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Structure of Cartography as an Application in Geography

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Abstract

Cartography (sheet of papyrus) is the study & practice of making maps. Combining science, aesthetics & techniques, Cartography builds on the premise that reality can be modeled in the ways that communicate spatial information effectively.

Keywords: Scope of Cartography; Application of Cartography; Structure of Application of Cartography; GIS; New Cartographic Problems.

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1. Introduction

Set the map's agenda and select traits of the object to be mapped. This is the concern of map editing. Traits may be physical such as roads or landmasses or may be abstract such as toponyms or political boundaries.

Represent the terrain of the mapped object on flat media. This is the concern of map productions.

Eliminate characteristics of the mapped object that are not relevant to the maps purpose. This is the concern of generalization.

Reduce the complexity of the characteristics that will be mapped. This is also the concern of generalization.

Orchestrate the elements of the map design.

2. History of Cartography

To know the absolute history of cartography, we will be back in the ancient geography that will be focused our modern cartography. Therefore, we have to know about the old age cartography.

2.1. Greek & Roman Cartography

The ancient Greeks and Romans created maps, beginning at least with Anaximander in the 6th century B.C. In the 2nd century, Ptolemy produced his treatise on cartography.

2.2. Chinese Cartography

In ancient china, geographical literature spans backs to the 5th century B.C. The oldest extent Chinese mass come from the state of in, dated back to the 4th century B.C., during the warning stated period.

2.3. Indian Cartography

Early forms of cartography of India includes the locations of the pole star and other constellations of use. These charts may have been in use by the beginning of the Common Era for purposes of navigation.

2.4. Arabic Cartography

The Arab geographer Muhammad-Al-Idris produced his medieval at last Tabula Rogeriana in 1154. He incorporated the knowledge Africa, the Indian Ocean and the Far East, gathered by Arab merchants and explores with the information inherited from the classical geographers to create the most accurate map of the world up until his time.

2.5. Modern Cartography

Modern cartography has created a new era for us. Many geographers have created digital maps. However, computer is giving an opportunity of making map that is also giving a digital world map. At present, geographers use computers to identify the country, the oceans etc correctly.

3. Scope of Cartography

a) New technologies have made the maps an important part of every life through published on the internet and mobile or small display devices. The traditional map design, however, is not suitable to be applied in the mobile devices due to the restricted mobile devices capability such as low processing power, limited storage input capability and display area.

b) This paper aims at designing better maps for effective display on mobile devices by summarizing some design issues. These constraints include both cartographical and technical problems.

c) Cartographically the map content has to be restricted to make it appropriate to display in small screen. One of the possible ways to deal with map design is to simplify the maps according to the users aim and cognitions in order to reduce the unnecessary map information. This method also helps the cartographer to overcome one of the main problems of the screen map design that is the limited size of the screen of mobile devices.

d) In this study display map design, which is a current scope of cartography, is handled especially by considering the car navigation systems. In this concept, cartographic visualization for mobile mapping is discussed with related subjects on generalization and as multiple representations in the second part of study.

4. Application of Cartography

Requirements we wish to have the following characteristics

a) Navigation in the map with functions allowing cartographic zoom. As the user scrolls around the map, he will be able to zoom on an area to see information that is more detailed. Simultaneously, when the user is over a geographic area, the shape of this area must be highlighted and some specific quantitative and textual information presented.

b) Possibility for the user to choose the kind of information he went to visualize. For example, he can choose to select the cities whose name contains a specific string of characters or the cities whose population lies between two figures.

c) Fast downloading of the maps in order to facilitate navigation (with relatively small file size).

d) The cartographic zoom of this application is entirely based on the hierarchy of the administrative entities. When the displayed map corresponds to the level n , the visible entities are those of level (n+1).When one clicks on one of these entities, the new displayed map will be centered around it, the entities of level (n+2) will be shown.

5. Structure of Application of Cartography

a) Our application is in fact a dynamical web site. We only used free software's for the application, server side; we have an apache/2.0.53 server (UNIX), with the php/5.0.3 module and MySQL/4.0.20 database. We do not need to use a GIS for this application. The 2D graphics are obviously in SVG in edition with java script for the animation.

b) Java script is used to perform the events by displaying the corresponding information. The mouse clicked events and the ECMA script standard to be compatible with most browsers.

6. Geographic Information System

The influence of the cartography has opened up cartographic methods and techniques to more general purpose uses of geographic information. Nowhere has this been more evident than in the field of geographic information system (GIS). GISs are automated systems for the capture, storage, retrieval, analysis and display of spatial data. Large number of these systems are now available to assist resource and spatial data managers with their planning and decision-making, as well as their routine record keeping and inventory. Because these systems use geographic data extensively, most of the queries made of these systems provide cartographic solutions.

As a result, these systems either are usually supplied with an interface to a separate cartographic display system or contain their own such systems. The type, quality, and capabilities of these display systems very remarkably from system to system, ranging from poor to the very best in quality. The major differences in how GISs generate maps are twofold. First, the map is either an intermediate or a partial solution to a query and may therefore not contain any of the true cartographic elements other than a figure a geo-reference system. This is not to say that the final maps that provide the problem solutions are not good cartography, but these maps instead reflect the emphasis on query and response rather than display.

Second, the user of a GIS is not always a cartographer and therefore does not place the same level of importance on the map as on the message the map conveys. GISs have become the primary way in which people are first introduced to computer cartography and in some cases to analytical cartography. It is important to realize, however, that the goals of computer cartography and the goals of geographic information processing are not always identical, although they are always similar.

The skilled cartographer should develop an understanding of GISs and should see in them the challenge of a new set of demands on the theory and methods of cartography. It is not sufficient that the computer cartographer is interested solely in the graphic display of digital cartographic data, since the structuring, encoding and the representation of the data are very basis upon which analytical cartography is built. Cartographic transformations, the basis of analytical cartography, underlie all geographic data processing and therefore are of overlapping interest to cartographers and the builders and users of GISs alike.

7. Some General Trends

There have been many general trends within cartography because of the advent of the computer. One trend has been toward simpler maps. If we were stuck with a single product, we often believed that there were savings to be made by incorporating as much data as possible on a single map. Maps have become "single message", in much the same way as business graphics, with a good example being the weather map or the sales map. These are maps being used to communicate a message. A whole school of thought within cartography has concentrated on the effectiveness of maps in communicating a particular message to the map-reader. This communication school has sought to improve map design to get the message across faster and more effectively.

The computer has given us defensible design. We can assign numbers to back up qualitative judgements. A good example is to use recognized error reduction techniques to choose class breaks for shaded maps or known methods to do line generalization and simplification. So as an island may be eliminated on a map at a certain scale because it falls below a certain threshold area, rather than because it was easy to paint over the island with occupying fluid on a negative.

The computer has promoted new types of cartographic symbolization and representation; that is, we have devised new types of maps as well as new ways of making the old types. An example is the depiction of terrain. Now we can generate realistic depictions of terrain to stimulate the way the terrain will actually look to an observer. In particular, the computer has made thematic mapping available to those who are cartographers but who work with statistical data with a geographic component. The computer, therefore, has opened up mapping to those without a formal training in the discipline. This may yet prove to be the most critical advance in the acceptance of computer mapping.

Finally, we have had an enormous has expanded cartography to include computer and analytical aspects. We have had an enormous increase in both the numbers of, and demand for, the type of college course at which this book is aimed. Almost every geography program in the country offers at least some form of computer cartography. Sometimes schools offer multi semester sequences, even entire specializations in computer cartography, usually coupled with sequences in geographic information systems and remote sensing.

Increasingly, the graduates of these classes go on to find employment in the booming industry of computer cartography, well endowed, one hopes, with a sound base in the analytical aspects of the discipline, which will ensure those same students of employment in the future.

8. New Cartographic Problems

We are moving towards automatic even the toughest cartographic problems, among them the automated placement of text, an often ignored but essential part of maps and we are increasingly making maps directly from images, especially air photos and satellite images. Dealing with text has been a particularly difficult issue for computer cartography, especially because the production of text in traditional stick-up methods was undergoing its own technological revolution due to desktop publishing, photo typesetting, laser printing, and new drafting and reproduction materials.

A map is not just a collection of lines, colors, and polygons, it is also has important textual information. The selection, placement, and production of text is a very important part of cartography. Previously, this aspect was virtually ignored by almost all computer mapping system. At last, we are dealing, not only with some of the issues related to putting text on maps, but we are also working to make the computer automatically select and place text where appropriate.

To be able to have the computer decide where to put the text could automate the single most time-consuming task in Manual cartography. Text positioning must be such that it does not overlap other labels or important information, and that the laws of text placement are obeyed. A Pioneer system for automated text placement was the AUTONAP systems (Ahn, 1984).

Once the text has been selected and placed, symbolization is critical to the esthetics of the map. Choice for the text of font, color, spacing, path and slope are variables with which individual cartographers have been able to give a map certain "style". Much of the "artificial" look of computer-produced maps can be traced to text design. An effective mapping system would give the cartographer control over this intangible quality of maps.

Another problem is making maps directly from images. In the past, we used to go out and survey areas using plane tables. Later this was replaced with photogrammetry using air photos to compile and update maps. Increasingly satellites are reaching higher and higher resolutions, making them suitable for mapping at larger and larger scales, certainly scales approximately 1:50,000.

How to make maps directly from these images without the intervention of a human interpreter is the final part of this problem. Progress is being made in this area, especially in the fields of remote sensing and image processing. Features such as roads and rivers can now be identified from imagery and replaced directly with

the appropriate cartographic symbols. Mapping some of these things requires the use of artificial intelligence methods.

At the extreme, one can imagine a fully automated mapping system, acquiring data by Remote Sensing, extracting, identifying, and symbolizing the various features in the image by understanding their context and form and labeling the features by searching databases by location. Some of the more recent systems show promise of these shots of capability providing the conceptual problems can be solved in the future.

Developments In other parallel field are also influencing current events in computer cartography. Surveying has undergone its own computer revolution, and many surveyors now use COGO systems, automatic note takers and pen plotters. Similarly, the Computer-aided design industry is producing highly sophisticated tools for automating the traditional drafting process, in much the same way that paint programs are automating the artistic painting process. These technologies are influencing and being influenced by developments in computer cartography.

9. Conclusion

Finally, we can guess that cartography means not only map making but also the most important branch of geography. When people want to know about geography, they should have a knowledge about cartography. Cartography has its own tradition to make digital maps and we can take help of computer to produce better maps.

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