Business Applications of GIS

Posted on

Scene Number One: You head a construction company which plans to build a twenty-storeyed office complex in say, Male. You can make your pick from several sites. The problem is you are hardly familiar with any of them. You are faced with lots of questions. On which sites is the ground capable of supporting the massive weight of the building? What are the sites most accessible by road? Which sites will show the minimum costs for transporting construction material? On which site will the labour cost be the cheapest? A building constructed at which site will make the maximum number of entrepreneurs bring their offices to it? Will their clients and customers also find it convenient? What are the possibilities that the roads leading to a selected site will be closed in the near future for security reasons? You want answers and you want them. fast. You cannot give an infinite time period for the research people to come up with the answers. By that time your competitor may have already used a few of those sites to build his buildings.

Scene Number Two: You reach a metropolitan city in one of your business travels. You have never come to the city before. You are badly pressed for time. There are several routes to your destination from the airport and you cannot afford losing a few hours due to the heavy road traffic. Which route should you take to make the journey in the shortest possible time? Scene Number Three: You are the leader of the trade delegation team which is on a visit to South Korea. You are in the middle of a conversation with a prospective investor. He likes to build an Electronics Factory in a third world country. You tell him about the free trade zones in Katunayake, Biyagama and Koggala. The investor is doubtful. He has never been to Sri Lanka before, let alone to these three places. Is there a way to provide him with a better picture?

The above three cases illustrate three situations largely different from each other, but surprisingly, all of them have the same solution to use a GIS.

To give a general definition, GIS (Geographical Information System) is a software system capable of assembling, storing, manipulating, and displaying geographically referenced information, i.e., data identified according to their locations. In fact, there is nothing new in the fundamental methods used in this process. Throughout the history of mankind, various geographical information had been gathered and

analyzed in a systematic manner. (Historians say pre- historic hunters drew maps illustrating the best hunting grounds!) Somehow, until the arrival of GIS, the results that could be obtained from these methods were confined by the limitations of the capability of humans to analyze such a problem. Unlike computers, Homo Sapiens are neither capable of digesting a huge quantity of the information nor of doing massive calculations.

It was not the computer professionals who put Geographic Information Systems into a different category from the other software systems. To them, a GIS is only a collection of a few familiar software tools and engineering techniques. Desktop mapping utilities, Computer Aided Design (CAD) software, Remote sensing technologies (particularly, the ones which make use of satellites) and relational database systems are widely used to build Geographic Information Systems. However, the way these tools are exploited in GIS are different. For example, the databases used in these systems should be able to store visual and graphical data like maps, charts etc., in addition to the text based data they normally store.

The reason for adding geographic data to a conventional data management system is to provide users the ability to retrieve and analyze information in the most convenient, clear and easily understood form. GIS provides benefits to almost any business. Recent studies indicate that benefit-to- cost ratios of upto seven to one can be achieved by implementing Geographic Information Systems in organizations that use Geographic processing as a basis for their work.

At the fundamental level, a GIS provides the facility to extract different sets of information from a map (roads, settlements, vegetation, etc.) and use these as required. This provides great flexibility allowing a paper map to be quickly produced which exactly meets the needs of the user. If required, it goes further. Because the data is stored on a computer, analysis and modelling become possible.

GIS has traditionally been used to explore the earth and to exploit its resources. GIS technology, as an expansion of geography, has enhanced the efficiency and the analytic power of traditional mapping. Now, as a bonus, GIS is be coming an essential tool in the effort to understand the process of global environmental change. Various map and satellite information sources can be combined in modes that simulate the interaction of complex natural systems.

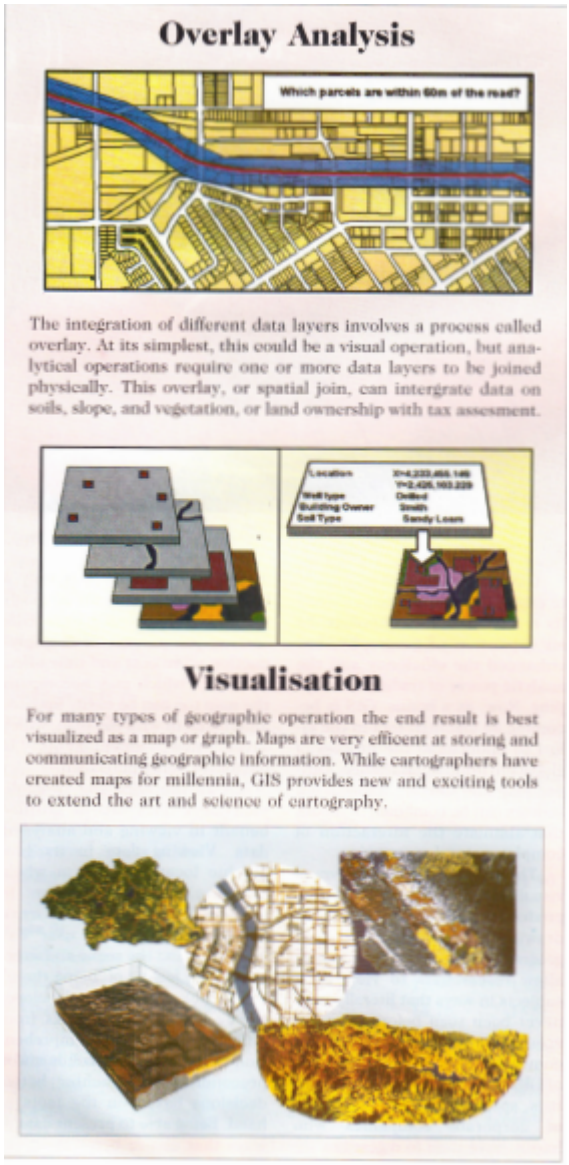
Through a function known as visualisation, a GIS can be used to produce images, not just maps, but drawings, animations, and other geographic products. These images allow researchers to view their subjects in ways that literally have never been seen before. The images often are equally helpful in conveying the technical concepts of GIS study subjects to non-scientists, specially to busy executives of corporate companies who hardly have time to digest raw information. Though, it is only a basic feature, maps can be easily updated and changed on a GIS, making the process of map production more cost and time-effective. Data which may accompany the map too can be easily updated and linked in with the map, which saves new amendments of databases being published.

Of all the GISS the three-dimensional ones are of greatest benefit in viewing and analysing data. Viewing data in its geographic location opens a whole new level of comprehension. In addition, by applying some Virtual Reality features, the user can ‘travel’ around the scene and experience the feeling of ‘being there’. This enables the user or developer to see how the data looks from different angles. Data comprehension is an important factor and a precondition in reaching better decisions based on the facts at hand. Being able to present data in ways that assure better comprehension and understanding, puts a powerful tool in the users’ hands, especially when they are the decision makers. Once the data is properly understood it can also be better analyzed and the conclusions drawn from it can become more meaningful.

There are many different applications of GIS. The Survey department in the US now have most of their maps stored digitally on computers, making it easier and cheaper to produce and distribute them. As computers can manipulate maps so well, areas of land can be ‘zoomed in’ upon to give greater detail. They are also in the planning stage of incorporating postal codes into a GIS, so that if a house on any street was clicked upon, the post-code and house number would be displayed.

GIS can be used to help reach a decision about the location of a new housing, that has minimal environmental impact, is located. in a low risk area, and is close to a

population center. The information can be presented succinctly and clearly in the form of a map and accompanying report, allowing decision makers to focus on the real issues rather than trying to understand the data. Because GIS products can be produced quickly, multiple scenarios can be evaluated efficiently and effectively. Other countless applications exist, mainly in the business area, such as planning and transportation, utility services (gas, electricity etc.) and in computerised route planners. A GIS-aided planning system, for example, would enable the user to ask the computer to describe two buildings from an attached database (much more information than could be displayed on a paper map) and then to calculate the best route between. these. Such information could be gathered in seconds. Some GISS can even be used to do market researches. For example, a consumer products manufacturer can obtain the day-to-day sales of a product on a geographical basis. These details, he could efficiently use in planning and production.



Until recently, the use of GIS had mainly been confined to the public sector in the developed countries. The implementation and adoption of GIS solutions by the private sector has become more and more pronounced, as the cost of converting maps and engineering drawings, which provide the basis for every GIS is a fraction of what it was ten years ago. Moreover, quality data is now readily available from data providers.

In the private sector, GIS start up generally begins in the marketing areas. Some examples are service center location, customer distribution and transportation networks. Plus geographic add-on tools are unique components that integrate into

existing development environments, enhancing their capabilities by adding full GIS and surface analysis functionality to a wide range of application areas. They help developers gain direct access to geographic functions, without having to master new systems and worry about how to integrate them into their familiar programming environments.

Market researches show that about 30% of current GIS users term their use as ‘operational support’. 50% term it as an ‘intermediary tool, while the rest say that GIS plays a strategic, on-going role. It has also been observed that more and more developers are joining the professionals who apply this new technology in an unprecedented number of application arcas.

In recent years, the Internet also has become an important tool for GIS. With the help of this, information can be transmitted around the world in a matter of seconds, meaning that up-to-date ideas and data can be received and contributed to by millions of people.

As the Internet and GIS are both computer based, very little. effort needs to be put into transmit maps and databases down the street or to the other side of the World. As the data changes, new data can be put up on the web, enabling existing users to download the latest version. Ordnance Survey, for example, offers users the ability of taking samples of maps from the Internet.

Real time information is becoming increasingly popular and useful, and is available on the Internet. Data can be downloaded as it happens. For example, the latest satellite image of Europe can be viewed or a real time map of the traffic situation in Los Angeles. This means you will be able to know the traffic flow situation on a particular highway in Los Ange les more quickly than whether or not there is a traffic jam on Galle Road at the moment.

Whatever the applications, the Internet provides a very useful and efficient means of communicating data around the World. Many disciplines can benefit from GIS techniques. An active GIS market has resulted in lower costs and continual improvements in the hard- ware and software components of GIS. These developments will in turn result in a much wider application of the technology throughout government offices, business, and in industry.

The condition of the earth’s surface, atmosphere, and subsurface can be examined by feeding satellite data into a GIS. GIS technology gives researchers the ability to

examine the variations in earth processes over days, months, and years. As an example, the changes in vegetation throughout a growing season can be animated to determine when drought was most extensive in a particular region. The resulting graphic, known as a normalized vegetation index, represents a rough measure of plant health.

These analyses are made possible both by GIS technology and by the availability of digital data on regional and global scales. The satellite sensor output used to generate the vegetation graphic is produced by the Advanced Very High Resolution Radiometer or AVHRR This sensor system detects the amounts of energy reflected from the earth's surface across various bands of the spectrum for surface areas of about 1 square km. The satellite sensor produces images of a particular location on the earth twice a day. AVHRR is only one of the many sensor systems used for earth surface analysis. More sensors will follow, generating even greater amounts of data.

Due to the rapidly falling prices of hardware and software, GIS is now affordable to a growing number of users. Once the GIS technology is readily available, including the maps and the data at affordable prices, everybody can start benefiting from enhanced applications.

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