

Mis Calles: an open platform to explore destinations through the history of its streets

Mis Calles: una plataforma abierta para explorar destinos a través de la historia de sus calles

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ABSTRACT. Street names facilitate the understanding of the geographical deployment of cities and the historical facts that shaped them from their foundation. In Europe, streets are usually named for famous local figures, historical events and important facts for the region. This paper introduces Mis Calles, an open and free Web application to collect, describe and visualise the historical facts reflected in the street names. This tool serves as a cultural guide on the move for tourists and citizens.

RESUMEN. Los nombres de las calles facilitan la comprensión de la historia de las ciudades y el desarrollo de las mismas desde su creación. En Europa, las calles suelen llevar el nombre de personajes locales o eventos singulares que fueron importantes para la región. Este documento presenta Mis Calles, una aplicación Web gratuita, basada en datos públicos abiertos, que recoge, describe y visualiza los hechos históricos y personas que dan nombre a las calles de una ciudad. Esta herramienta es una excelente guía cultural para turistas y ciudadanos curiosos.

KEYWORDS: Tourism, Streets, History, Culture, Knowledge graph, Artificial intelligence.

PALABRAS CLAVE: Turismo, Callejero, Historia, Cultura, Grafo de conocimiento, Inteligencia artificial.

1. Introduction

Denomination of the streets in cities or towns depends on local governments. Names are usually requested by the developers of new divisions that usually follow guidelines on the type of street names required for an area. Sometimes, those naming rules are thematic (i.e., tree species and historic names), referring to historical landmarks, or just numeric, according to a geographic protocol (i.e., East to West, North to South, etc.).

Changing street names is not uncommon, but always controversial. The reasons depend on the specific case, from reorganising the urban plan and honouring notorious figures to specific historical and popular claims. As an example, recently, the City of Madrid renamed over fifty streets connected to the rule of Franco's dictatorship, reverting to the original names in the pre-Franco era (Dowsett, 2018).

Most of cities in the US follow simple rules. The US National League of Cities —an association that collects information from more than 19000 cities, villages and town— published a ranking of occurrences in street names in the country (National League of Cities, 2012). The top-15 street names list only contains numbers, tree names —e.g., Oak and Maple— and landmarks —e.g., Park, View and Hill. Second (or 2nd) is the most popular street name in the US.

In Europe, streets names are usually given for famous local figures —politicians, artists, etc.—, historical events —military battles, constitutional acts, etc.— and important facts in the region —food, geography, etc. (Halifax, 2009).

Street names facilitate the understanding of the geographical orientation of cities and the historical facts that shaped them from their foundation. Some cities and towns preserve their history on the name signs, sometimes unknown for visitors, and even for most of the local citizens.

2. Objectives

Mis Calles (Spanish spell of 'street names') is a Web platform, evolved from a personal project, motivated for the human curiosity to figure out who was the person, historical fact or place that named and represent cities and towns. The objective of this tool is to understand the reasons to name streets after them. Mis Calles allows visitors and citizens to have a clear picture of the past and present of a city and its historical facts.

This application has been implemented in Gijón/Xixón (Spain) —a city in the north of Spain with more than 270,000 inhabitants (Instituto Nacional de Estadística, 2019)— collecting more than a hundred of street names, and organising them by theme as shown in the Figure 1. All the information is represented in an intuitive way, enabling visitors to explore the city on the move through their smartphones. The configuration of Mis Calles is automatic, but supervised by an expert, so it may be deployed all around the world with only minimal adjustments.

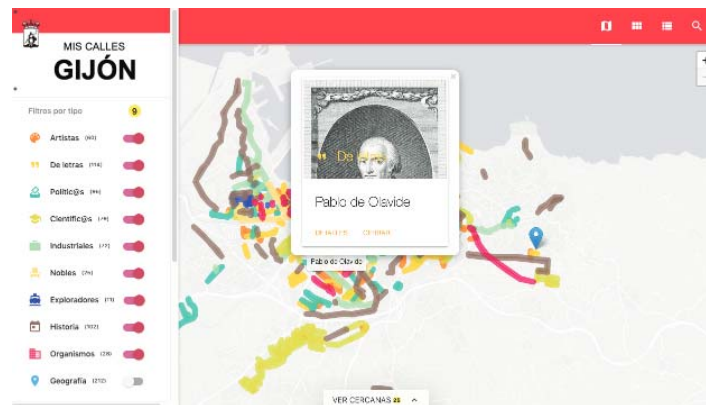


Figure 1. Map with street clusters and the detail of a street. Source: Self made.

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3. Methodology

In technical terms, Mis Calles is a Progressive Web Application designed for any mobile device that enables the use of their location capabilities (i.e., GPS and network tracking) to enrich the user experience. The application was developed through a series of complex Python scripts, which allowed the ingestion and processing of the information from public open sources automatically.

The development process had taken the following steps:

Step 1: Find the streets and their location. The City of Gijón, through its Transparency and Open Data Portal, publishes two datasets that served to: (1) identify the streets of Gijón —list of streets, type (e.g., avenue, road, park, street, etc.), unique names, without acute accents, and numerical identifiers—, and (2) locate them on a map. The location of the streets is based on the dataset of streets and portal numbers (Ayuntamiento de Gijón, 2016), a table with thousands of coordinates corresponding to each street number —building level— and street in the city. This does not include the geometric line or polygon to be drawn on a map, just the coordinates.

Step 2: Generate the polygons on the map. After nesting the tables of streets and numbers, another script built the lines and polygons —in KML (Google, 2019b) and geo-JSON format (Internet Engineering Task Force, 2016)—enabling visualisation of the streets on a map.

For this, each street is divided into odd and even street numbers, corresponding to both sides of the street. A script generates a polygon with the shape of the street.

This technique arises successful results when the numbers of a street are distributed in an orthogonal geometry, but if the street has few registered portals, or the shape is complex it might generate polygons with weird forms, as can be seen in the example of the Tejerona Street in Figure 2.



Figure 2. The geometry of a street in Mis Calles. Source: Self made.

Step 3: Description of streets (by human expert knowledge). Once the streets were identified univocally, including their approximate location, they were described using the expert knowledge of a local historian. A digital copy of *Las calles de Gijón. Historia de sus nombres* (Piñera, 2005) in PDF format (detail in Figure 3) served as a basic source of information for that purpose.

Ascraper script extracted the main data for most of the streets of the city: name of the person or thing that named after the street; description; date of registration; and previous names.

The natural language and lack of standard formats (e.g., changes in the expected structure, page breaks,

figures, cites, etc.) resulted in a chaotic human-driven double check exercise.



Figure 3. Detail of the publication in PDF. Source: Self made.

Another Python script nested the resulting tables into a complete list of streets with geo-location and some descriptive information. The script was built to prompt, asking for confirmation in those cases when there was no exact match between identifiers (e.g., comparison of 'LOS CALEROS' and 'CALEROS, LOS').

Step 4: Description of streets II (Knowledge Graph). The real value of the application comes from that scraped publication, but several entities were not included in the book, written more than a decade before. Those missing figures were usually abstract concepts or elements (e.g., light, love, sea, etc.) or contemporary people. In these cases, finding descriptive information on the Web is simple.

So, in order to complement description of concepts not included in the previous publication, another script was created to get information from the Knowledge Graph, which Google offers through an API (Google, 2019a).

The Knowledge Graph is a structure of information linked by semantic concepts —is what Google uses to show proper results. This graph contains information from open sources, such as Wikipedia. It includes metadata associated with the concepts that characterize them in depth, and also pictures.

This data source is really interesting to get information about places, events or people. The script queries the API analysing and recognising the types of results obtained. The results also show the degree of success confidence. So in the case of finding a match of the expected type (e.g. a philosopher), the script stores the data in a table with the needed information: description; alternative title; URL of the entity (i.e., to the Wikipedia page); image URL and associated license; standardised entity type using schema.org (e.g., Civic Structure or Landmarks Or Historical Buildings). For example, the result obtained for the entity 'EUROPA' [Square] was:

Name: Europa;
 Score (confidence): 244.048874
 URL: <https://es.wikipedia.org/wiki/Europa>
 Type: Continent, Place, Administrative Area, Thing
 Description: Europe is one of the continents that make up the Eurasian supercontinent, located between the parallels 36° and 70° north latitude.
 Image: <http://t0.gstatic.com/images?q=tbn:ANd9GcS0uZNM54cfxsd-XA8iNVY-6CjX9gMCUV2BSloYIjgEQewznu>
 Image license: https://en.wikipedia.org/wiki/Wikipedia:Text_of_Creative_Commons_Attribution-ShareAlike_3.0_Unported_License
 Knowledge Graph URI: kg/m/02j9z

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Step 5: Classification: Types of Entities The Knowledge Graph, and its queries classified most of the entities in an automated way. In the previous example, Europe is of type: Thing; Continent; Place; and Administrative Area (administrative area).

Approximately, 40% of the entities represented were classified automatically, always under human supervision, since there are confusing cases in which artificial intelligence cannot perform the work properly.

A clear example to illustrate this is the case of 'Cabrales' street. The Knowledge Graph recognises this concept as a municipality in Asturias (Spain), but actually the street is named after a person —whose surname is 'Cabrane's', indeed.

Once all the tables were joined and nested —so, all listed, geo-positioned, with human descriptions, enriched by the Knowledge Graph, and automatic typed—, the classification of entities was completed using a semi-automatic homogenization of the themes using OpenRefine (detail in Figure 4), an open tool to manage and clean large datasets.

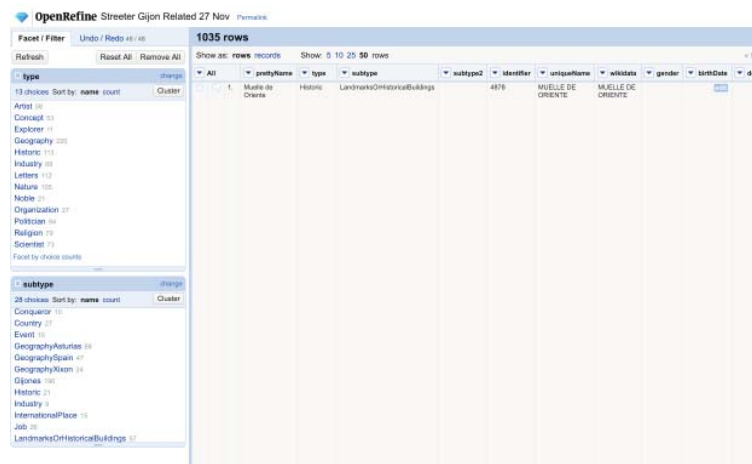


Figure 4. OpenRefine screenshot with the faceted browser menus. Source: (OpenRefine, 2019).

Finally, all the themes were cleaned and summarised in an intuitive taxonomy through a card sorting exercise. This helps to achieve a better user experience. As a result, 1035 entities were grouped in the following twelve concepts: (58) Artists (musicians, painters, actors, athletes); (11) Explorers (conquerors, navigators); (220) Geography (municipalities of Asturias, geographical features, populated places, etc.); (113) History (historical events, people, landmarks of historical relevance); (69) Business (people related to industrial and/or urban development); (112) Letters (writers, thinkers, philosophers, etc.); (105) Nature (fauna, flora, and other natural concepts); (21) Nobility (monarchs and nobility in general); (27) Organisations (companies and organizational entities); (94) Politicians (governors, military and councillors); (79) Religion (religious people, places and concepts); (73) Scientists (mathematicians, physicists and science or technology persons); and (53) Concepts (feelings, jobs, physical elements).

Apart from this first-level classification, and taking advantage of other concrete types gathered by the scripts from the Knowledge Graph, a fine-grain second level of topics was used to classify the concepts more accurately. For example, the subject Geography has narrower sub-themes: Country (27 entities), Geography of Asturias (66), Geography of Spain (44), Geography of Gijón (21), International Geography (13), Historical Places (1), Orography (48).

This second-level classification was complemented by an ad hoc third-level taxonomy, created by local experts to increase usability and used for a recommendation system that suggests similar results to end users. As shown in Figure 5, the recommendation system shows similar entities to the final user.

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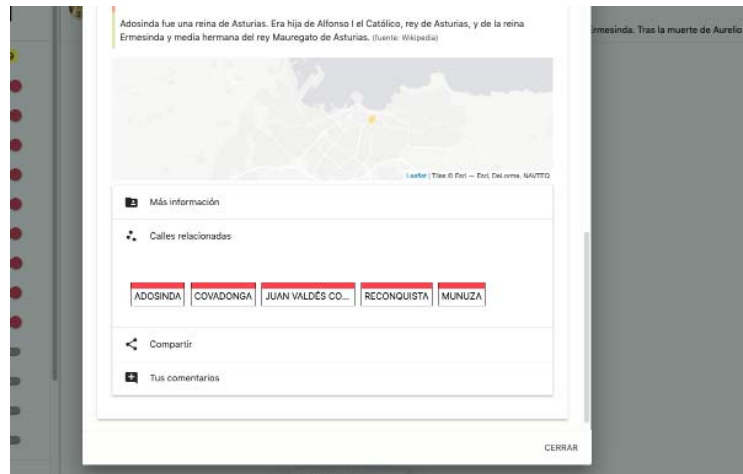


Figure 5. Detail of the recommendation system results. Source: Self made.

4. Results and conclusions

Mis Calles is fully functional and it has been deployed in cooperation with the local newspaper, El Comercio, in February 2019. The tool is available at any time and at no cost for any tourist visiting the city. It can be installed on a mobile device or just accessed via any modern Web browser at <https://www.miscalles.es> (see Figure 6).

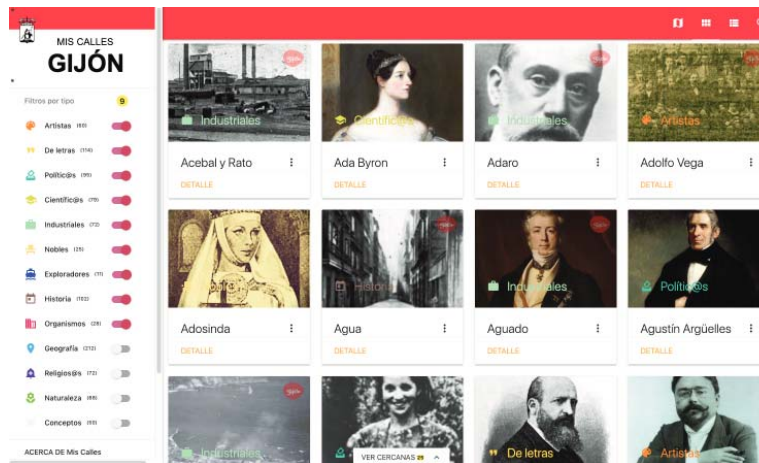


Figure 6. Cards view interface. Source: Self made.

During the first three months of operation, the platform registered more than ten thousand unique visitors, with 01'18" of average session duration. As expected, most of the users accessed locally from either Gijón (43%), but also from the other cities, like Oviedo (17%) and Madrid (12%). The application seems to be slightly more interesting for men (57%), and for those in the 34-64-age range (70%).

It is interesting to observe that 4% of the people that accessed the platform speak English —at least, it is the preferred language in the device configuration.

The success of Mis Calles in Gijón serves as proof of concept that it could be adapted and deployed in any other city around the world. It is an intuitive tool for cultural tourism and could be offered and promoted in local tourism information desks as a valuable guide for those tourists that want to explore the history of the city through the nearby streets, as shown in Figure 7.





Figure 7. Nearby streets panel. Source: Self made.

An interesting feature of this platform that contributes to its maintenance is the possibility of relying on the expert knowledge of citizens. Relatives and local culture enthusiasts may send comments to enhance descriptions, dates or even the pictures of the streets. A Web form, embedded in the details of streets, allows anyone to send their contributions. Up to date, the platform received more than a dozen of interesting corrections and adaptations, including original pictures.

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References

- Ayuntamiento de Gijón (2016). Conjunto de datos: Calles y portales. (<http://transparencia.gijon.es/set/urbanismo-infraestructuras/calles>)
- Dowsett, S. (2018). Madrid removes Franco-era place names of streets. Reuters. (<https://www.reuters.com/article/us-spain-politics-streets/madrid-removes-franco-era-place-names-of-streets-idUSKBN1HY28Z>)
- Google (2019a). Google Knowledge Graph Search API, (<https://developers.google.com/knowledge-graph/>)
- Google (2019b). Keyhole Markup Language. (<https://developers.google.com/kml/>)
- Halifax (2009). Halifax Estate Agents reveals the UK's Top 50 street names. (https://www.lloydsbankinggroup.com/globalassets/documents/media/press-releases/halifax/2009/02_01_09_street_names.pdf)
- Internet Engineering Task Force (2016). The GeoJSON Format. (<https://tools.ietf.org/html/rfc7946>)
- Instituto Nacional de Estadística (2019). Cifras oficiales de población de los municipios españoles: Revisión del Padrón Municipal. <http://www.ine.es/dynt3/inebase/index.htm?padre=525>
- National League of Cities (2012). Most Common U.S. Street Names. (<http://www.nlc.org/most-common-us-street-names>)
- OpenRefine (2019). (<http://openrefine.org>)
- Piñera, L. M. (2005). Las calles de Gijón. Historia de sus nombres. El Comercio.