



École Polytechnique Fédérale de Lausanne

Standardising ownership information from the Napoleonic Cadastre
of 1808 Venice: methods and findings in the first database creation

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Master Project Report

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Mio caro amico, qualunque cosa tu abbia udito su Venezia,
nessuna uguaglia la magnificenza e lo splendore della realtà.

— Charles Dickens

Ecco la mia Venezia, conosciuta da molti, sconosciuta a tutti.

— Carlo Goldoni

Se dovessi cercare una parola che sostituisce *musica*,
potrei pensare soltanto a *Venezia*.

— Friedrich Nietzsche

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Chapter 1

Introduction

1.1 Historical context

On May 12, 1797 the Doge Ludovico Manin surrendered unconditionally and abdicated under the ultimatum of General Napoleone Bonaparte.

The Republic of Venice ended on that day after more than one thousand years of existence.

Going a step backwards, in August 1795, in Paris, the political-institutional bodies of the Revolution placed a new political organ at the top of French institutions: "le Directoire". The Directoire planned significant aggressions against reactionary European forces: the main attack was intended to hit the states of the Holy Roman Empire.

In March 1796, the Directory entrusted the governance of the Italian campaign to the 27-year-old General Napoleon Bonaparte. On May 10, 1796, Austrian soldiers defeated by Napoleon at the Battle of Lodi retreated to the territories of the Republic of Venice. The day after, a regiment of two thousand French soldiers chasing the Austrians stopped under the walls of Crema, crossing, for the first time, into the neutral territory of the Republic of Venice. On June 1, the *provveditore* Foscarini, hoping not to provoke Napoleon further, agreed to the entry of French soldiers into Verona, a city of strategic importance for the war against the Austrian troops.

On April 17, 1797, Napoleon signed a preliminary peace agreement with the representatives of the Emperor Francis II. On the same day, a rebellion started in the city of Verona; this event was later named the *Veronese Easter*: following various conflicts, the Venetian troops and a part of the population of Verona, tired of the arrogance of the French, started revolting on the streets and began capturing, disarming, and massacring all the French they came across.

On April 20, a new incident took place, this time in the Venetian lagoon: the French battleship *Le Libérateur d'Italie* attempted to force its way into the Lido. After commanding a retreat, the Venetian

commander of the fort of Sant'Andrea fired artillery and took possession of the French ship after killing its commander.

On April 25, Napoleon declared that he had eighty thousand men at arms and twenty battleships ready to overthrow the Republic of Venice; and on May 1, he published a manifesto in Palmanova that concluded with a formal declaration of war against the Republic.

The night of May 11, the last one before the convocation of the *Maggior Consiglio*, under threat of invasion, the 71-year-old Doge Ludovico Manin pronounced the famous quote: "*stanote no semo seguri gnanca nel nostro leto*" (tonight, we are not safe, not even in our beds). On the morning of May 12, with rumours of conspiracies and the upcoming French attack, the republic's *Maggior Consiglio* met for the last time. A vote was immediately taken, and with 512 votes in favour, 5 abstentions and 20 against, the republic was declared to have fallen. On May 15, the doge left the Doge's Palace permanently announcing in the last decree of the old government the birth of the provisional municipality that took over power the next day, May 16, 1797.

With the treaty of Campoformido, the French transferred the city of Venice and its territories to Austria. The French would then return for ten years between 1805 and 1814. Venice would then be part of Austria until the annexation of Venice to the new state of Italy in 1866 (with the exception of the revolutionary years of 1848 and 1849).

Between 1805 and 1814, the second French domination brought the creation of a scrupulous cadastral map of the city of Venice. This cadastral map, a detailed map of the city along with its reference book, the *Sommarioni*, constitutes the central source of information of this project.

1.2 The Sommarioni dataset

On the 13th of April 1807 in the Regno Italico (founded by Napoleone Bonaparte on the 17th of March 1805), the Decree-Law n° 62 started the cadastral operations on various territories of today's northern Italy. The City of Venice constructed their cadaster between 1808 and 1811.

The Venice 1808 cadaster shows the position and dimension of portions of land (parcels) with their parcel number. It is accompanied by the Sommarioni, a register in tabular form containing details on utilisation and ownership of each parcel. In Venice's case, the Sommarioni are the key to the understanding of these maps. In its original form, the Sommarioni is a register containing parcel location, parcel number on the map, utilisation type, **area (m^2)** and, most importantly: information on the **parcel owner**.

Here below an example of two pages of the Sommarioni.

The DHLAB digitalised the whole Napoleonic land register. The map of Venice was remade in an interactive web map that displays the raw owner text and further details when a parcel is selected. Also, the Sommarioni register was converted into an Excel dataset. See the digital version of the Sommarioni in the `data_pre-processing` directory on the GitHub repository of the project.¹

Here below a screenshot of the digitalised map of Venice on the DHLAB platform.



¹data_pre-processing directory of the GitHub repository: https://github.com/dhlab-epfl/venice-owners-1808/tree/main/data_Sommarioni/data_pre-processing

1.3 Project Goal

This project's primary goals are to standardise the Sommarioni owner entries and disambiguate people present in the register. This work is of great value for two reasons: to make every future usage of the Sommarioni dataset less cumbersome and exception-free and to carry out meaningful data analysis, which can only be done with easily manipulable data.

The standardisation of the Sommarioni will lead the project to the next step: creating the people dataset. This dataset consists of a list of all categorised and disambiguated people extracted from the Sommarioni. Explaining both processes (standardisation and subsequent dataset creation), a specific terminology will be used to differentiate *mentions* of owners in the Sommarioni and actual unique disambiguated *persons* of the new dataset.

This process is accomplished through the following steps:

1. Standardise the Sommarioni owner entries (creation of a standardised version of the dataset).
2. Perform rule-based categorisation of owner types per parcel (Demanio-owned, institution-owned, people-owned).
3. Carry out named entity recognition for people on the standardised dataset and build a new people dataset.
4. Create a web-visualisation of the people dataset enabling a user to query per-family, per-name, or per-parcel owned.
5. Discuss a first analysis of the statistics and insights that can be extracted from the standardised Sommarioni dataset.

Chapter 2

Sommarioni standardisation and named entity recognition

In this section the first two steps of this project will be presented in details: the Sommarioni standardisation and the creation of the new People dataset.

2.1 Sommarioni standardisation

After having studied the dataset in detail, the overall observation is that the owner text entries are too noisy for an efficient and reliable data analysis: owners are not explicitly separated by a standard delimiter, and last names are sometimes missing if the names are related to a common last name in the same parcel entry. Frequently, the whole text is missing and substituted by *suddetto* (meaning "as above"), and several other inconsistencies. Furthermore, parcel entries often contain all sorts of additional information about owners (*fratello*, *sorella*, *eredi*, *vedova*, *di provenienza*, etc).

This stated, there is no general logic or ad-hoc algorithm that would be able to **accurately** correct and standardise the entries in the dataset, if not a very cumbersome case-specific and unscalable one; which, however, will for sure not obtain the same accuracy of a human mind-driven approach. In this regard, the chosen technique for standardisation uses a combination of manual standardisation of entries thanks to Italian language proficiency and a customisable Jupyter notebook modification tool. Fortunately, the acceptable amount of entries (23428) permitted the completion of this approach in a reasonable amount of time.

All the 23428 entries were looked at and edited manually to match the standardisation rules explained in the following sections of this report. This process was strongly aided by the Jupyter modification tool in the code repository: once a recurrent correction is needed, the notebook can be customised to apply this specific correction to all relevant entries in the dataset.

All entries were modified with the certainty of not tampering with historical facts; if this certainty could not be established, the entry, or the specific owner (mention), was left unchanged. The result of this process is the new standardised dataset.

The standardisation process is a five-step process:

1. spelling corrections fix
2. *suddetto* substitution and unknown owners
3. standardisation of terminology
4. categorisation of owner types (main standardisation)
5. categorisation of additional information on owners

This report will discuss the conclusions of this standardisation, reporting the usage rules for the dataset and the parcel assignment protocol applied in the rest of the project. Note that **a detailed step-by step explanation of this process is available in the Appendix A.1 of this report**.

Moreover, the README.md file in the data_processing_Sommarioni directory of the GitHub repository¹ contains further details on the standardisation process.

2.1.1 Standardisation rules (summary)

In this section, we summarise the rules that describe the structure of each parcel owner text in the new standardised dataset. These rules are the guidelines to follow when using the Sommarioni dataset for any scope regarding the owner text (*possessore*) column, which standardised version is the column *possessore_standardised*. In the rest of this section, we refer to an entry as one entry of the *possessore_standardised* column.

Entry examples: pre-standardisation

	Pre-standardisation
1	GRIMANI vedova Morosini Loredana
2	MOROSINI Luigi et Corner Elisabetta
3	DUODO Carlo q. Gerolamo
4	DUODO Carlo, Domenico, e Pietro Fratelli q. Gerolamo
5	FINI suddetto [Vincenzo q. Gerolamo]

¹data_processing_Sommarioni directory of the GitHub repository: https://github.com/dhlab-epfl/venice-owners-1808/tree/main/data_processing_Sommarioni

General rules

- Inside an entry every owner (mention) is separated by the unique separator ',' (comma).
- Inside an entry all categorised references to Venice are in CAPS.
- Inside an entry all categorised references to Institutions are in CAPS.
- Some of the properties of Venice were recently owned by institutions; these are marked as *di provenienza*.
- Some of the properties of Institutions are under the usufruct of People; these are marked as *goduta da*.
- Inside an entry, all family names and person titles are in CAPS, while persons' first names are in lower case (except the first letter).
- Owner entries often have additional information or specifications; these are called notes. Notes appear, wrapped in parenthesis, near the owner's name, in three different formats (see appendix A.1.5).

Each of the 23395 resolved entries can be categorised using only the rules presented here above.

Entry examples: post-standardisation

	Pre-standardisation	Post-standardisation
1	GRIMANI vedova Morosini Loredana	GRIMANI Loredana (Vedova MOROSINI)
2	MOROSINI Luigi et Corner Elisabetta	MOROSINI Luigi, CORNER Elisabetta
3	DUODO Carlo q. Gerolamo	DUODO Carlo (q. Gerolamo)
4	DUODO Carlo, Domenico, e Pietro Fratelli q. Gerolamo	DUODO Carlo, DUODO Domenico, DUODO Pietro [Fratelli q. Gerolamo]
5	FINI suddetto [Vincenzo q. Gerolamo]	S FINI Vincenzo (q. Gerolamo)

Assigning parcels to owners (process)

Once the entries follow the above rules, the goal is to traverse the entire dataset and map each owner to an owner type (i.e., Venice, Institution, Person). This is the process of assigning parcels to owners.

This process is carried out in three-steps:

1. A loop through all the entries looks for owners of type City of Venice and assigns the parcel. If the number of owners in the entry is 1 (i.e. only the City of Venice), then the entry is marked as resolved. Otherwise, update the dataframe to insert the string containing the rest of the owners.

2. A loop through all unresolved entries looks for owners of type Institution and assigns the parcel. If no other owners except institutions are found, the entry is marked as resolved. Otherwise, update the dataframe to insert the string containing the rest of the owners.
3. A loop through all unresolved entries looks for owners of type Person and assigns the parcel. If no other owners except people are found, the entry is marked as resolved. Otherwise, the entry is ignored.

After this three-step procedure, a total of 23395 out of 23428 is marked as resolved, 33 are unresolved since they do not correspond to any of the above categorisations of owner types.

Classification of parcel owner type

During parcel assignment, the owners of a parcel have to be mapped to one of the three owner types. In order to recognise owner types, the following rules apply:

- **City of Venice** - if the entry contains one of the categorised references to Venice (see Appendix A.1.4 - City of Venice).
- **Institution** - if the entry contains one of the categorised references to Institutions. (see Appendix A.1.4 - Institutions).
- **Person** - if the entry owner is not Venice and not Institution, then check one of the following conditions:
 - get the CAPS characters (i.e. the family name) in the owner text and check whether its length is > 0 (i.e. it has a family name).
 - otherwise, check whether this owner is part of the exceptions (*Eredi, Ricevitori, Eredità, Concorso dè Creditori*).

Each of the above-listed owner types can appear in an owner entry one or more times; all possible combinations of these owners is possible in a single owner entry.

Completed the five-step process, we have obtained the standardised version of the Sommarioni *possessore* entry with which we can now carry out meaningful data analysis queries and start the creation of new datasets based on these investigations as, for instance, the People dataset (explained in the below section).

2.2 Named entity recognition for persons

Now that we can access the owner data according to a few fixed rules, we can perform data examination and create new datasets by manipulating and aggregating this data.

The people dataset is the most essential one: it is at the heart of this project's goal. The people dataset is a collection of all disambiguated people extracted from the Sommarioni, along with their personal information and details on the owned parcels.

The scope is to identify people in the Sommarioni and link them with their relatives using the information gathered in the owner text entry of each parcel. The information that allows us to understand the linking between people is explained in the People section of "Additional information on owners" in Appendix A.1.5.

However, before constructing the linkage between owners, it is necessary to convert mentions (owner references) into unique people.

When the word **mention** is used, it is always referred to a single mention of an owner found in the Sommarioni; when the word **person** is used, it is always referred to the unique disambiguated person result of a merge of different mentions. The person is guaranteed to be unique. Nevertheless, there could be scenarios in which a mention, which is the same person of a unique person, appears separately as another unique person. This is possible because the merge criteria used in this project requires sufficient information on both owners to approve the merge.

One mention, for instance, could be *MANIN Ludovico* at parcel 123; another mention could be *MANIN Ludovico* at parcel 234; the goal is to create a protocol determining whether these two references can reasonably be considered the same person. If these two owners are considered the same person, then the information of the two mentions gets merged into a unique person object. The protocol that determines whether the merge occurs or not is given hereunder. More details on the merging phase of the project can be found in the `README.md` file of the `people_linking` directory.²

Creating Persons

As a first step, the list of all people mentions (owner references) is traversed, and one person object is created for each reference. A person object has various attributes which could be assigned or not assigned depending on whether the corresponding attribute information is present in the Sommarioni for this person.

²people_linking directory of the GitHub repository: https://github.com/dhlab-epfl/venice-owners-1808/tree/main/people_linking

The person object has the following attributes:

- `uid` - unique ID of the person in the dataset
- `nucleus_uid` - unique family nucleus
- `family` - last name(s)
- `name` - first name(s)
- `title` - person's Title
- `father` - father's name
- `father_is_q` (bool) - True if the father is dead, False otherwise
- `mother` - mother's name
- `siblings` - names of all siblings
- `husband` - husband's name
- `husband_is_q` (bool) - True if husband is dead, False otherwise
- `other_notes` - any other note
- `parcel_ids` - all the unique parcel IDs (unique in the `Sommarioni_dataset.xlsx`) where this person appears as the owner or one of the owners.
- `merged_ids` - all the unique IDs of the owners created at the beginning that were merged to this person during the merging phase.

When a person object is created, any attribute that can be filled in using information found in the owner text is assigned. This process yields **21589 owners** (Figure 2.1) that will be merged into unique people in the following phase.

Merging protocol

The merging phase traverses each person created from a mention and checks for attributes in common which may trigger a merge. The minimal necessary condition for triggering a merge is the same name and the same family name. However, by default, the protocol is configured to be stricter: it triggers a merge only if the two owners have the same name, same family name and **at least one same attribute** (i.e. same father, same siblings, same title).

The algorithm can be configured on a looser merge condition: if `accept_same_name_only` is set to True, this will trigger 14684 merges (against 9312) since the same name and last name is sufficient

to merge. When merging two owners, a union of their information is assigned to the corresponding unique person.

Finally, a dataset is created (Excel and JSON) for the list of unique people (Table 2.2).

Table 2.1: Examples of standardised owner text entries

	post-standardisation
10	MARTINELLI Stefano, SACERDOTE MARTINELLI Giorgio [Fratelli q. Carlo]
11	VENIER Maria (q. Pietro - Vedova MOROSINI)

Table 2.2: Examples of the above full entries in the People Dataset

uid	n_uid	family	name	title	father	father_q	mother	siblings	husband	husband_q	notes	merged_ids	parcel_ids
1	4	MARTINELLI	Giorgio	SACERDOTE	MARTINELLI Carlo	True		MARTINELLI Stefano				10	
2	4	MARTINELLI	Stefano		MARTINELLI Carlo	True		MARTINELLI Giorgio				10	
3	8	VENIER	Maria		VENIER Pietro	True			MOROSINI	True		11	

This default merging criteria yields **9312** merge operations (Figure 2.2 & 2.3) and a total of **12277 unique persons** (Figure 2.1) created from the Sommarioni. During the merging phase, a register of these merges and their reason is kept in the **merge log**. The reasons that trigger a merge operation are the following: the two mentions must have the same family name, the same first name and **at least one** of the following conditions satisfied:

- the mention is *suddetto* (i.e. explicitly noted as the same person as above)
- the two mentions have the same father
- the two mentions have the same mother
- the two mentions have at least one same sibling
- the two mentions have the same husband
- the two mentions have the same title
- the two mentions have a same other note (i.e. any note not categorised above)

Examples: post-merge

	post-standardisation
10	GRIMANI Loredana (Vedova MOROSINI)
11	DUODO Carlo (q. Gerolamo)
12	DUODO Carlo, DUODO Domenico, DUODO Pietro [Fratelli q. Gerolamo]

Table 2.3: Pre-merged people dataset

uid	n_uid	family	name	...	father	...	siblings	husband	...	parcel_ids
1	6	GRIMANI	Loredana	MOROSINI	MOROSINI	...	10
2	7	DUODO	Carlo	...	Gerolamo	11
3	8	DUODO	Domenico	...	Gerolamo	...	DUODO Carlo, DUODO Pietro		...	12
4	8	DUODO	Pietro	...	Gerolamo	...	DUODO Carlo, DUODO Domenico		...	12
5	8	DUODO	Carlo	...	Gerolamo	...	DUODO Domenico, DUODO Pietro		...	12

Table 2.4: Post-merged disambiguated People dataset

uid	n_uid	family	name	...	father	...	siblings	husband	...	parcel_ids
1	6	GRIMANI	Loredana	MOROSINI	MOROSINI	...	10
2	7	DUODO	Carlo	...	Gerolamo	...	DUODO Domenico, DUODO Pietro		...	11, 12
3	7	DUODO	Domenico	...	Gerolamo	...	DUODO Carlo, DUODO Pietro		...	12
4	7	DUODO	Pietro	...	Gerolamo	...	DUODO Carlo, DUODO Domenico		...	12

* note that DUODO Carlo (id 2) of the first mention was merged with DUODO Carlo (id 5) of the second mention because the two owners had same name, same last name and same father. The smallest uid and nucleus_uid is kept.

Merge log

The merge log dataset is also written in an Excel and JSON file. This dataset contains the **linking log** of the merging phase. It contains all non-unique people that were merged along with the reason that triggered the merge encoded in a bit-vector. Entries of the Linking Dataset are as below (Table 2.5).

- uid - this is the ID of the person's copy. This ID is built on top of the original person uid in the `people_Sommarioni_dataset.xlsx`. The uid of a copy for ID 123 will always start with `123_`: e.g. two copies of a Person with uid 123 will have IDs `123_1` and `123_2`, respectively.
- owner_uid - this is the owner's ID that was merged into the unique person object.
- parcel_id - this is the unique ID of the parcel (unique in the `Sommarioni_dataset.xlsx`) where this person appears as the owner or one of the owners.
- S - if this column is True this person was merged because it was **SUDDETTO**
- SF - if this column is True this person was merged because of **SAME FATHER**
- SM - if this column is True this person was merged because of **SAME MOTHER**
- SS - if this column is True this person was merged because of **SAME SIBLINGS**

- SH - if this column is True this person was merged because of SAME HUSBAND
- ST - if this column is True this person was merged because of SAME TITLE
- SO - if this column is True this person was merged because of SAME OTHER NOTE
- SNO - if this column is True this person was merged because of SAME NAME ONLY

Table 2.5: Example of Merge Log entries

uid	owner_uid	parcel_id	S	SF	SM	SS	SH	ST	SO	SNO
0_1	24	635	True	False						
0_2	25	282	False	True	False	True	False	False	False	False
2_1	191	344	True	False						
3_1	223	776	False	True	False	False	False	True	False	False
3_2	332	997	False	True	False	False	False	True	True	False
9_1	567	775	False	True	False	False	False	True	False	False

The **last entry** of the Merge Log shows the count of each merge reason (Table 2.6).

Table 2.6: Merge Log - last entry

uid	owner_uid	parcel_id	S	SF	SM	SS	SH	ST	SO	SNO
merge_type_count	-	-	3455	5067	0	1057	250	60	229	0

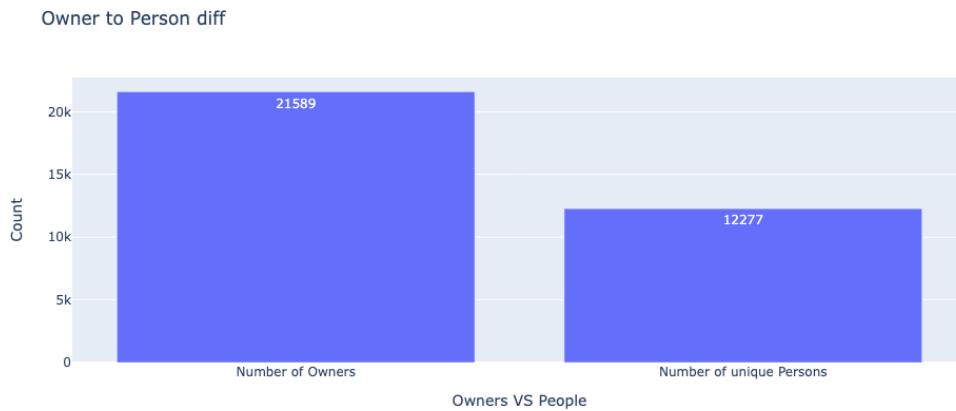


Figure 2.1: Number of mentions (owners) VS number of unique persons

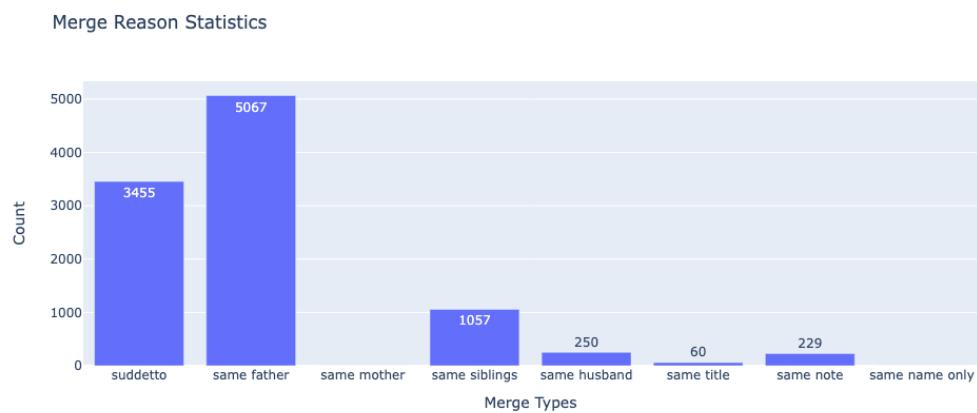


Figure 2.2: Merge reason distribution

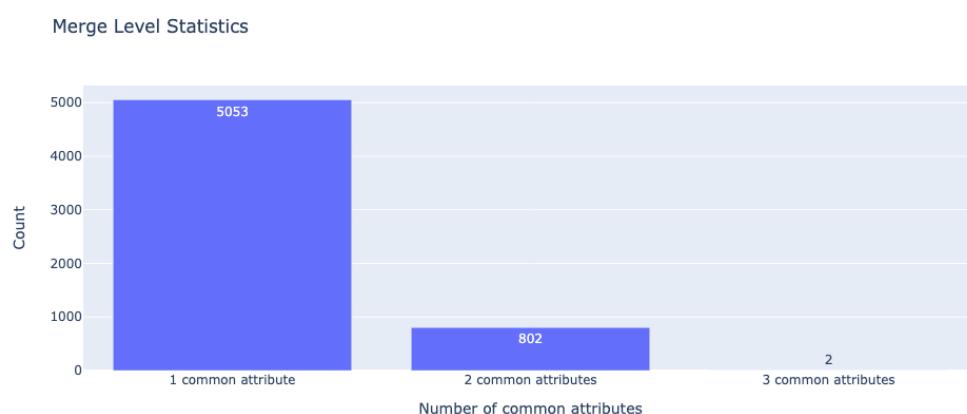


Figure 2.3: Merge level - number of common attributes

2.3 Pre-computed statistics

Other smaller datasets have been created from the standardised Sommarioni in order to visualise insightful statistics on the data. These smaller datasets contain aggregated data concerning the distribution per owner type, the possession distribution per-family and per-institution type of the parcels and the confiscation analysis. These JSON files are all stored in the `research_insights/new_datasets/` directory.³

Owner type distribution

The file `owner_type_distribution.json` contains a simple parcel count of how many parcels are owned by people, institutions or Venice. The sum of these values is higher than the total number of categorised parcels (23395) since various of them can be owned, for instance, by both Venice and an institution or by an institution and a family.

Owner type	Parcel count
Venice	1949
Institutions	1922
People	19817

Family ownership distribution

The files `family_possession_parcel_count_m1.json`, `family_possession_parcel_count_m2.json`, `family_possession_area_m1.json`, `family_possession_area_m2.json` contain the distribution per-family of parcel ownership. File 1 & 2 report the parcel count while files 3 & 4 the sum of the total area owned. These datasets contain statistics on the **3244** families found in the Sommarioni.

Family	Parcel count
CORNER	511
CONTARINI	455
MOROSINI	439
...	...

Family	Area [m ²]
CONTARINI	157.615
CORNER	138.982
MOROSINI	129.109
...	...

³`new_datasets/` directory of the GitHub repository: https://github.com/dhlab-epfl/venice-owners-1808/tree/main/research_insights/new_datasets

Confiscation distribution

The files `confiscation.ParcelCount.json` and `confiscation.Area.json` contain the total parcel count and area of confiscated properties, grouped by property type.

Property type	Parcel Count
SCUOLA	391
MONASTERO	346
CONVENTO	31
...	...

Property type	Area [m²]
MONASTERO	181.469
SCUOLA	147.937
CONVENTO	16.391
...	...

Inter-family parcel sharing

The file `interFamilyParcelSharing.json` contain the total shared parcels count for each family couple (e.g. *RENIER-CORNER*). When one shared parcel has more than two families (e.g. *RENIER, CORNER, FONTE*), all the possible pairs combinations created by the list of family owners is incremented by +1.

Family couple	Parcel Count
GIUSTINIAN - RECANATI	52
RENIER - CORNER	42
CONTARINI - VENIER	41
...	...

Chapter 3

Web-visualisation

With the People dataset in place, we can now build a web visualisation to link the interactive map from the DHLAB website for the Venetian cadaster to a People page where the information on the owners of the selected parcel is displayed.

The idea of the People page is to enable the user to query the people dataset by first or last name, by person ID, by parcel ID or by family nucleus ID. The result of the query appears in a response list, and on click of one of the person objects returned by the query, all information available on this person will be displayed to the user.

The People page is available on the DHLAB website for the venetian cadaster at the People tab.¹

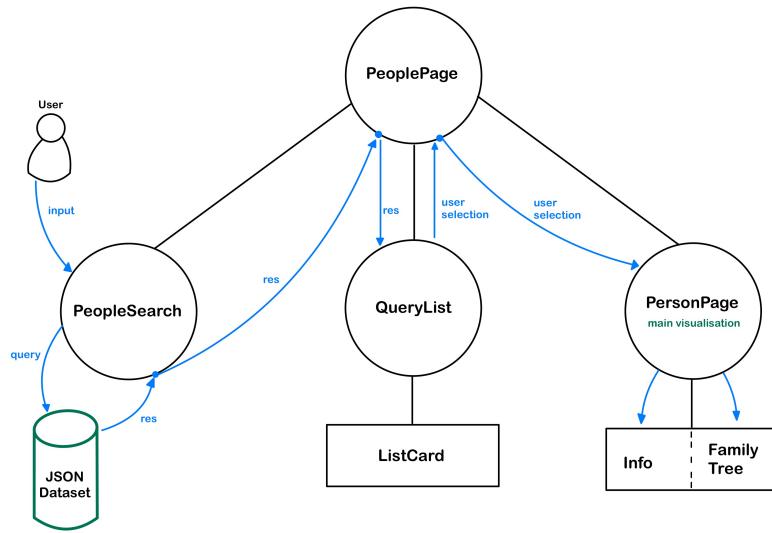
3.1 Design

The design of the visualisation is straightforward. The People page comprises three main components: PeopleSearch, QueryList and PersonPage. The PeopleSearch component manages the user input and queries the dataset accordingly. It has four query sections (`name`, `personID`, `parcelID`, `nucleusID`) and filters the entries of the dataset returning the list of all persons that match the query to the mother component (i.e. PeoplePage), which in return feeds this response list to the QueryList component. From the QueryList component, the user can scroll through the results and select a person. On selection, the PersonPage component pops up, displaying the person's information.

* Design schema on next page

¹People page on the DHLAB website for the venetian cadaster: <https://scanvan-test.dhlab.epfl.ch/people>

Design schema



3.2 PeopleSearch

The People page is usually reached through an interaction with the map of Venice on the homepage: on click of a parcel, the person page is opened with the list of owners for the selected parcel. However, the PeopleSearch component enables the user to query the dataset regardless of the connection with the homepage map.

You can lookup people by name, ID, parcel, or by family nucleus ✖

NAME	PERSON ID	PARCEL ID	FAMILY NUCLEUS ID
------	-----------	-----------	-------------------

USE EXACT MATCH

SEARCH IN SOMMARIONI

The toggle button allows the user to search only for exact matches. For instance, querying for family name *MORO* will display as results also all *MOROSINI*. While, with *use exact match* toggled, only members of the *MORO* family will be present in the query result.

3.3 QueryList

The query list displays all matching results for the query and allows the user to select one of the results to display its PersonPage. Furthermore, it keeps the results memorised until the next search so that the user can examine each person and return to the result list without reloading.

6 matches found for this query.

The screenshot shows a list of six search results for the query "Sommarioni". Each result is a card with the following structure:

- Header:** People found in the Sommarioni
- Information:** First name: Carlo, Family: DUODO, UID: 118, Family Nucleus ID: 132, Owned Parcel IDs: 131, 132
- Details:** First name: Carlo, Family: DUODO, Father: DUODO Gerolamo, Siblings: DUODO Domenico, DUODO Pietro, UID: 229, Family Nucleus ID: 259, Owned Parcel IDs: 241, 242, 243, 247, 248, 8910, 8941, 9421, 9879, 9881, 9882, 13758, 14236, 14237, 15544, 15551, 15552, 16892, 16893
- Information:** First name: Carlo, Family: DUODO, UID: 4412, Family Nucleus ID: 4860, Owned Parcel IDs: 4635
- Information:** First name: Carlo, Family: DUODO, UID: 4415, Family Nucleus ID: 4863

3.4 PersonPage

The person page is the main visualisation component; it is divided into a text and a family tree section.

The text section displays all the information available on this person in the dataset: name, last name, title, father, mother, siblings, husband, additional notes, all parcel IDs this person owns and all merged IDs. By clicking on the ID tags of the merged IDs, the page displays the reason for the merge (e.g. *same father*).

The family tree section displays the tree of the family with colour-coded nodes that illustrate the member relationship. It is an elementary version of a family tree which supports only two generations, as it was done specifically for this project's purpose. The tree is interactive and can redirect the user to the person page of members of the same family. However, redirection is possible only if the family member is also an owner in the Sommarioni. For instance, usually, fathers are not owners since they appear as additional information on the owner, while siblings are usually also owners.

Person page UI

ID 123

Teresa MOROSINI

Title [text input]

Family NUCLEUS ID
234

FATHER DEAD MOROSINI Pietro

MOTHER CONTARINI Elisabetta

SIBLING MOROSINI Domenico

SIBLING MOROSINI Alberto

HUSBAND ALIVE VENDRAMIN Giovanni

ADDITIONAL NOTES
ramo di S. Stae

OWNED PARCEL IDs
21 980 5788 9984 10123 14888

OWNER MENTIONS IDs
235 8154 8187 9054 12318

Family Tree

```

graph TD
    Pietro((MOROSINI Pietro)) --- Line1
    Elisabetta((CONTARINI Elisabetta)) --- Line1
    Line1 --- Line2
    Line2 --- Domenico((MOROSINI Domenico))
    Line2 --- Alberto((MOROSINI Alberto))
    Line2 --- Teresa((MOROSINI Teresa))
    Teresa --- Giovanni((VENDRAMIN Giovanni))
  
```

*note: the person represented here above is for demonstration purposes only (in order to show a complete visualisation in a case where we have all the possible pieces of information on the owner).

3.5 URL search scheme

The connection between the People section and the Venice map component on the Cadaster interface happens by linking the parcel on the map through URL search. The URL scheme of the People page enables search by parcelID and by personID.

By searching <https://scanvan-test.dhlab.epfl.ch/people?parcelID=13758> the page will directly display the query result list for owners of the parcel with id 13758.

At the moment of submission of this report, the scheme for URL search in the People dataset is already functioning (i.e. searching for <https://scanvan-test.dhlab.epfl.ch/people?parcelID=13758> will yield the corresponding results), while the connection that redirects the user to the people page by clicking on the parcel is still work in progress and will be completed before the final project submission.

Chapter 4

Data insights

One significant advantage of having standardised the owner entries of the Sommarioni is the potential to structure the data and perform insightful data analysis. The new Sommarioni dataset can be exploited to analyse three main research questions: ownership distribution, inter-family parcel sharing and confiscations statistics.

4.1 Family Ownership Distribution

The ownership distribution analysis on families allows us to understand (and visualise) who were the principal real estate owners in Venice at the beginning of the XIX century. These analytics are executed directly on the Sommarioni dataset (and not on the people dataset) for one specific reason: numerous owner entries have owner text in which a specific person cannot be identified, but a family clearly owns the parcel. For instance, the owner strings *GRIMANI* or *MOROSINI* (*Eredi del fù Andrea*) will not trigger the instantiation of a person entry in the dataset (since a name and last name cannot be identified); nevertheless, it is undoubtedly owned by the two respective families.

Ownership distribution can be computed in several ways. This report considers ownership **per number of parcels** and ownership **per total area owned**. Furthermore, both computations can be examined as **per-family** or **per-family normalised**. Per-family count considers a set of last names owning the parcel (i.e. each family name appears once and counts as 1). While, per-family normalised count considers a list of names and the ownership as divided by the number of owners.

For instance, consider the following owner text: *LOREDAN Giovanni, LOREDAN Antonio, ZEN Pietro*

In per-family count the algorithm will assign +1 for the *LOREDAN* family and +1 for the *CONTARINI* family; in per-family normalised count instead, it will assign two times $+\frac{1}{3}$ to *LOREDAN* and one time $+\frac{1}{3}$ to the *ZEN* family.

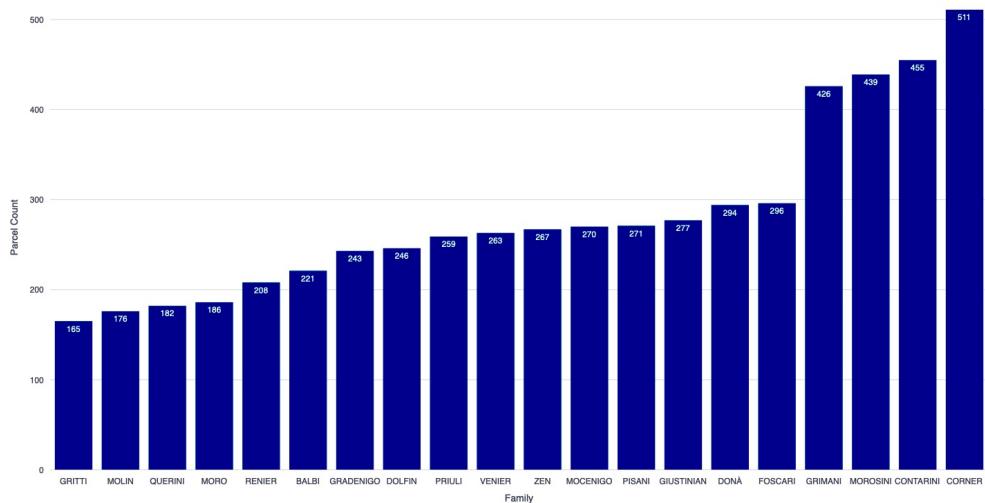
4.1.1 Ownership per number of parcels

For both types of count (i.e. per-family and per-family normalised) the top 20 real estate owners for number of parcels are following families:

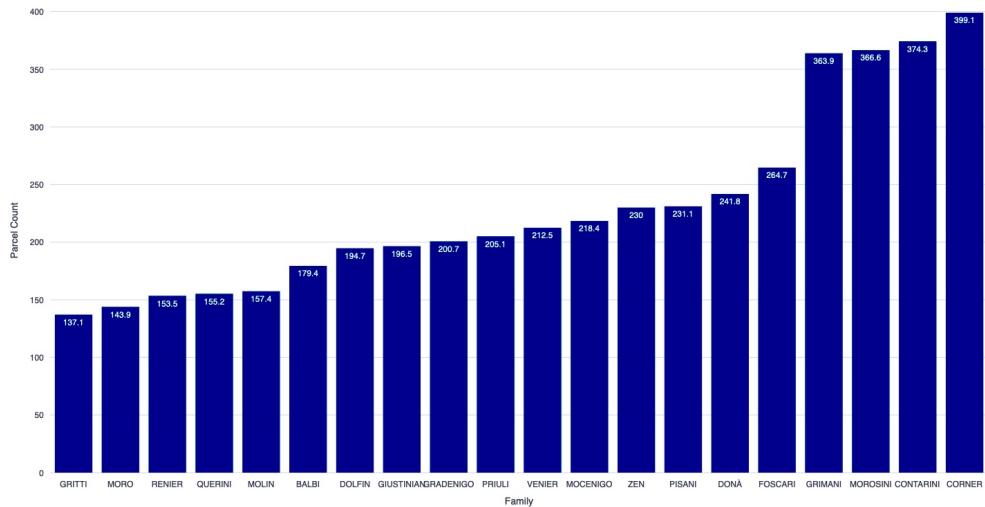
CORNER, CONTARINI, MOROSINI, GRIMANI, FOSCARI, DONÀ, GIUSTINIAN, PISANI, MOCENIGO, ZEN, VENIER, PRIULI, DOLFIN, GRADENIGO, BALBI, RENIER, MORO, QUERINI, MOLIN, GRITTI.

The mean number of possessions, using per-family count, is 7.4 parcels per family, using per-family normalised count 6.1 parcels per family. Here below we see the parcel count for the top 20 owners. In both cases the last names are the same, while the ordering changes depending on the count-type.

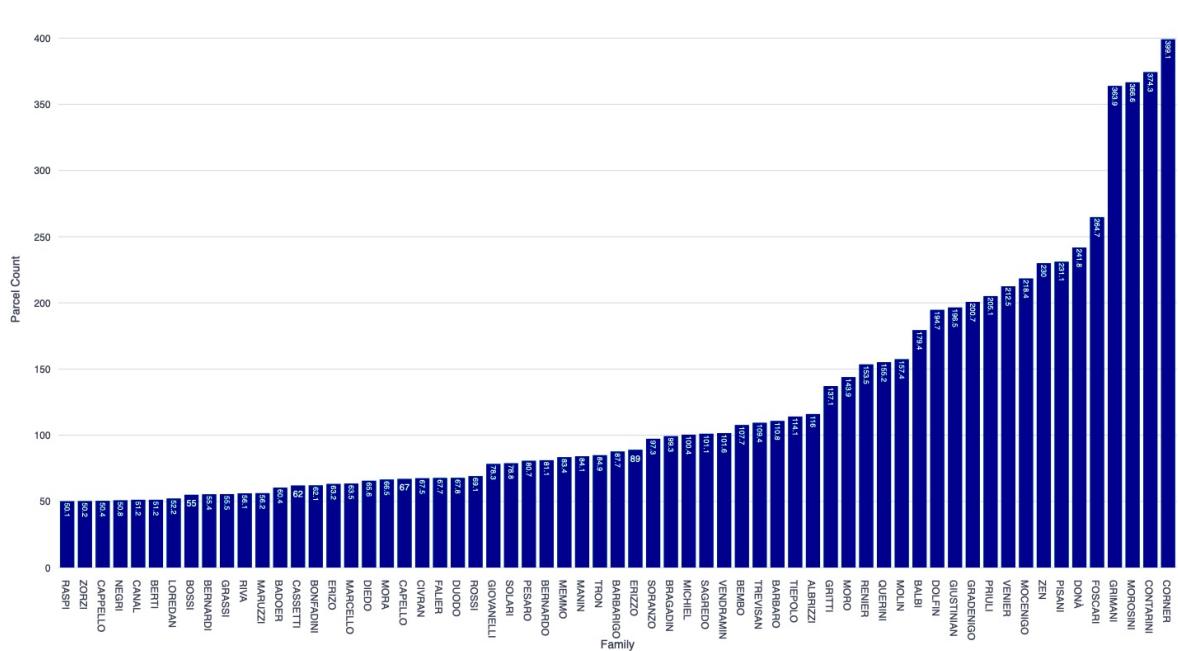
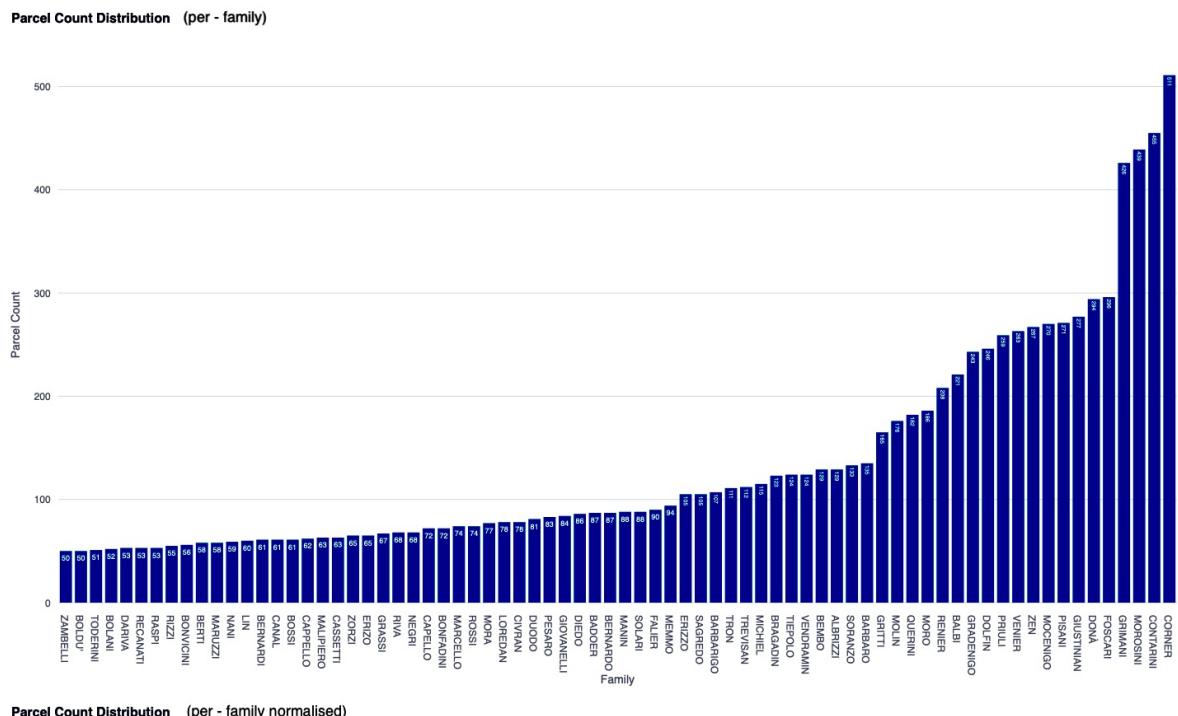
Parcel Count Distribution (per - family)



Parcel Count Distribution (per - family normalised)



Looking more generally at the chart showing all families having more than 50 parcels, we observe the following results.



¹*Note - an interactive version of these charts is available as a streamlit app in the code repository¹.

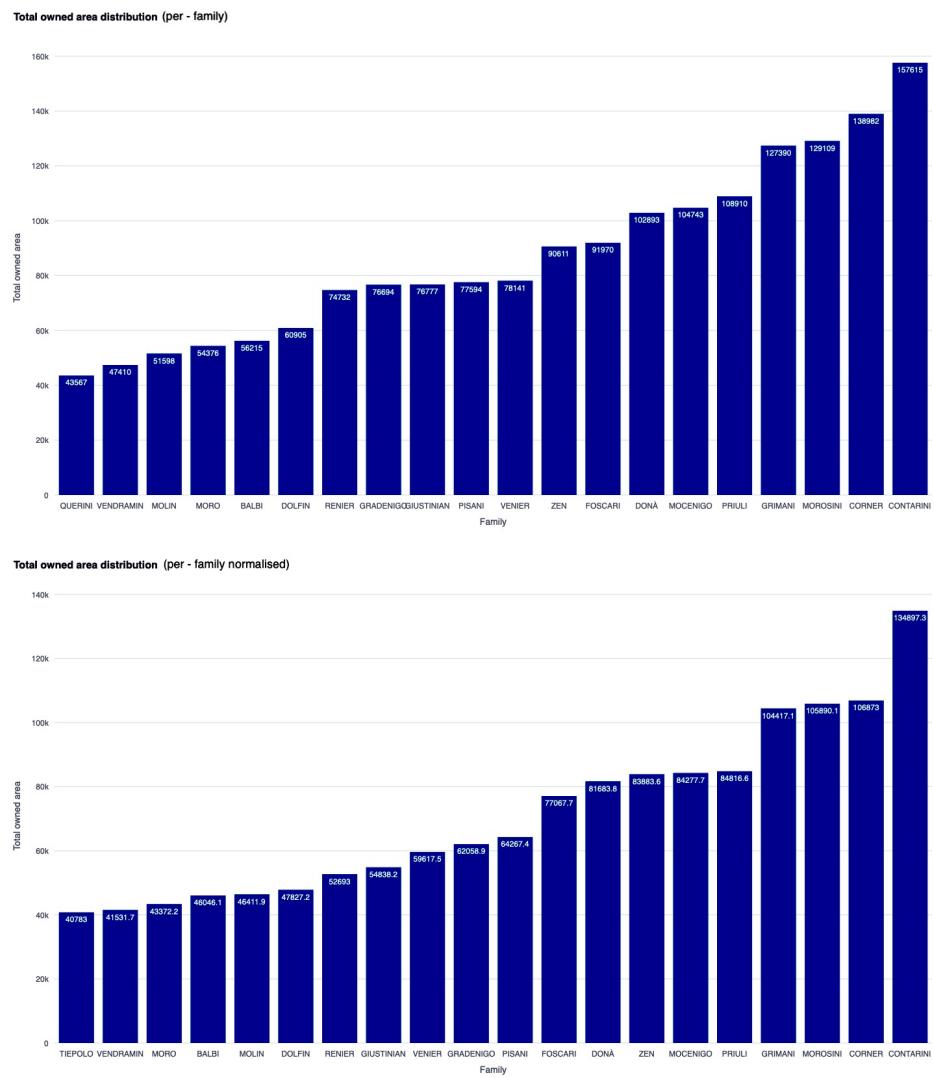
¹ Streamlit app in the `dashboard_statistics.py` file in the GitHub repository: https://github.com/dhlab-epfl/venice-owners-1808/tree/main/research_insights

4.1.2 Ownership per area

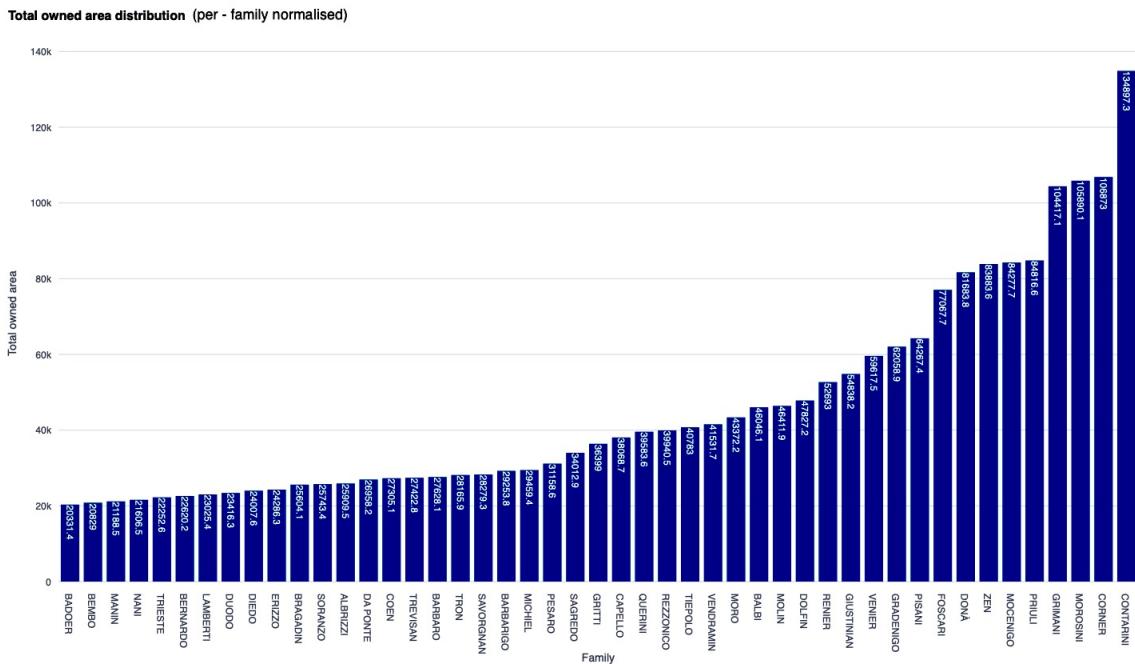
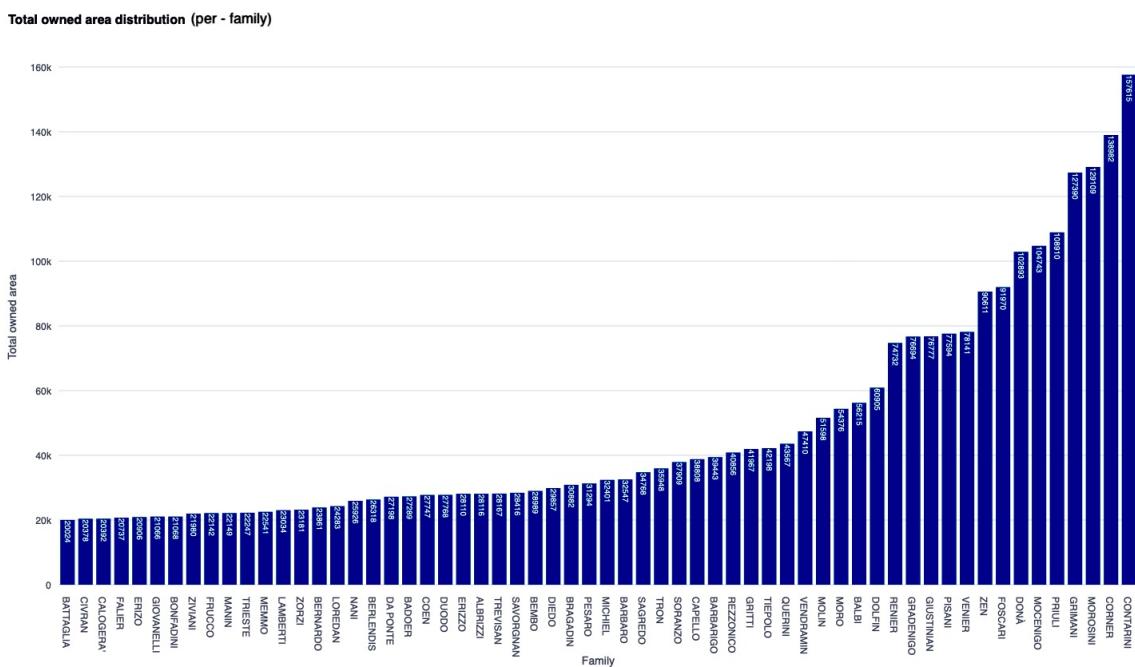
For both types of count (i.e. per-family and per-family normalised) the top 19 real estate owners for total squared meters owned are following families:

CONTARINI, CORNER, MOROSINI, GRIMANI, PRIULI, MOCENIGO, DONÀ, FOSCARI, ZEN, VENIER, PISANI, GIUSTINIAN, GRADENIGO, RENIER, DOLFIN, BALBI, MORO, MOLIN, VENDRAMIN. The 20th position goes to QUERINI based on per-family ownership or to TIEPOLO based on per-family normalised.

The total number of squared meters of Venice's real-estate in 1808 is around $7.136.189m^2$. The mean total area per family is $2115.7m^2$ (per-family count) or $1750.3m^2$ (per-family normalised count). Here below we see the total area for the top 20 owners.



Looking more generally at the chart showing all families owning more than $20000m^2$, we observe the following results.



²*Note - an interactive version of these charts is available as a streamlit app in the code repository².

²Streamlit app in the dashboard_statistics.py file in the GitHub repository: https://github.com/dhlab-epfl/venice-owners-1808/tree/main/research_insights

4.1.3 Family ownership distribution considerations

Upon examining the outcomes based on occurrence frequency, it becomes apparent that the observed results likely stem from the fragmentation and dispersion of real estate ownership within the same family lineage. Notably, the families of Corner, Contarini, Morosini, and Grimani emerge as dominant in terms of both ownership and distribution. These families undeniably constitute the longstanding land framework of the city.

Interestingly, even when evaluating ownership by specific areas, these families consistently occupy the top four positions, attesting to their substantial presence within the urban landscape. Stemming from the ancient nobility, these families trace their lineage back to the imperial patriciate of the city's formative centuries. Moreover, as dogal families, they have produced a significant number of doges and have played prominent roles not only within the city but also in the land and maritime dominions of the Republic of Venice.

4.2 Inter-family parcel sharing

One fascinating point to analyse is with which frequency and between which families were parcel ownership shared. The set of people-owned parcels was traversed, and the count of shared ownerships was stored in a key-value map, where the key is a family connection (e.g. *RENIER-CORNER*) and the value is the total number of shared parcels.

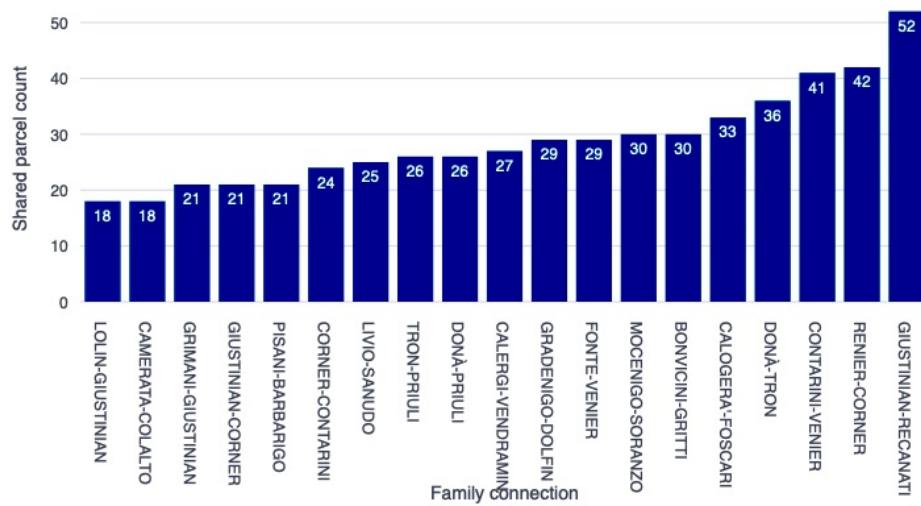
When one shared parcel has more than two families (e.g. *RENIER, CORNER, FONTE*), all the possible pairs combinations created by the list of family owners is incremented by +1. For instance, if a parcel is shared by *RENIER-CORNER* then the connection *RENIER-CORNER* is incremented by +1; if a parcel is shared between *RENIER, CORNER, FONTE* then the three connections *RENIER-CORNER*, *RENIER-FONTE* and *FONTE-CORNER* are incremented by +1.

We find in the top 5 families sharing parcels the connections:

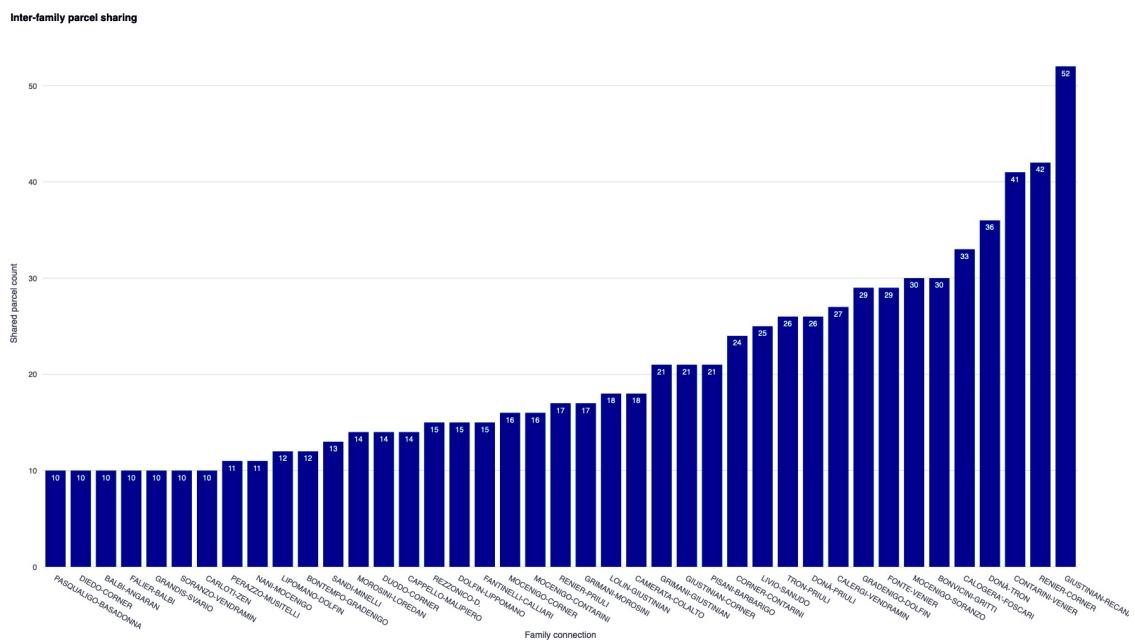
- *GIUSTINIAN - RECANATI* with 52 shared parcels.
- *RENIER - CORNER* with 42 shared parcels.
- *CONTARINI - VENIER* with 41 shared parcels.
- *DONÀ - TRON* with 36 shared parcels.
- *FOSCARI - CALOGERÀ* with 33 shared parcels.

Here below we find the distribution chart for the top 20 family connections.

Inter-family parcel sharing



Here below the distribution chart for all family connections sharing more than 10 parcels.



*Note - an interactive version of these charts is available as a streamlit app in the code repository ³.

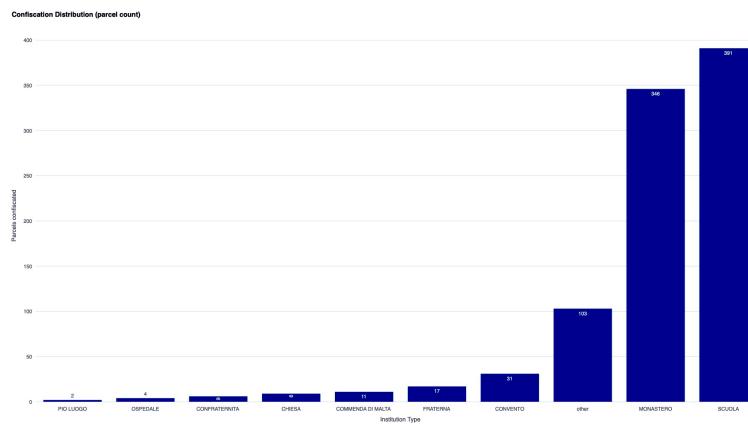
³ Streamlit app in the dashboard_statistics.py file in the GitHub repository: https://github.com/dhlab-epfl/venice-owners-1808/tree/main/research_insights

4.3 Confiscation statistics

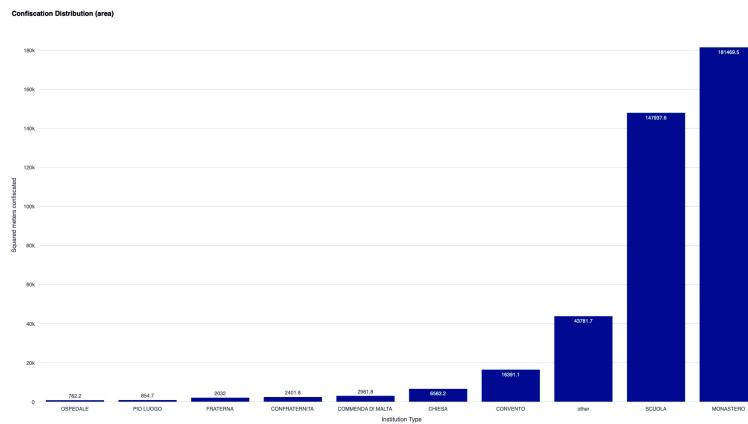
As we recall from the introduction of this report, when Napoleone Bonaparte ended the millenary Republic of Venice, he confiscated numerous properties from various institutions. In the 1808 Cadaster, we have the rare chance of having these confiscated parcels explicitly denoted as *di provenienza di ...*, namely, *once the property of ...*. This enables us to broadly quantify the amount of wealth that institutions had to give up in favour of the Demanio at the beginning of the XIX century.

The total number of confiscated parcels, according to the Sommarioni, amounts to **920 parcels**, yielding a total of around **405.195m² confiscated**. Here below the statistics of confiscation divided per property type. In order to compute the confiscation analysis, this report took into consideration all the parcels that are owned by Venice and that were tagged as *di provenienza* or one of its variations (see Appendix A.1.3). However, there exist other infrequent denominations that can represent confiscated parcels; these are not taken into consideration. Therefore, the below statistics are significantly representative of the insight addressed but have yet to be exhaustive.

4.3.1 Confiscation per number of parcels



4.3.2 Confiscation per area



Chapter 5

Future work

5.1 Named entity recognition for institutions and Venice departments

Currently, detailed categorisation and disambiguation have been done only for people and families. The next logical step will be to organise institution types (*Chiesa, scuola, congregazione*) and to categorise specific institutions (*Scuola di San Rocco, Congregazione della Carità, etc.*). This categorisation will lead to an interesting possession distribution analysis also done on institutions. Moreover, once institutions are precisely organised and tagged, a confiscation analysis per-institution would result in engaging insights.

Furthermore, the same can be done for parcels owned by the city of Venice. As we have seen, also properties owned by Venice are of different types (*ufficio, piazza, ministero, etc.*), and some belong to various departments (*Ufficio del Casastico, Ministero delle Finanze, Ufficio del Censo, etc.*). Given that the standardised Sommarioni dataset enables an easier manipulation of the data, these categorisations will also yield interesting possession analysis, which with the support of web visualisation, become authentic insights.

5.2 Web visualisation extensions

Currently, all the exciting data insights discussed in this report are fixed charts inserted as images or as part of a jupyter notebook, which is not very useful for users. The appropriate next step in this regard is to create a data visualisation page on the current DHLAB website for the Venetian cadaster inserting interactive plots and charts to make the user engaged and participative in these insights.

* examples on the next page

Some examples of visualisation could be:

- Display parcel ownership statistics (both as parcel count and as squared meters):
 - per family, per person
 - per institution, per institution type
 - per Venetian administration department
- Display confiscation statistics (both as parcel count and as squared meters):
 - general overview
 - specific per institution
- Dedicated interactive visualisation of inter-family parcel sharing in a graph format: visualise the families sharing ownership of parcels and which with frequency.
- Map colour coding: per owner type, per family, per single person, per institution, per institution type, per department.

5.3 People dataset expansion

One of the primary outcomes of this project is the People dataset. However, this dataset is uniquely based on data found in the Sommarioni. An interesting future work on this matter is to merge information from other datasets, such as the birth or marriage register, or any other document which could contribute to verifying and adding details on these families.

A good practice would be to determine a high-level data structure that could generalise to the information one can realistically find on these families and their members. Once a general data structure has been established, future projects can add data on these families or new ones; it is also interesting to expand this information with data from a different period of the history of Venice (e.g. the 1741 *Catastici* or the Austrian cadaster of the XIX century).

This will yield a central dataset with a standard data structure on which to build on top.

5.4 Spatial analysis

This work was mainly based on the tabular Sommarioni. However interesting spatial analyses could be done by combining it with the vectorized cadaster extracted by the DHLAB from the original cadastral maps.

This process would enable a study into which areas were mainly occupied by which families. It would be interesting to cluster families according to the geographical position of their ownerships and discuss hypotheses on inter-family relations that emerge from the results of this clustering.

Chapter 6

Conclusions

Summing up the tasks accomplished by this project, we recall the standardisation of the Sommarioni owner entries that allowed the rule-based categorisation of owner types into Venice, institutions and people. This led to named entity recognition of venetian real-estate owners, with the consequent creation of the new people dataset containing all information extracted from the Sommarioni on these owners.

The people dataset is made available in Excel and JSON formats; or through a web visualisation (on the DHLAB website for the Venetian cadastre) that allows a user to query the dataset per-family, per-name, or per-parcel owned. Furthermore, the creation of minor datasets of pre-computed statistics on ownership type and family ownership distribution, inter-family parcel sharing and confiscation analysis are available for usage in the code directory or to visualise through interactive charts implemented through the Streamlit web application in this projects GitHub repository.¹

Most importantly, the project has delivered the first building block of an organised structure on which to build future initiatives related to the Venice project. These could include expanding the people dataset with other sources of information, creating new visualisations and charts for dataset statistics or adding similar information as the one treated in this project but related to other centuries of the unique, extraordinary and surprising history of the Republic of Venice.

¹GitHub repository: <https://github.com/dhlab-epfl/venice-owners-1808>

Appendix A

Appendix

A.1 Sommarioni standardisation step-by-step

A.1.1 Step 1 - spelling corrections

In the original dataset various spelling variations or errors were found, these were modified to match the spelling.

Examples:

- COMUNE - comune, commune
- CITTÀ - CITTÀ, CITTA'
- SCUOLA - scuola, scola, schola, scupla
- OSPEDALE - osepdale, spedale, ospitale, spitale
- Giovanni - Giovanni, Gioavnni
- Parroco - Parroco, Paroco

A.1.2 Step 2 - suddetto substitution and unknown owners

Unknown owners

Various entries had unknown owners under different forms:

- *possessore ignoto* or *ignoto*
- '-' or <blank>

All unknowns were marked as **Possessore ignoto**.

Sudetto owners

The word *sudetto* (= "as above") is a very frequent entry of the Sommarioni. Were applicable, all *sudetto* were replaced with the actual owner that it is referred to. Although almost all of these entries were easily inferred, some couldn't. In this case they were marked as Possessore ignoto. Whenever any additional information was present in an unknown entry this information was wrapped in parenthesis (...) and kept in the entry near the denomination of Possessore ignoto.

Since *sudetto* entries are crucial to link owners to the same person, the symbol |S| was prepended to that owner in the entry.

A.1.3 Step 3 - Standardisation of terminology

Several sentences or expressions were used to describe or add information about the state of the owner; these will be explained in more depth in the section "Additional information on owners" here below. However, among these expressions, three of them were recurrent enough to require standardisation. These expressions are the following:

- *q.* - quondam, q.m., q.m, qm, q.
- *di provenienza* - proveniente, provenienza, di provenienza
- *goduta dal* - goduto, goduto da, goduta da, goduto dal, abitata

Quondam

Quondam means *once in the past*. In front of a title (e.g. *Giuseppe quondam Sacerdote*) it means that once in the past Giuseppe was a Sacerdote. In front of a name (e.g. *Giuseppe quondam Andrea*) it shows a paternity relationship: Andrea is the father of Giuseppe.

The expression - *q.* - is the standardisation of the quondam word in the variations presented above.

Di provenienza

The expression *di provenienza* reveals that the property is now of some owner (usually Demanio) but was not long ago the property of another owner (usually an institution). We recall that between 1805 and 1807 numerous ecclesiastical buildings were confiscated by Napoleone Bonaparte and given to the public property of the Demanio di Venezia. This is clearly visible in a large number of entries (e.g. *COMUNE DI VENEZIA di provenienza del Monastero della Celestia*).

The expression - *di provenienza* - is the standardisation of the variations presented above.

Goduta da

The expression *goduta dal* reveals that the property of this parcel is of some institution but that currently the usufruct of this parcel is given to a member of the owner institution. These examples are very frequent in church-related ownerships where parcels are given, for instance, to the current

priest of the church (e.g. *Beneficio Canonicale della Chiesa di S. Vitale attualmente goduta dal Sacerdote Angelo SPINEDA*).

The expression - *goduta dal* - is the standardisation of the variations presented above.

A.1.4 Step 4 - Categorisation of owner types (main standardisation)

All observed owners were divided in owner types. At a very broad level, we can divide the owners into 3 categories:

- City of Venice
- Institutions
- People

City of Venice

Categorised references to Venice's ownership are the following:

CITTÀ DI VENEZIA, COMUNE DI VENEZIA, DEMANIO, DEMANIO NAZIONALE, REGIO DEMANIO, REGIO TESORO, MINISTERO DELLA GUERRA, MINISTERO DELL'INTERNO, MINISTERO DELLA GIUSTIZIA, MINISTERO DELLA GUERRA E MARINA, MINISTERO DELLE FINANZE, PUBBLICA ISTRUZIONE, UFFICIO DELLA SETA, UFFICIO DEL CASATICO, CIMITERIO, SOTTOPORTICO, CAMPANILE, UFFICIO, PIAZZA PUBBLICA, PIAZZETTA, PROCURATIA, PREFETTURA, REALE CORONA

Institutions

Categorised references to Institution ownership are the following:

CHIESA, CHIESA PARROCCHIALE, CASA PARROCCHIALE, CLERO, PREBENDA, BENEFICIO, BENEFIZIO, SAGRISTIA, SACRESTIA, CAPITOLO (... della Chiesa), PAPA DI ROMA, SUA SANTITÀ DI ROMA, MONASTERO, CONVENTO, ORATORIO, ABBAZIA, PRIORADO DI VENEZIA, PATRIARCATO, PATRIARCATO DI VENEZIA, SCUOLA, FRATERNA, CONFRATERNA, CONFRERNITA, OSPEDALE, UNIVERSITÀ, SOCIETÀ, COLLEGGINO, FABBRICA, COMPAGNIA, COMPAGNIA DEI MERCANTI, CONGREGAZIONE, CONGREGAZIONE DELLA CARITÀ, CONGREGAZIONE DEL CLERO, ORFANOTROFIO DELLA PIETÀ, COMMENDA DI MALTA, PIO LUOGO, PIA CASA

People

A person owner is classified by having a family name and a first name. People-related ownerships constitute all the remaining owner entries in the dataset. These entries appear in several different ways that will be explained in detail hereunder.

- Single person: e.g. *MOROSINI Luigi*
- Single person with note: e.g. *GRIMANI Loredana vedova Morosini*
- More people of same family: e.g. *MOROSINI Vittore, Sebastiano, Giovanni*
- More people of same family with note: e.g. *MOROSINI Vittore, Sebastiano fratelli q. Andrea*
- Family name only: e.g. *MOROSINI*
- Note reference only: e.g. *MOROSINI Eredi del fu Andrea*

People can have more last names and more first names. The following standardisations were made on each of the above cases.

Single person

In the original dataset, family names were often in CAPS but also frequently not. In the single-person case, standardisation was limited to converting all family names in CAPS while names or second names in lower case (except the first letter).

e.g. *Morosini Luigi* → *MOROSINI Luigi*

Single person with note

In the case where additional information is present near the name, the applied standardisation is to put this information inside parenthesis. See "Additional information on owners" for details.

e.g. *GRIMANI Loredana vedova Morosini* → *GRIMANI Loredana (Vedova MOROSINI)*

More people

When more people (or, in general, more owners) were present in the same entry, they were sometimes separated by a comma (,) and sometimes by a word such as "e" or "et". The standardisation applied divides all owners using a single unique separator: the comma (,)

e.g. *MOROSINI Luigi et Corner Elisabetta* → *MOROSINI Luigi, CORNER Elisabetta*

More people of same family

We often spot entries where more people of the same family are listed but where the family name is omitted for everyone besides the first mentioned. In this case, the family name was added near each person.

e.g. *MOROSINI Vittore, Sebastiano, Giovanni* → *MOROSINI Vittore, MOROSINI Sebastiano, MOROSINI Giovanni*

More people of same family with note

In the above example, no information is given concerning the relationship between the family members. Because it is fundamental not to tamper with historical facts, no assumption has been made in this regard. However, entries of this type often contain specifications regarding the nature of the relationship; if this is the case, this information is treated as a note and wrapped in squared parenthesis for all the people that, in the owner entry, precede the person owning the note and have its same family name. See "Additional information on owners" (Appendix A.1.5) for details.

e.g. *MOROSINI Vittore, Sebastiano Fratelli q. Andrea* → *MOROSINI Vittore, MOROSINI Sebastiano [Fratelli q. Andrea]*

Family name only and family name only with note

Some entries only contain the family name without specifying what family member owns the parcel. These are clearly still considered as person entries, and the entry is left unchanged.

Another entry type can be considered as family name only: the family name with note. Some entries have no specification regarding the exact owner but explain that the parcel is owned, for example, by the heirs of this family. These were standardised by keeping the keyword (in this example Eredi) as the first word in the owner text and moving the family name near the first name.

e.g. *MOROSINI Eredi del fu Andrea* → *Eredi del fu MOROSINI Andrea*

These exceptions are four: *Eredi, Eredità, Ricevitori, Concorso dè Creditori*

Person titles

Several person titles were categorised from the dataset. These titles refer to a specific person and were standardised by changing them all to CAPS.

Categorised references to Titles are the following:

SACERDOTE, PARROCO, PRETE, ARCIPRETE, PIEVANO, DIACONO, SUDIACONO, CAVALIERE, TENENTE COLONNELLO, DOTTOR

A.1.5 Step 5 - Additional information on owners (notes)

Owner entries often have additional information or specifications; these are called notes. Notes were standardised to appear near the owner's name in three different formats.

- Wrapped in parenthesis (...): the note is specifically referred to this owner.
- Wrapped in squared parenthesis [...] : the note is referred to this owner and every owner with the same family name mentioned before in the same owner entry.

- The third case is less frequent; the note appears after a - (dash) symbol. If the note is inside a note, the two notes are separated with the - (dash) symbol and wrapped in parenthesis (...)
e.g. *BERTOLINI Elisabetta (Vedova FRACASSO - come tutrice di sua figlia Elena)*

Possible note types

There are several note types. Here under are listed the most frequent notes, divided by owner type.

City of Venice

- di provenienza*: indicates that the property is now of some owner (usually Demanio) but was, not long ago, the property of another owner (usually an institution).
- successa a*: similar to *di provenienza* indicates that the property was of another owner.
- others: *rappresentata, pignorata, era di ragione, amministrata, detta*

Institutions

- goduta da*: indicates that an institution-owner has granted permission to one of its members to use the parcel, the Title and name of the member comes after goduta da in the note.
- volgarmente detto/a*: precedes the expression with which this owner was commonly called.
- others: *altre volte, ora, Luoghi, Locali, rappresentati*

People

- q.*: quondam means literally once in the past. Most of the time it precedes the name of the father of the owner(s).
- Fratelli*: indicates that this owner and all owners with the same family name in the parcel entry are brothers.
- Sorelle*: indicates that this owner and all owners with the same family name in the parcel entry are sisters.
- Fratelli e Sorelle*: indicates that this owner and all owners with the same family name in the parcel entry are brothers and sisters.
- Erede / Eredi*: precedes a name (e.g. *Eredi di SPONGIA Domenico*) and indicates that the current owner is the heir of SPONGIA Domenico.

- *Moglie*: term meaning wife.
- *Nipoti*: indicates that this owner and all owners with the same family name in the parcel entry are nephews.
- *Vedova*: this term is always referred to a women and precedes a person's name (e.g. *Vedova MICHELI*). It indicates that the current owner was married with a MICHELI, who is now dead.
- *ramo di*: indicates the specific branch of the family name.
- *detto/a*: precedes the expression with which this owner was commonly called.
- *di <city>*: e.g. Treviso, Bergamo, Pordenone, Mestre, d'Istria, Venezia, Verona, Germania, Ravenna, Bassano, Udine, Lugano, Brescia, Ferrara. This indicates that this person, or its family, is originally from the specified city.
- others: *Figlio, Madre, Padre, Cugino, Figlia, Zio, Zia*

A.2 General standardisation rules

- Inside an entry every owner is separated by the unique separator ',' (comma).
- Inside an entry all categorised references to Venice are in CAPS.
- Inside an entry all categorised references to Institutions are in CAPS.
- Some of the properties of Venice were recently owned by institutions; these are marked as *di provenienza*.
- Some of the properties of Institutions are under the usufruct of People; these are marked as *goduta da*.
- Inside an entry, all family names and person titles are in CAPS, while persons' first names are in lower case (except the first letter).
- Owner entries often have additional information or specifications; these are called notes. Notes appear, wrapped in parenthesis, near the owner's name, in three different formats.

Each of the 23395 resolved entries can be categorised using only the rules presented here above.