KM4city URBAN GRAPH REPRESENTATION

TrafAir internal document

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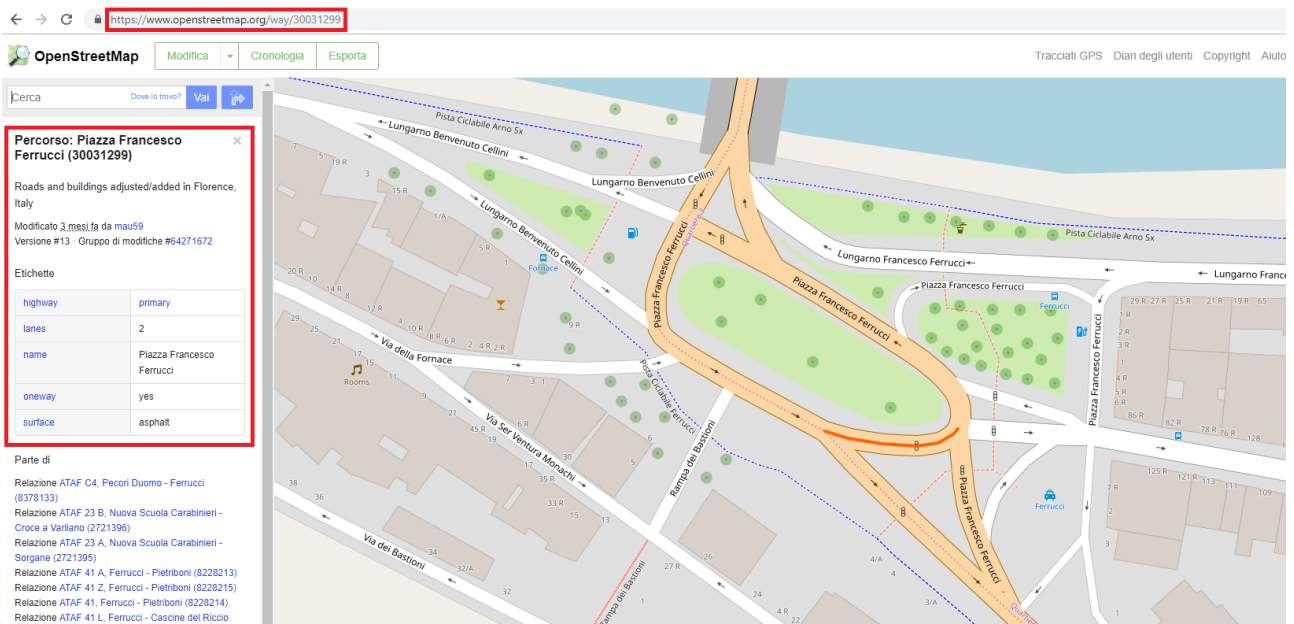
Starting from the OSM data and the KM4City Ontology (http://www.disit.org/km4city/schema), the Florence Graph has been created by Disit Lab. In this document some details are described.

A road network is studied as a directed graph composed by arcs that meet at some nodes, corresponding to road junctions. The urban roads' characteristics are stored in the OpenStreetMap database, for example:

- *road type* https://wiki.openstreetmap.org/wiki/Key:highway
- *road lanes* https://wiki.openstreetmap.org/wiki/Key:lanes
- etc.

Each road admits an initial node and an end node in order to determine the corresponding directed arc in the graph. In the following we consider an example.

Road 1 (labelled with OS000**30031299**SR, in OSM: https://www.openstreetmap.org/way/30031299):

Road 2 (labelled with OS000<mark>26943048</mark>SR):

Road 3 (labelled with OS00<mark>205385722</mark>SR):

Road 4 (labelled with OS00509328804SR):
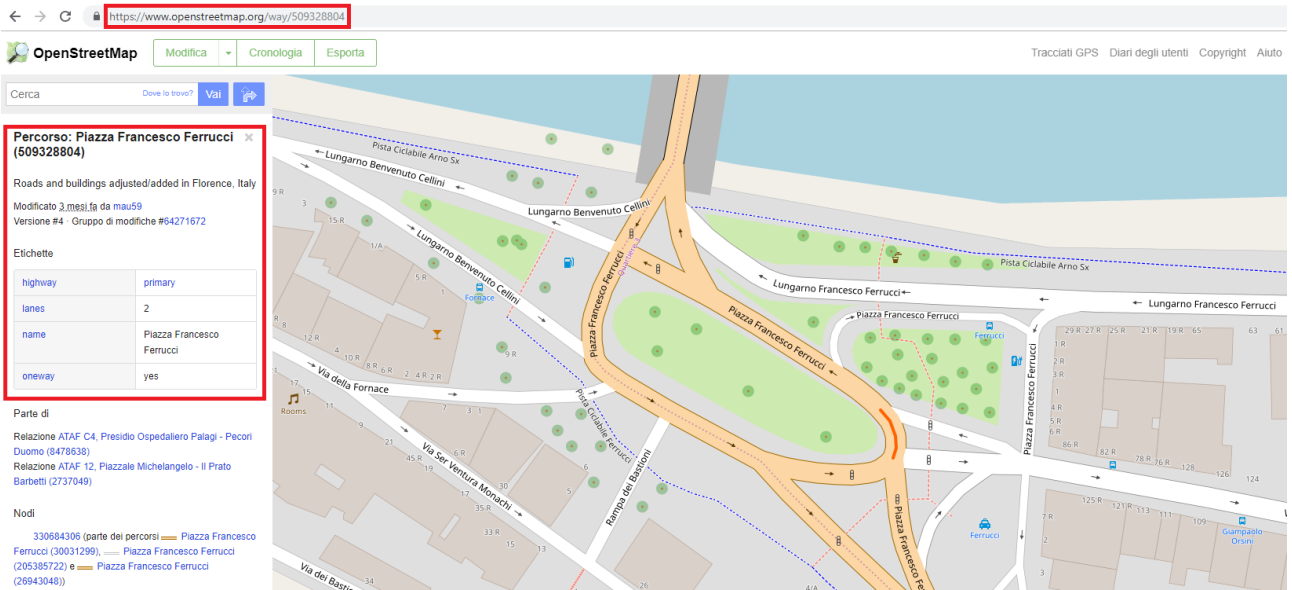
Listing the previous road-segments with their initial (nodeA, see the following table) and end node (nodeB, see the following table), the related road junction *J* (labelled with OS00330684306NO) is implicitly determined by means of the corresponding incoming and outcoming road-segments. In particular, the incoming road-segments in the road junction *J* are the road-segments having *J* as their end node, while the outcoming road-segments in the road junction *J* are the road-segments having *J* as their initial node (road details can be found in *roadDetails.xlsx* file coming from the ingestion process).

nodeA	segment	length	road	nodeB
OS01344583128NO	OS00030031299RE/4	4	OS00030031299SR	OS00330684306NO
OS00295213650NO	OS00026943048RE/5	8	OS00026943048SR	OS00330684306NO
OS00330684306NO	OS00205385722RE/0	29	OS00205385722SR	OS04985765666NO
OS00330684306NO	OS00509328804RE/0	3	OS00509328804SR	OS05200009916NO

Road Junction node (labelled with OS00330684306NO):
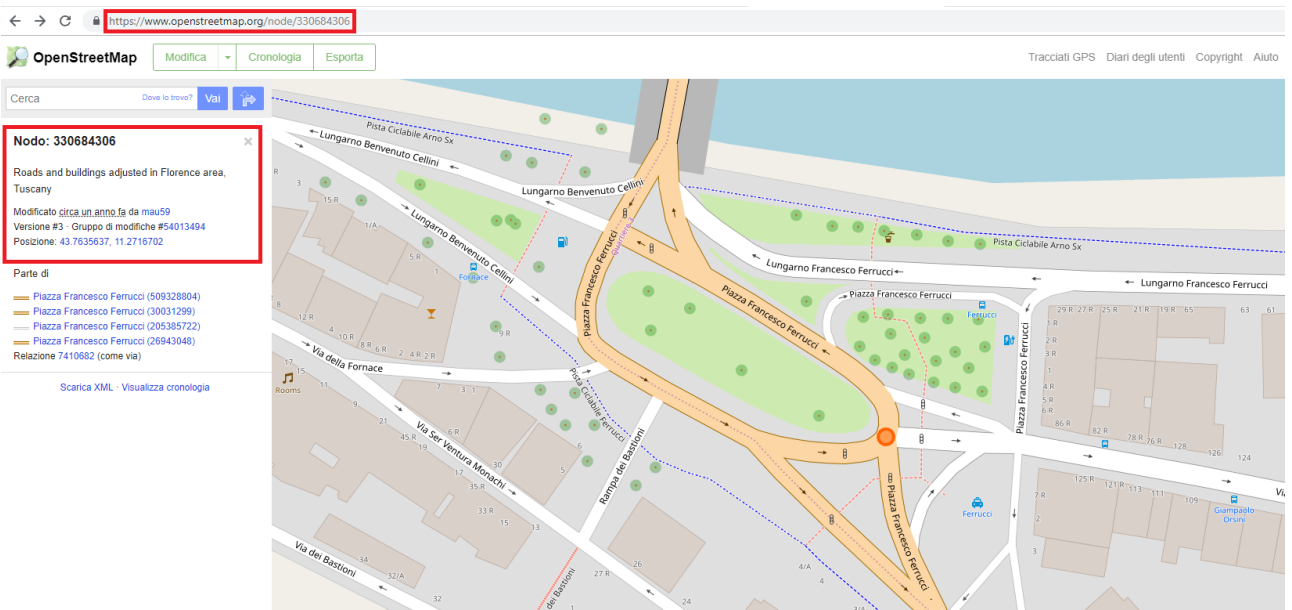
Moreover, further relations can be considered at the given junction (for example, representing the related turn restriction https://wiki.openstreetmap.org/wiki/Relation:restriction). In the example, *no_right_turn* restriction from road-segment labelled with 26943048 to road-segment labelled with 205385772 is considered.
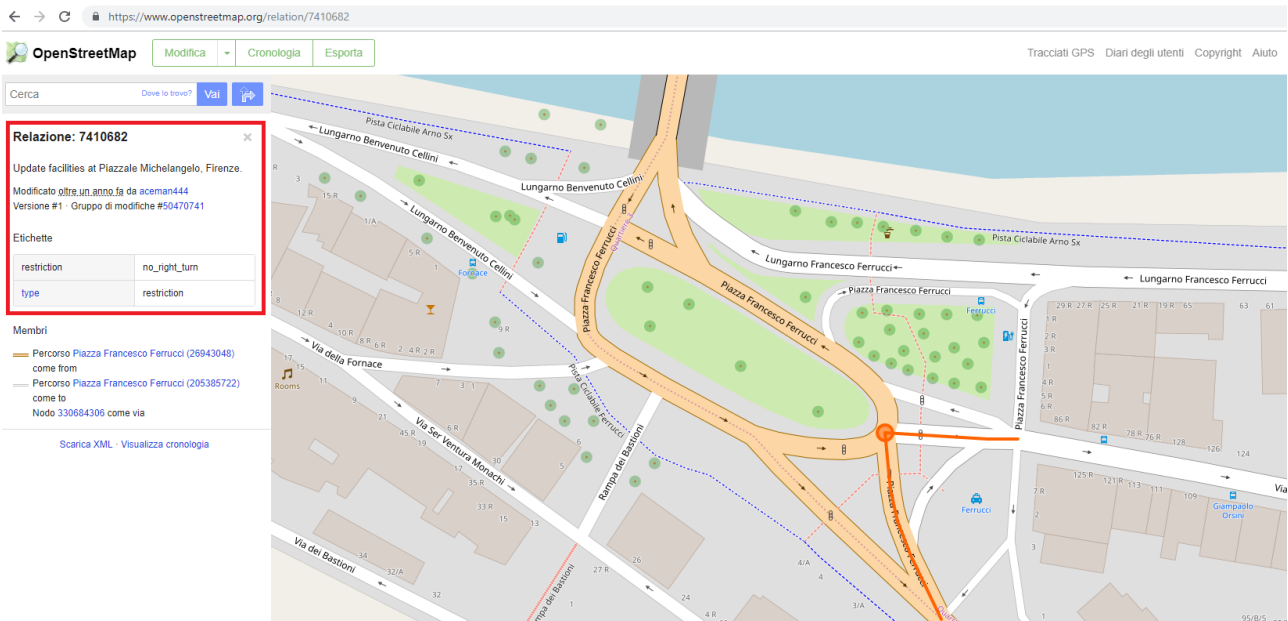
node	from	to	restriction
OS00330684306NO	OS00026943048RE/5	OS00205385772RE/0	no_right_turn