

MyBestDistrict: a Tool for Computing the Quality of Life exploiting Open Data

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MyBestDistrict (MBD) is a web application that allows citizens to find out the quality of life in the different districts of their city. The quality of life is computed by taking into account several aspects such as: environment, culture, security, and services. In particular, the citizen can express a degree of interest for each aspect, consequently an algorithm adapts its score according to the citizen preferences.

MBD is an outcome of the workshop about open data within the Bari European Maker Week¹, an initiative promoted by several organizations and sponsored by the City of Bari. For five days (from the 1st to the 5th of June 2016) makers, researchers, professionals and enthusiasts have worked together to design useful tools for the community.

Generally, open data are data freely released by the government to the community with the aim to make products or services useful for the citizens. The release of open data opens interesting scenarios, for example researchers can analyze, summarize, and also apply machine learning techniques in order to extract new information or knowledge.

MBD is the results of a joint work between computer science experts, statisticians and mathematicians. During the workshop, we have discussed about how open data can be exploited to produce useful services for citizens. The motivation behind MDB is twofold: 1) the citizen should have a concrete perception of the quality of life in her/his district; 2) the governance should understand how to improve the quality of life and in which districts to focus improvement actions.

Following these ideas, we collect all the geo-referenced datasets about the City of Bari and we map each dataset to an aspect. For each aspect, we compute a score that depends on the number of Points of Interest (PoI) located in a specific district. The mapping is obtained by a matrix W in which each row represents a type of PoI, while each column is an aspect. Each value w_{ij} in the matrix W indicates how relevant is the i -th type of PoI with respect to the j -th aspect. The weight w_{ij} ranges from 0 to 10. The matrix W has some properties in order to satisfy both uniformity and consistency, in particular the rows must sum to 10, while the columns to 25. Taking into account a district, the score assigned to each aspect is computed as reported in Equation 1, where nt_i is the number of PoI of the type i -th in the district under consideration.

$$a_j = \sum_i w_{ij} * nt_i \quad (1)$$

Since the final score assigned to each city district depends on the user preferences, we consider a vector u which contains for each aspect a score in the range $[0 - 10]$ indicating how relevant is the aspect for that

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¹<http://www.spaziomurat.it/evento/european-maker-week-bari/>

user. The final score assigned to each district is computed as:

$$s_d = \sum_j u_j * a_j \quad (2)$$

Each s_d score is normalized using the sum of the scores for all the districts.

In our work we consider the following PoI: schools, green areas, monuments, hospitals, park&ride, pharmacies, cultural association, bus stops, small commercial organizations (shop or store), social or cultural associations. All these data are collected from the open data web portal developed by the City of Bari².

In order to build MBD, we normalize all the datasets and store all data in MongoDB³ in which we enable the support for geo-referenced queries. Moreover, we develop a Java back-end able to store, query and handle the data. The back-end provides a REST API for accessing to the provided services, like the: retrieve of the list of PoI in a specific city district filtered by type, the list and the coordinates of each city district, and the quality of life computed according to the algorithm proposed in this work. The REST API is exploited by a front-end able to visualize data using Google Map. The front-end is developed using the AngularJS framework and a prototype of our system is available on line⁴. The source code of both the back-end and the front-end is available on github⁵.

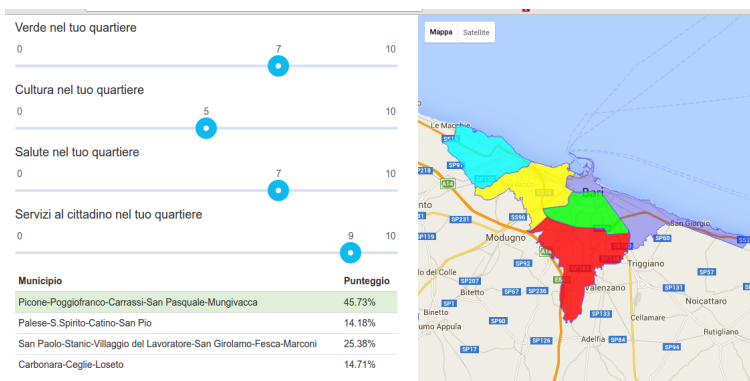


Figure 1: A screen-shot of the MDB prototype.

MBD is an interesting case-study that shows how to aggregate information coming from several open datasets. In particular, our approach is able to predict a single score which indicates the quality of life in a city district by taking into account the user interests.

²<http://opendata.comune.bari.it/>

³<https://www.mongodb.com>

⁴<http://www.mybestdistrict.xyz/>

⁵<https://github.com/pippokill/EMWbariopendatalab>
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and

<https://github.com/giuseppe-santoro/>