

URBAN PLANNING COMPUTER AIDED METHODS

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In the practice of urban centers analysis and of urban planning projects, a noticeable aspect is the absence of some essential information required in the planning process due to the natural difficulty to manage the numerous data to process.

In many instances, it emerges that this process is regrettably elastic and for this reasons it is almost impossible to produce satisfactory informations either in establishing correct localities or for planning alternative.

On the other hand, in local planning development many recurrent processes intervene in which the urban planner's work has to be concentrated on the definition of the way of processing and on choosing the most important variables.

The object of this research is to focus upon this recurrent processes, to reduce it to the main components and to create algorithms for its proper usage with computers.

Again, the purpose of these efforts is to provide the urban planner with a quick and adequate tool with which local analysis is then possible.

Through alternative repetitions of these analysis of the projects, while following traditional and classic basic schemes, we may expect positive and satisfactory results.

Of course, due to the high number of variables that intervene in programming urban development, this analysis must be restricted to the fields in which the most important variables are reasonably well defined; these variables, for instance, might include the size of the population, the extent of existing dwelling and service and those likely to require end utilize any extension of these.

2. General Method Structure.

The problem faced was that one of creating an applicable software which would be restricted only to procedures not get developed by library programs. Those procedures, therefore, have to cover the following functions:

- * statistical database administration.
- * areal database administration.

The applicable software has, hence, to ensure the following functions:

- * transferring information from one database to the other.
- * administration of calculus problem referring to the various relative product lines.

Those functions, for instance, have been identified by:

- * Housing planning.
- * Schools planning.
- * Aims programming in the Urban structures.

Every calculus process is articulated on a main working line in which, step by step, various prepared functions are recovered.

These functions are divided in "Calls", "Macro" and "Internal procedure".

The are data units which can be either already explicit from the source (I.S.T.A.T. or direct survey) or can be explicit by simple mathematical functions.

They are recalled for statistical elaboration and for graphical representations. They are mostly used by "Macro".

The "Macro" are statistics, graphics and calculus algorithms used for date mapping, elaborations and programmatic hypothesis.

They represent the main object of the work, being algorithms which can be used in general for many different planning functions.

In particular "Macro" are the procedures which compute demographic projections, in numerous ways, that realize mathematical functions on maps, analyze areal data or which govern the database.

Developing those "Macros" it's possible to use powerful software, already on the market, as DB3, as relational database, IGL and TECNICAD as mapping programs.

There are, ultimately, "Internal procedure" which represent specific steps of the particular analyzed structures expressly made for those applications.

3. Housing Planning.

This method is a satisfactory and adequate model for evaluating the developing process of housing demand. From this model it is possible to define more housing projects hypothesis according to the requirement.

The principal intention is to create both a dimension of the real estate demand data and an analysis and a calculus method of the facility to be provided with. This method has to be clear and controllable enough, to provide such flexibilities as to allow variation sensible to the information system and to the particular application characteristics.

The procedures used are, hence, organized in such a way as to allow both the use of informative data, different from previous one and to modify the recognised evaluating parameters.

The current work refers exclusively to a database derived from the information available from the official demographic source (ISTAT).

According to the incomplete evidence of the information system, there exists, within the objectives which have been carefully examined, some recurrent procedure, these are able to link, on one side, current knowledge, and on the other, to provide a new database on which further analysis may be computed.

These are going to build up a "procedure catalogue" comprise of data math comput (calls).

In regard to the study of population growth and of the expectation of real estates, will be used the complex algorithms previously defined (Macro).

There are, moreover, other algorithms not included in the procedure catalogue" , which individuate a specific field of comparative work.

The mapping system is used to represent the new social structures on a wider scale, compared to the actual one, that is to say, the demographic one, in the local environment.

4. School Planning.

At the base of the Schools planning choice stands the peculiar characteristics that such a service is addressed to a known customers level whether from the quantitative point of view or from the qualitative one. Moreover, the scholastic service is

characterized by fixed norms about the ratio structures/customers (radius of influence, maximum dimension of buildings, etc....).

This gave a great advantage to this analysis it's possible to reduce widely the alaeory margin of our estimations.

Moreover, the algorithms can reach a large abstraction grade such as, only with unremarkable modifications, they can also be used to localize and to quantify other services with similar to the school structure.

The search starts with the analysis of the today's state of the service in the territory and the relative absence. We have considered a prevision of the demand in 10 years.

Every estimation needs the elaboration of the demographic function.

This can be obtained with many different methods: the best one for this application is the Cohort Method or age classes Methods, in which the variation of the total population is divided in that one of each single five years age class. In particular we are interested in the scholar age class.

The algorithm of this method represents one of the Macro that can also be used for other types of prevision.

According to this data and to the today's reality, it's possible to calculate the amount of structures that the local reality needs.

A localizing algorithm was preset to represent those data. It simulate, directly on the territory, already mapped on the computer, the influenced area and the costumers covered by such a service, allowing the urban planner to visualize the arrangement and considered the best solution.

Beside this, there have been supposed three levels of realization of the structures, 100%, 75% and 50% of demand; automatically, the three solutions will be localized on the territory.

Of course it is also possible to introduce each single structures on the territory so to see the single influences on the main indicators.

5. Planning the Aims in Urban Structures.

This line of work has the aim of applying the P.P.B.S. to the area, and in particular to the choice of intervention in the urban

By P.P.B.S., one means that particular method of programming that, given a certain objective, individuates, prepares and executes a complex of actions and interventions, or more precisely projects that allow the objectives themselves to be reached. The object is defined as the unity and the totality of elementary units for anyone of which a solution is singled out that maximises the objectives. This unity can not be broken up either in the projection or in the realization without bringing about a loss of economy.

The fundamental conditions in order to realize this type of planning process are the singling out of an objective which has to be follow, the disposition of a recognised quantity of resources, the characterization of norms and particularly restrictions that define an environment in which it may be possible to carry out projects.

For any project, the effects on the area are analyzed and evaluated to see if they are more or less in line with the expected objectives.

For this purpose it is necessary to simulate a scenario that considers the project as if it were already completed, and as if it really had influenced all the indicators. This simulation is made possible by the previously illustrated methods and procedures. However the possibilities offered by the mapping which is useful in the applicative phase of the project must be shown.

The project acts on the area and modifies some indicators. These indicators, in their turn, are linked to the characteristic data of every mapped element . Hence the introduction of new physical structures and of new communication links, or the modification of these, influences directing this elements with some delay, The obtaining effects of such a simulation then can be represented, in way gaining one or more images (alternative), then can be ensued by traditional methods.

Therefore, it is both possible to examine all the indicators that vary and to quick evaluate whether the project effectively improve upon the previous situation. In the presence of competing projects one is also able to measure the different variations of the indicators and see which one fulfills the objective better.

Obviously, and it is the opportune moment to stress this, the quality and the quantity of any possible observation is strictly related to the quality and to the quantity of input data but most of all, to the identification of the reciprocal links.

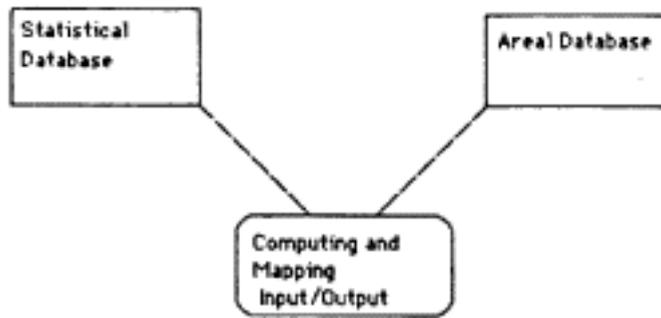


Figure 1

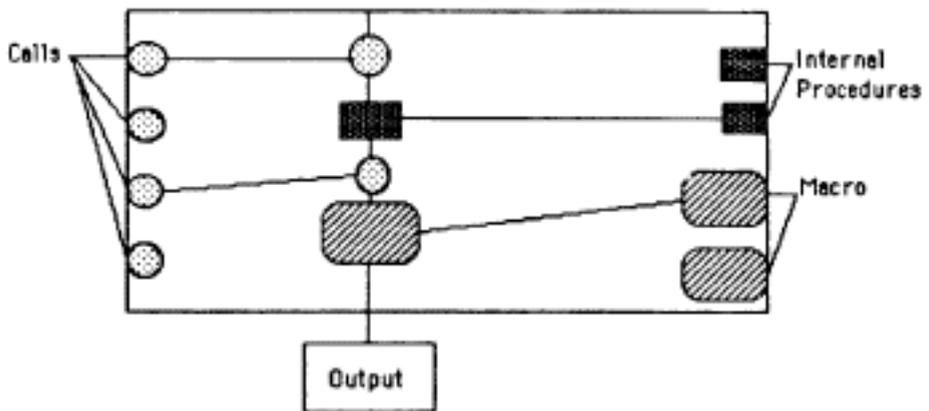


Figure 2

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