AUTOMATIC METHODS OF DATA PRESENTATION FOR PLANNING ANALYSIS AND URBANISTIC APPLICATIONS

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ABSTRACT

Urbanistics and land analysis on different scales both have a basic need processing an ever increasing amount of data and numerical information.
This might seem extremely easy to handle especially where we have computer at our disposal, but unfortunately that is riot true. The great wealth of data and information now available means that on one hand an unarrestable process is set in motion whereby more and more data are required but the analysis and consultation of this data becomes longer, more complex and laborious as the amount of data increases. There is also the danger that data produces more data and gives way to a process which can be endless.

The planner must also make quick decisions on what is happening and use several target analyses based on a vast quantity of data which he must process with the automatic system available.

There must always be strict compatibility between the available data processing system and the quantity of data. The representation of data in image form is an important aid in carrying out correct analyses as well as in decision making Basically it is a question of making synthetic, decisional use of information contained in raw data.
Systems which can process data visually are practically indispensable in urbanistics.

This paper presents some of the results which can be obtained with a system based on a micro-computer and which land planners can use to perform any kind of data representation with no great difficulty. Output is obtained on colour monitors and colour printers.

THE COLOUR MONITOR: THE USER-MACHINE INTERFACE

Just as the keyboard is the simplest, most immediate system for feeding data into the computer and making a selection, the graphic monitor in the processing system, which the planner can use, is the first peripheral to which his attention is called and on which the drawings produced by the data processing system appear.
Communication between the periphieral and the user must be clear, synthetic and dense of information. It is helpful to identify two main communication areas on the monitor: alphanumerical information and images (see fig. 01) .
The two areas are independent of the number of images which appear on the monitor. Whatever has been drawn and appears on the monitor, the user will always find on the same part of the monitor: either visual messages or graphic information. The monitor occupied by the image has been considered either a single drawing plane, or divided into 2 or 4 parts (see fig. 2).
This enables the user to make comparison between the images appearing on many different parts of the monitor and hold several images on it simultaneously. Several numerical indications at the top left of each of the parts show the user which zone is being used in the part for the images.
The system also has a non graphic monitor on which the alphanumerical information appears in the user-system dialogue; on this second monitor the user chooses the menu, decides which archive to go to for data and completes all the operations which allow him to obtain the data to be shown in the way he wishes.

All communications between the system and the user are interactive and in Italian. The user does not need previous instruction in data processing, he just has to know clearly what he requires and answer the questions put by the system, after a careful reading of the manual on how to use the system.

DIAGRAMS REPRESENTED TWO-DIMENSIONALLY.

The most immediate way of representing a series of numbers contained in a file is to perform the so-called histogram representation. Using this system, any number of values can be represented by autoregulating the lateral dimension (the thickness) of the histogram.

Filled-in and non-filled-in histograms can also be obtained and a threshold planned which appears as an horizontal line on the histogram and which identifies bars of two different colours.

Only five colours are used in two-dimensional software: dark blue and red for filling-in, green for the threshold and the light colours: yellow, white and light blue are for reference frames, captions and alphanumerical indications.

In the alphanumerical part of each histogram it is declared the maximum value, the minimum value and the file name represented as well as the threshold value when it has been established .

Up to four archives can be represented each time (see fig. 03) depending on whether the drawing plane has been sub-divided into one, two or four part. If two archives consisting of same number of data must be compared , the histogram can be represented above and below by arranging the graphic image in the top part and the other in the lower part of the monitor chosen. Comparison of this kind have been found much more useful than images of simple progress charts. In this case the two archives, from which the data is taken, are declared in the alphanumerical part below each chart.

DIAGRAMS REPRESENTED THREE-DIMENSIONALLY

Three dimensional representation is an important help in using data which otherwise may be difficult to understand. This is why the 3D representation is used.

Three dimensional graphic representation on grids enables a definition to be made of a square grid containing a number of elements which exceeds or is equal to the number of data to be represented. A parallelepiped is constructed on each grid element whose height is proportional to the value of the data to be represented in the element.

An algorithm is used to optimize the vision by covering the unseen zones.

In function of the amount of data to be represented (i. e. the number of the elements of the grid) the user can decide under which axonometrical correcting angle the e screen at.

Fig. 04 represents different grids seen from different angles. One cannot fill all the elements of the grid in order to supply a better vision of the data, this type of the representation is particularly useful when dealing with very large quantities of data where trends and exceptional events must be identified such as peaks, depressions, levelled situations, etc..

The elements of the grid can also be associated with simple terrain elements obtaining the so called discrete representation. This is especially effective in representing phenomena without specific geographical address such as population in scattered houses t economic and land potentials, etc..

Three dimensional representations are also preferred for pie-charts to guarantee a pleasing, comprehensive vision.

All the colours allowed by the system are used in pie-charts to make the phenomena and data clearly readably.

The user can choose from among the various types of representation and use them in different combinations.

ABOUT THE SOFTWARE

The software is user friendly oriented any peculiar skill in informatics is not requested, the planner, the engineer, etc. can approach it easily obtaining dramatic vision of data base which he was customer to see as group of insignificant data.
Technically speaking the software uses some machine language routines for speeding up the calculations and cutting the time of waiting for the user. The graphics are obtained using a modified version of Ampersand Basic Primitives.
The time needed for obtaining the graphics is function of the time devoted to process data before than they will be shown through images.
Software is written partially in high level language and partially in machine language code.

ABOUT THE HARDWARE

The system is based on a Apple II compatible machine equipped with a graphic board with NEC 7220 microprocessor and 128 Kbytes of RAM. The colour printout are produced an IDS 80 PRISM dot impact printer.

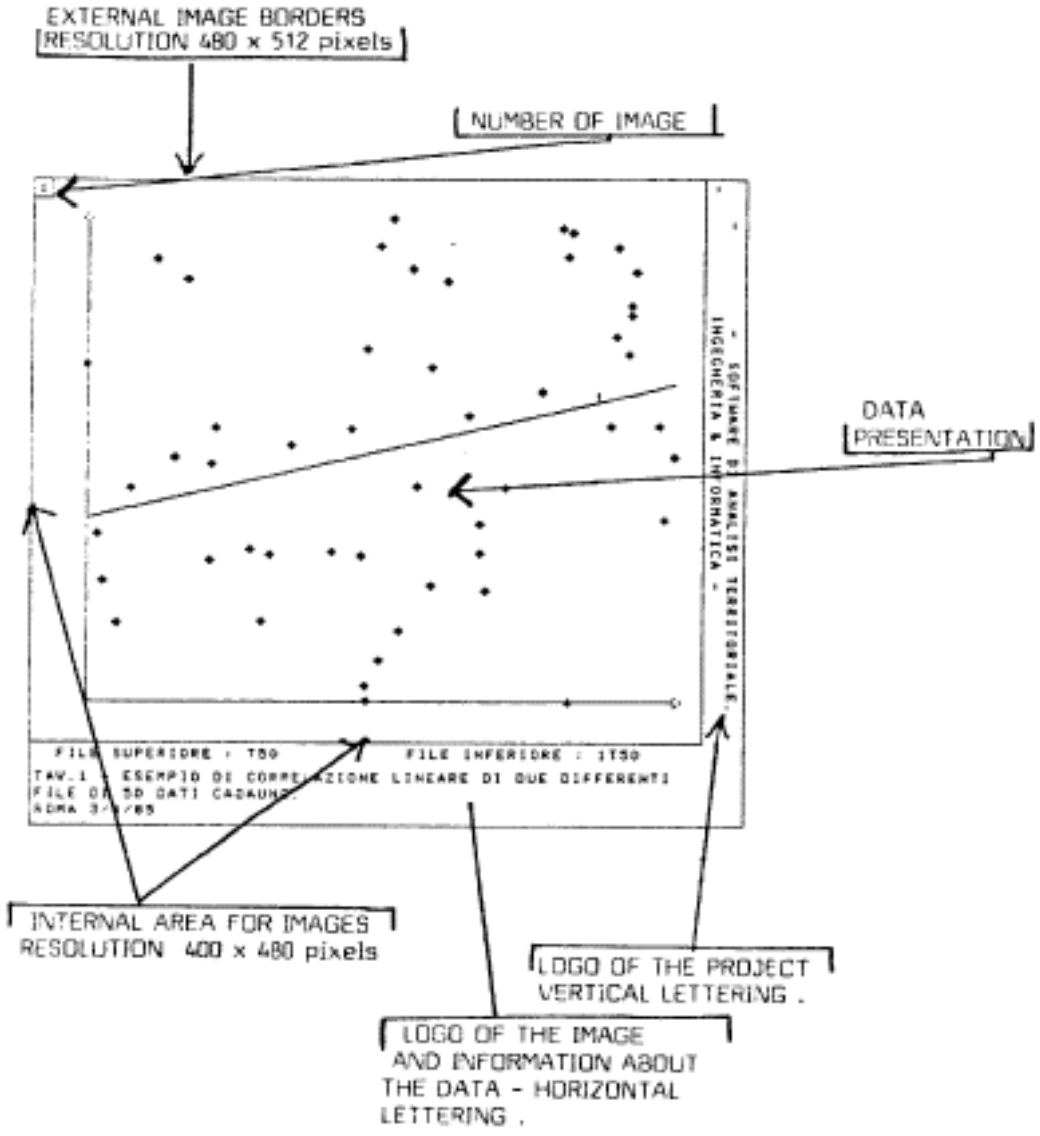
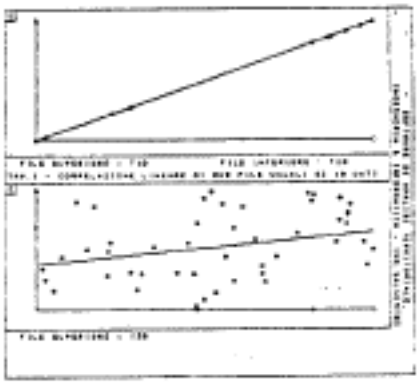


FIG. 01

General definition of the partitions of color monitors.



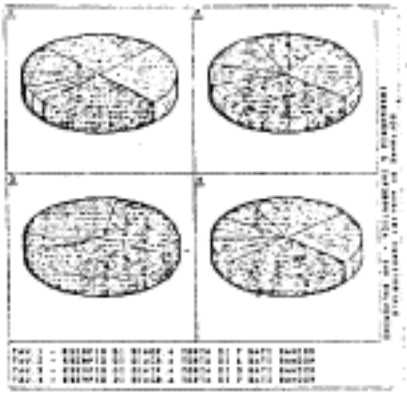


FIG. 02

The area for graphics can be divided in two or four parts.

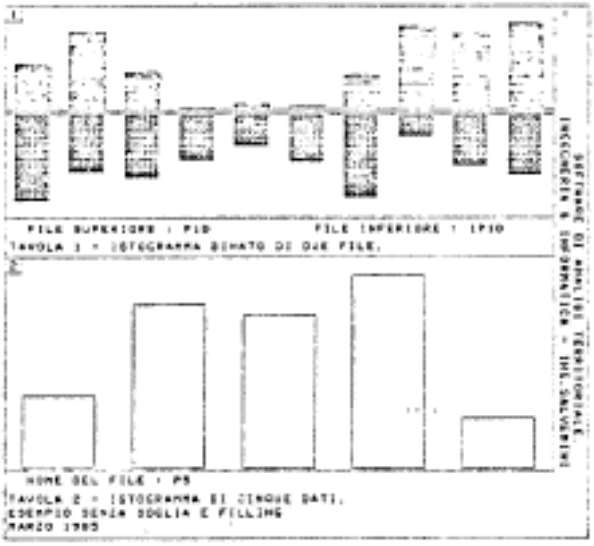


FIG. 03

Diagrams represented two-dimensionally can be filled or empty.
They can represent one or two archives contemporary.

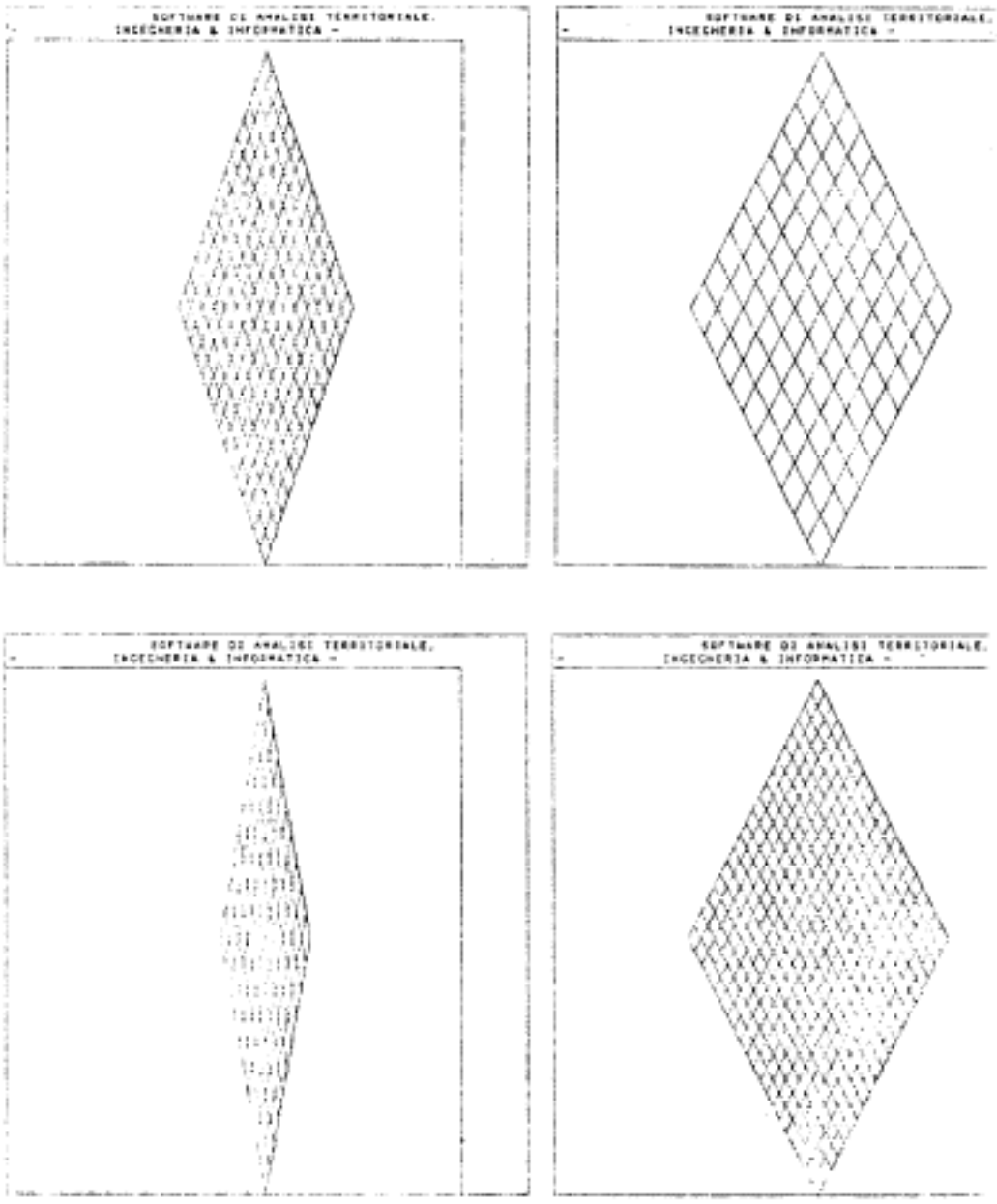


FIG.04

Different types of grids for examining data.

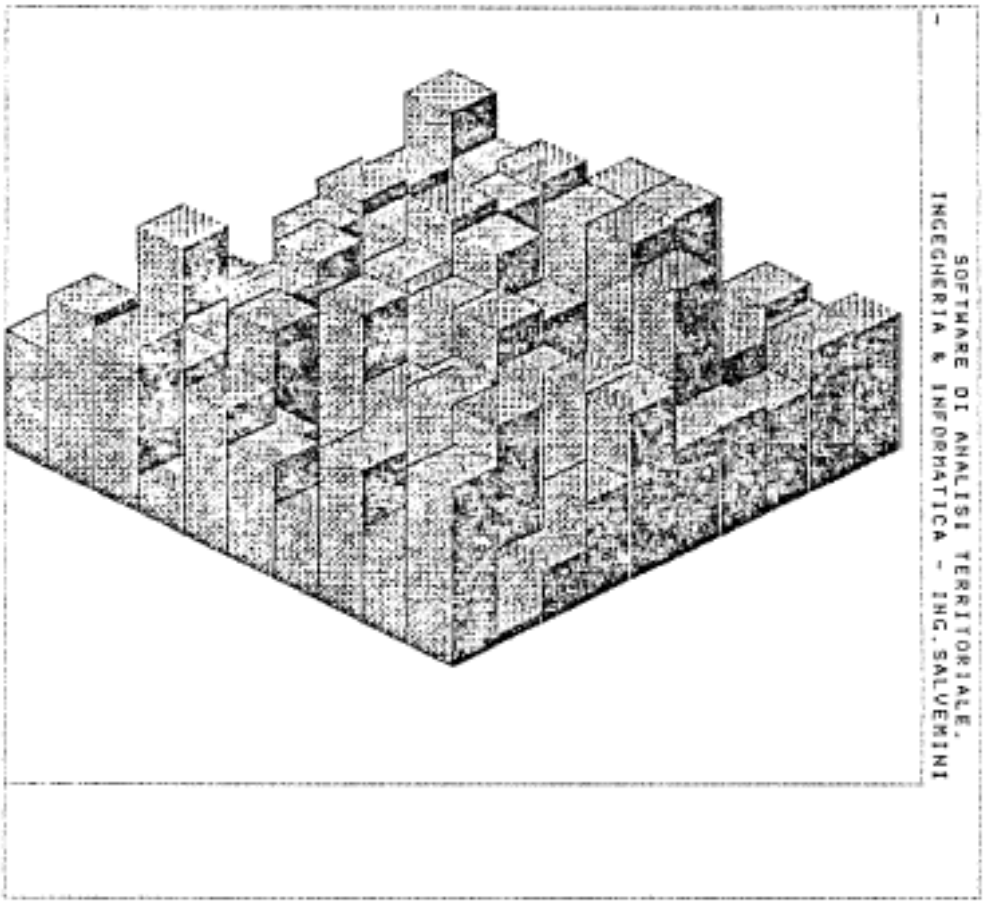


FIG. 05
An example of diagram represented three-dimensionally.
(colour plate)

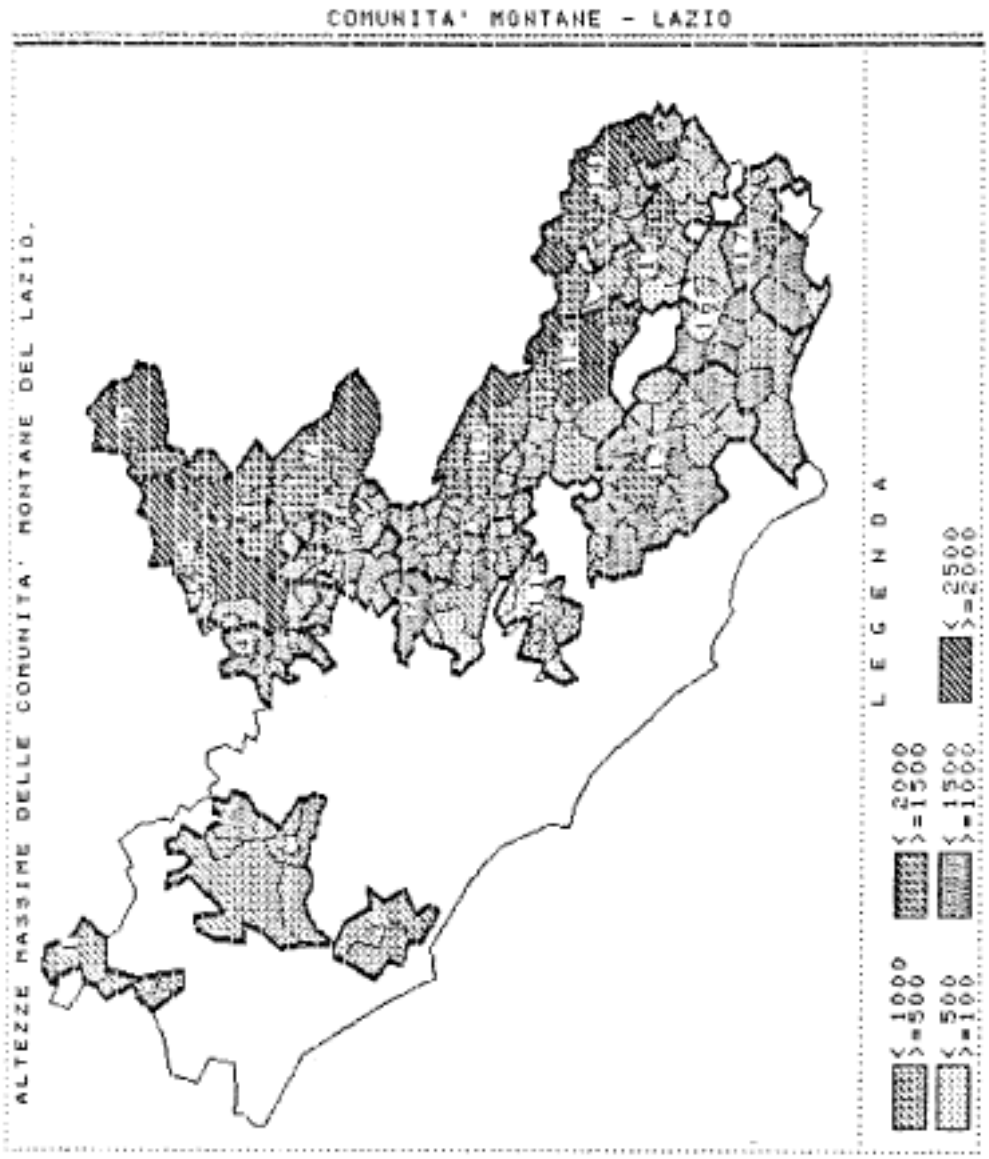


FIG. 06
Example of thematic map produced by the system.

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