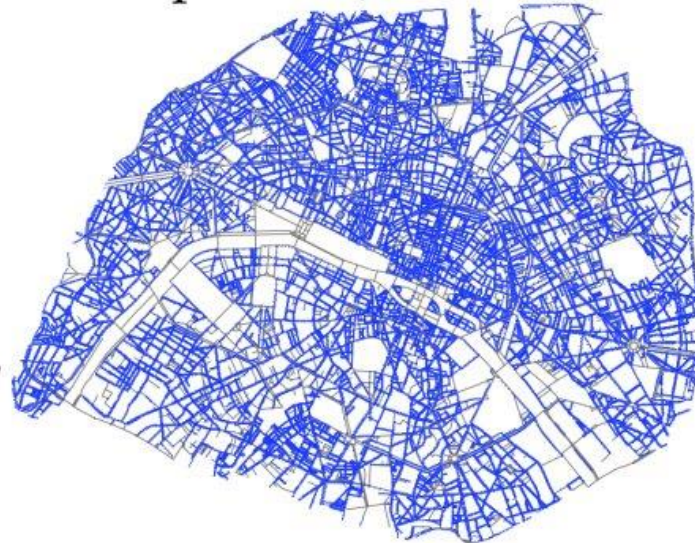
# Historical maps

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

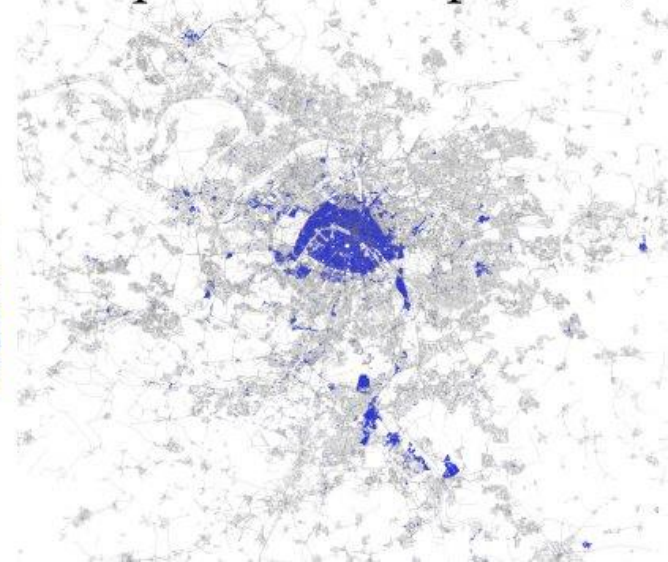
Jacoubet (1825-37)



Alphand (1887-89)



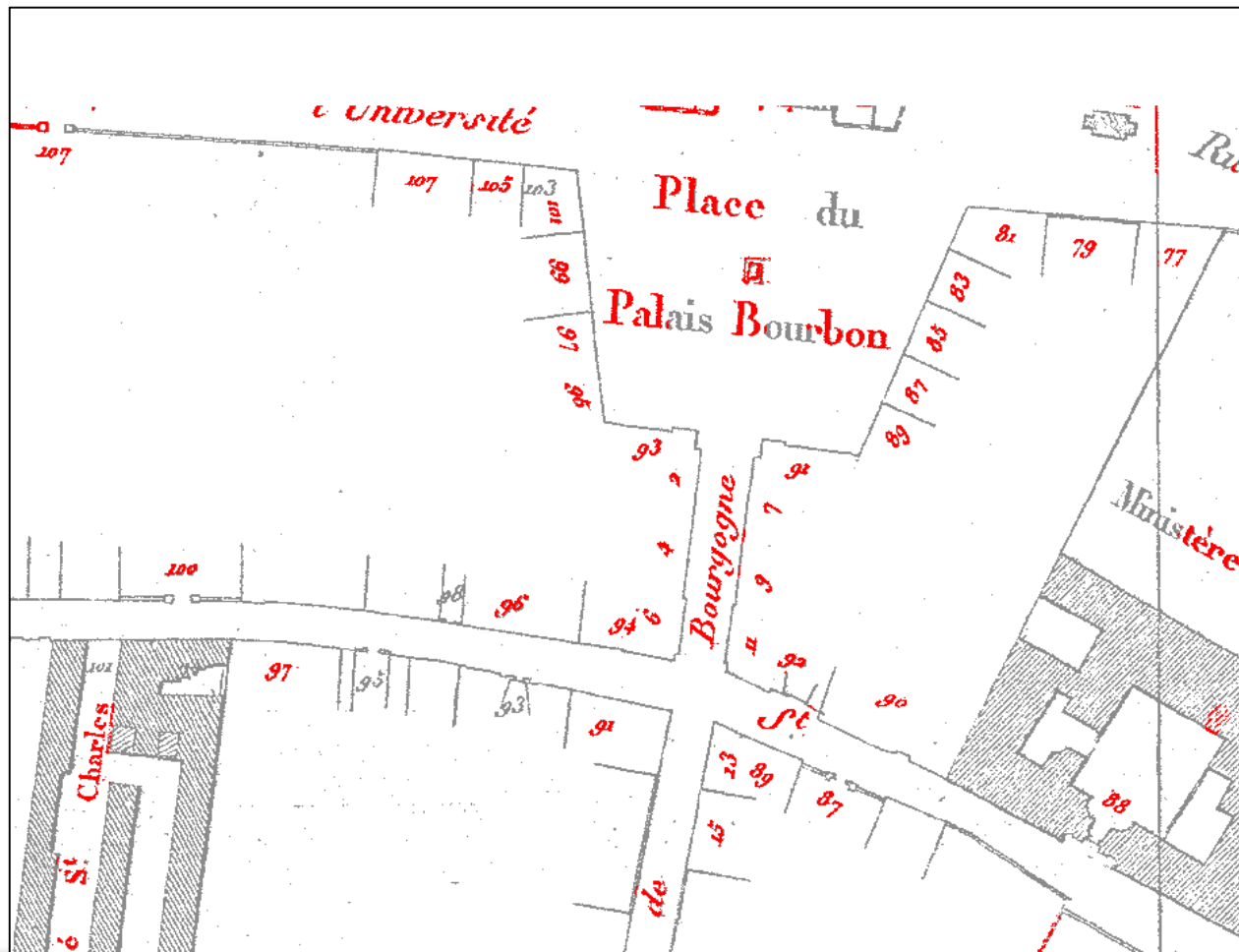
OpenStreetMap (2016)





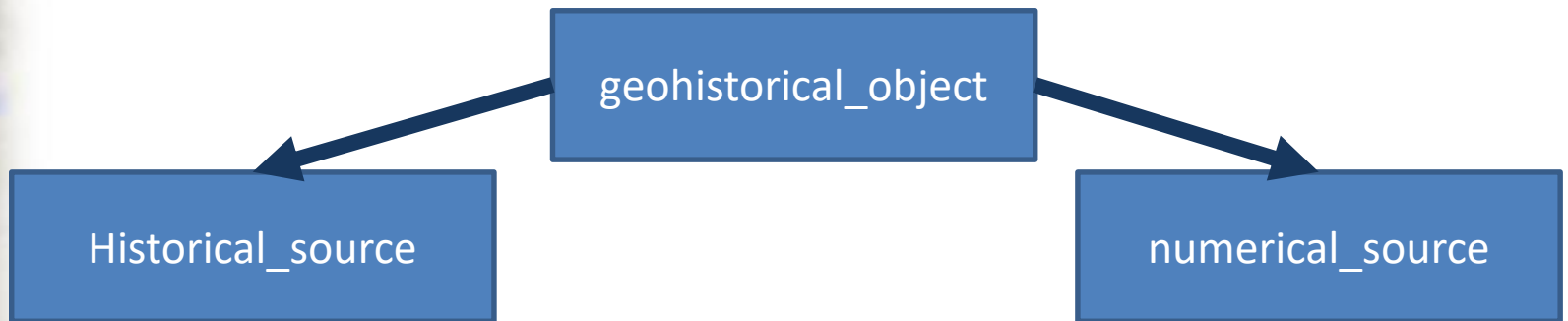
# Historical maps

- 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



8 rue des Noyers, Paris

1826-35

Jacoubet Map, created ... by ...  
Confidence...

- Model for extracted information :
- Geohistorical object





# GeoHistorical object

- Model for extracted information :
- Digitizing process





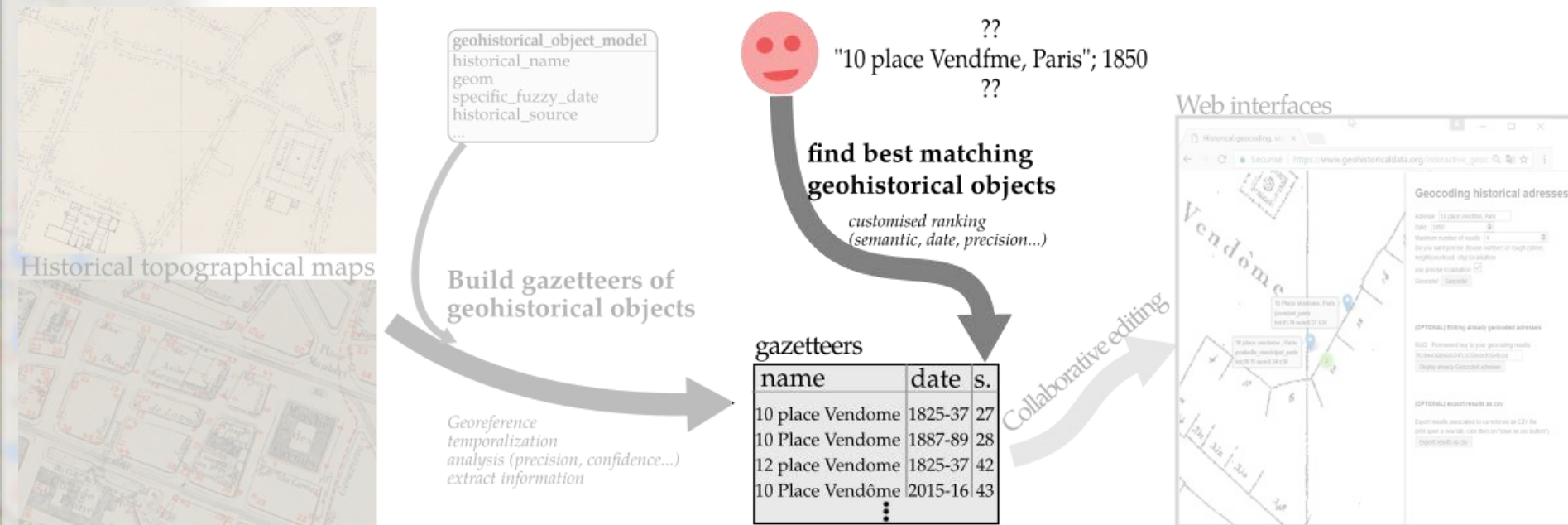
# GeoHistorical object

- Model for extracted information :
- Full Geohistorical object



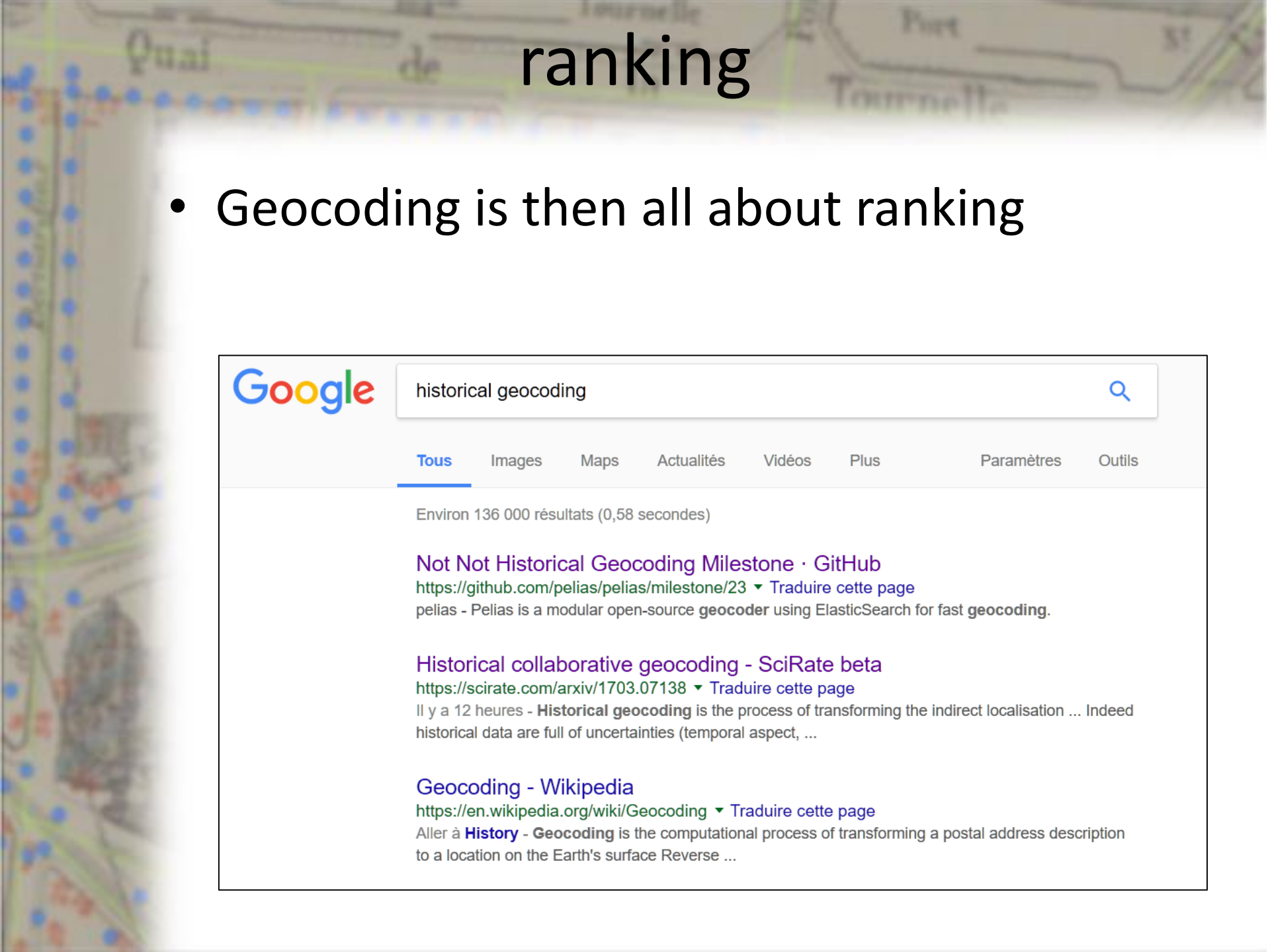
# Our method


- 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;



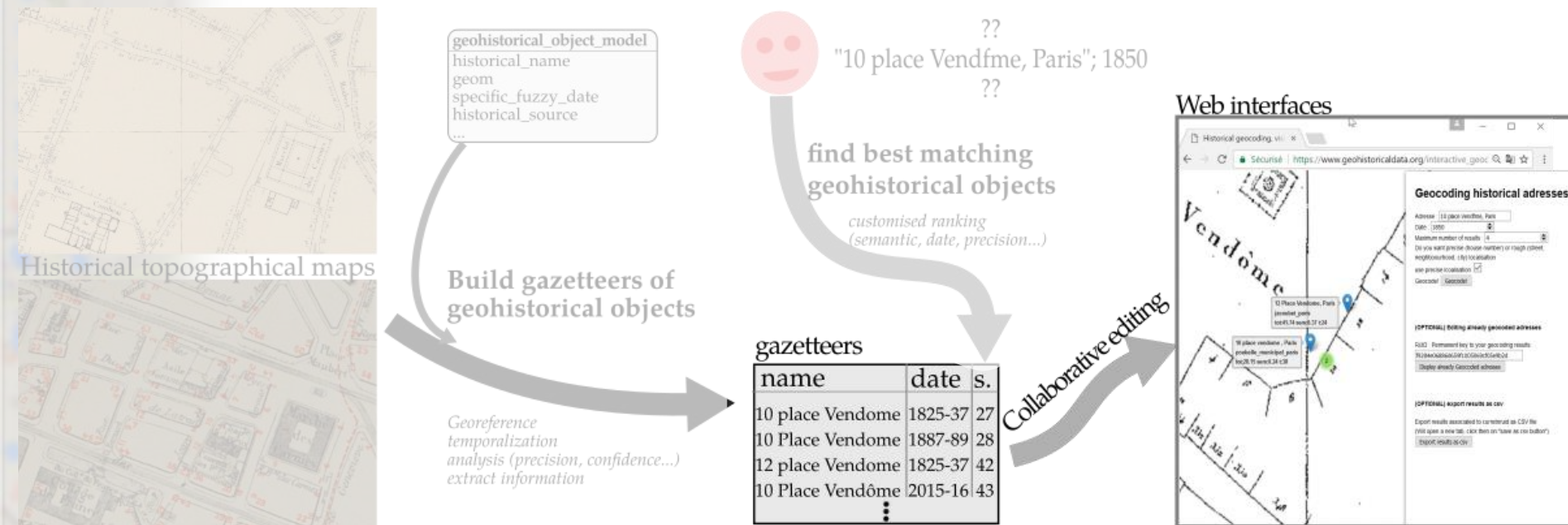
Geographique Scale

12 pl. Vendome, Paris ; 1870;



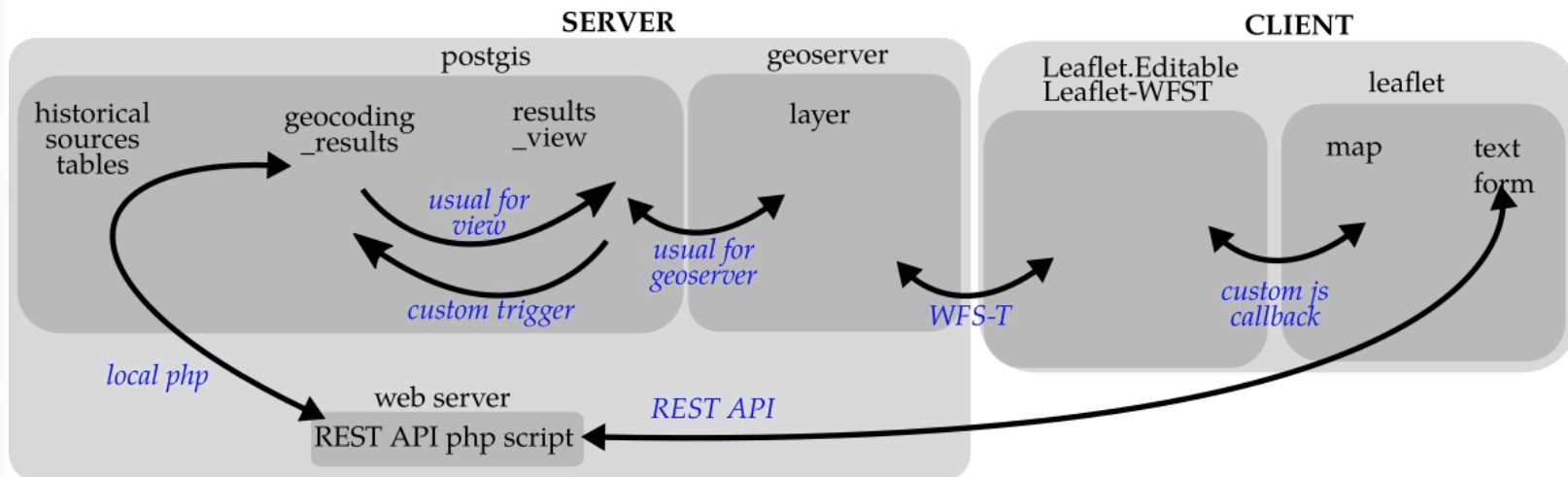
# Collaborative editing

- Proposed solution



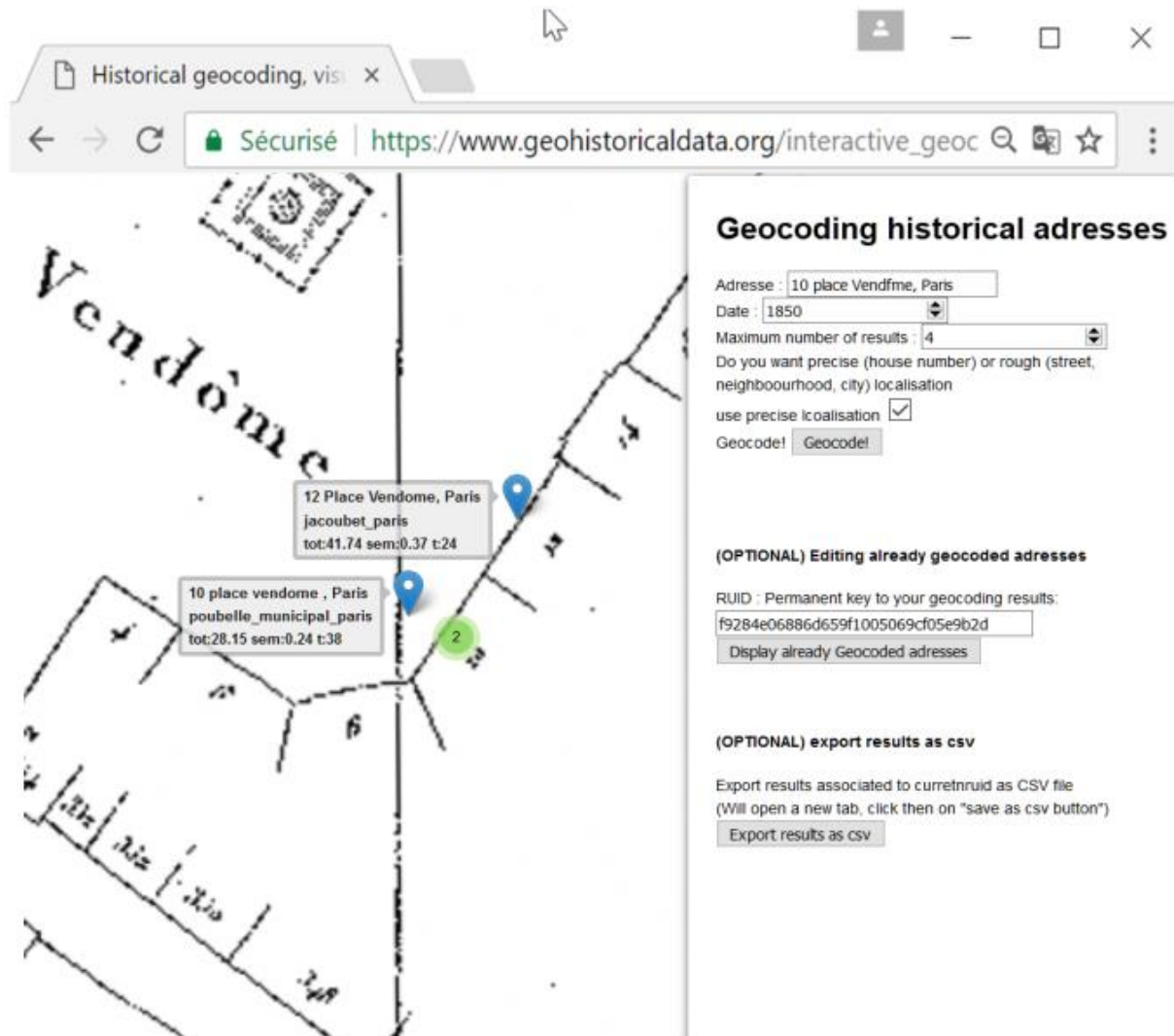
# Collaborative editing

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](https://www.geohistoricaldata.org/interactive_geoc). The main map area shows a historical street map of Paris, with 'Place Vendôme' 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")

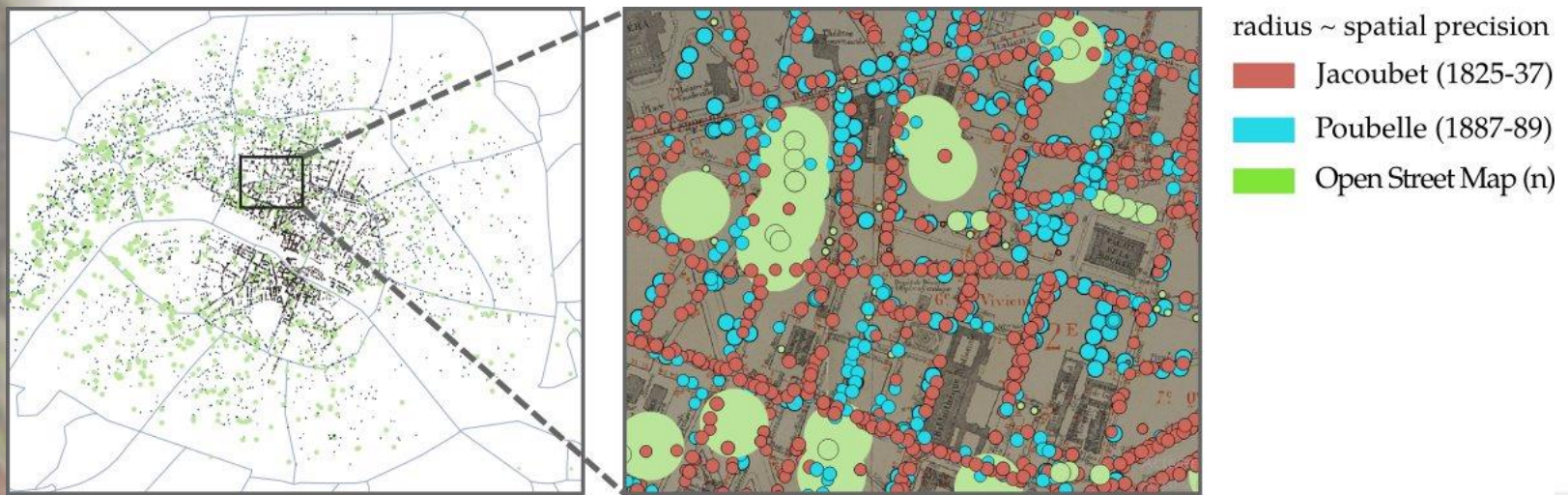


# Results

## 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

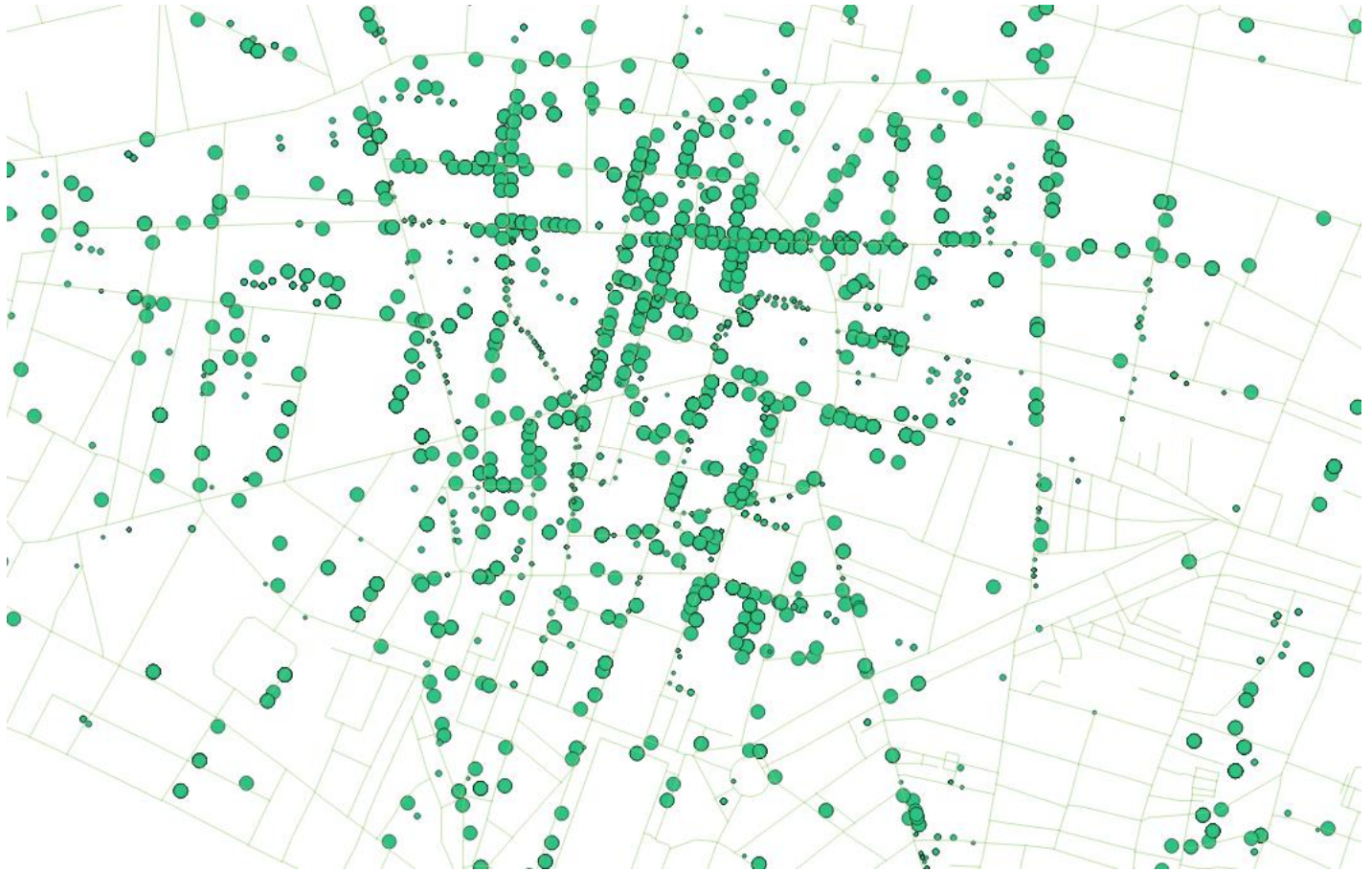
Example : bankers extracted by Theo (previous presentation)





# Results

- Full bottin : fuzzy results





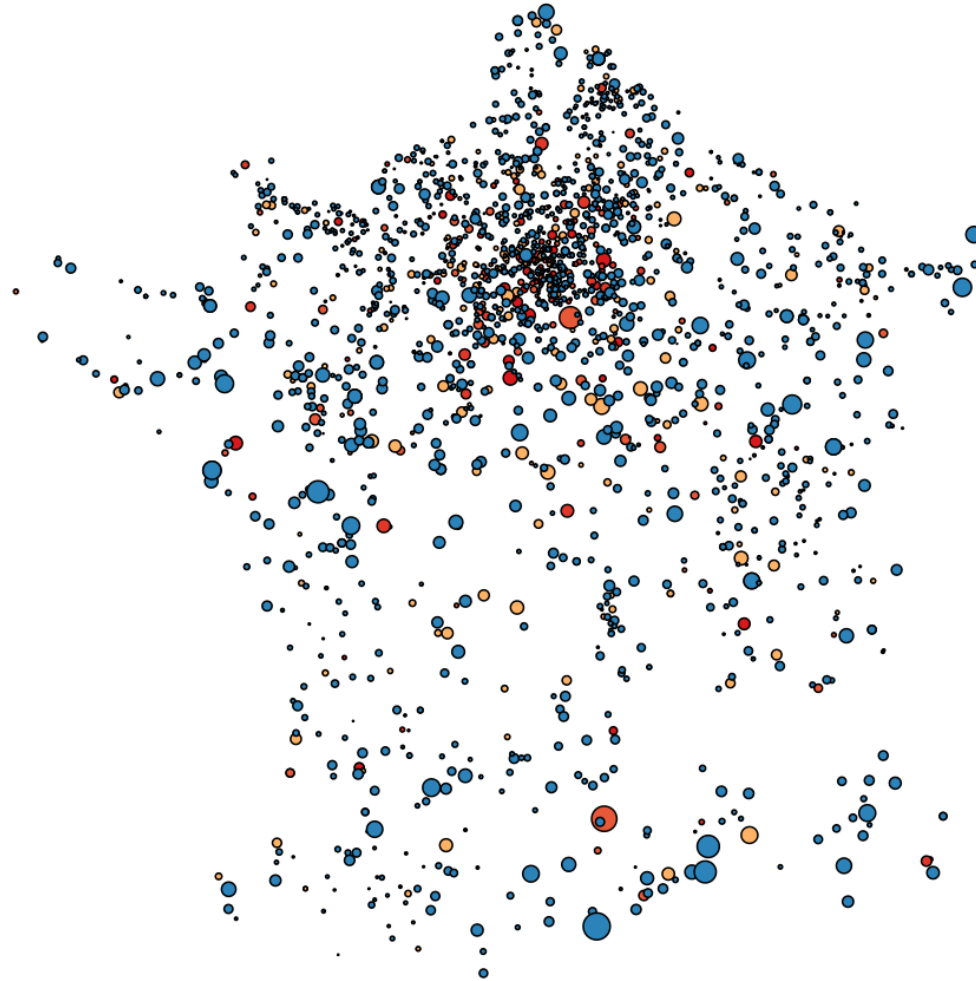
# Results

- Using various EHES datasets
  - People arrested in 1848




# Results

- Also works on other scales



# Conclusion

- After this:  
Historian work!



- After this:  
Historian work!

