

A Geo DataBase to Investigate the Maximum Distance Error in Quality of Life Studies

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Abstract : The background and significance of this study come from papers already appeared in the literature which measured the impact of public services (e.g., hospitals, schools, ...) on the citizens' needs satisfaction (one of the dimensions of QOL studies) by calculating the distance between the place where they live and the location on the territory of the services. Those studies assume that the citizens' dwelling coincides with the centroid of the polygon that expresses the boundary of the administrative district, within the city, they belong to. Such an assumption "introduces a maximum measurement error equal to the greatest distance between the centroid and the border of the administrative district.". The case study, this abstract reports about, investigates the implications descending from the adoption of such an approach but at geographical scales greater than the urban one, namely at the three levels of nesting of the Italian administrative units: the (20) regions, the (110) provinces, and the 8,094 municipalities. To carry out this study, it needs to be decided: a) how to store the huge amount of (spatial and descriptive) input data and b) how to process them. The latter aspect involves: b.1) the design of algorithms to investigate the geometry of the boundary of the Italian administrative units; b.2) their coding in a programming language; b.3) their execution and, eventually, b.4) archiving the results in a permanent support. The IT solution we implemented is centered around a (PostgreSQL/PostGIS) Geo DataBase structured in terms of three tables that fit well to the hierarchy of nesting of the Italian administrative units: municipality(id, name, provinceId, istatCode, regionId, geometry) province(id, name, regionId, geometry) region(id, name, geometry). The adoption of the DBMS technology allows us to implement the steps "a)" and "b)" easily. In particular, step "b)" is simplified dramatically by calling spatial operators and spatial built-in User Defined Functions within SQL queries against the Geo DB. The major findings coming from our experiments can be summarized as follows. The approximation that, on the average, descends from assimilating the residence of the citizens with the centroid of the administrative unit of reference is of few kilometers (4.9) at the municipalities level, while it becomes conspicuous at the other two levels (28.9 and 36.1, respectively). Therefore, studies such as those mentioned above can be extended up to the municipal level without affecting the correctness of the interpretation of the results, but not further. The IT framework implemented to carry out the experiments can be replicated for studies referring to the territory of other countries all over the world.

Keywords : quality of life, distance measurement error, Italian administrative units, spatial database

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