

Introduction

To provide something better than the existing should be the main concern of a planner. Since long time people have studied the world using models such as maps and globes.

From the last 4 decades it has become possible to put these models into computers along with the tools to analyze them in the form of Geographical Information systems. The twentieth century has witnessed great innovations in the field of communication one of which being the development of Geographical information system or called as GIS as its called in the 1960's. Representing of the world with its attribute information became a good way to perform several tasks. A geographical information system lets u visualize information on new ways that reveal relationships, patterns, and trends not visible with other popular systems. Geographical information systems are computer-based systems that are used to store and manipulate geographic information and the technology has developed so rapidly over the past 2 decades that it is now accepted as an essential tool for the effective use of geographical information. They represent a database that links information to location, allowing us to see and analyze data in new and useful ways. It lets you visualize information on new ways that reveal relationships, patterns and trends not visible with other popular systems. Its capability to link descriptive information with maps makes it a natural solution. The features on the map are organized according to relative positions or locations and the relationships are called as spatial relationship. GIS combines layers of information about a place to give you a better understanding of that place. Depending upon the requirement we can combine layers of information. It can produce information much more quickly, achieve higher mapping standards and keep data more current than was before. Hence this technology has provided an exciting potential for geographic information to be used more systematically and by a greater diversity of disciplines than ever before. More than 90% of urban affairs involve the use of geographical information systems.

Problem Statement

The Basic problems to be discussed here is representing KFUPM in its various forms of available services and also create a database for various features attached in the attribute tables as know that in GIS a one-to-one correspondence is established between the spatial features and their attributes. Along with that some of the analysis for the data attached will be generated in the form of some bar charts and pie-diagrams to show the analyzing power of GIS. There will be two maps generated. One for the total campus and the other for the academic campus. The purpose of studying the academic campus separately is because of its existence as a separate entity in itself.

Literature Review

In this mobile world it's really very difficult to find any individual who is not familiar with the technology of Geographical information system or simply GIS as its called. Geographic Information systems are computer-based systems that are used to store and manipulate geographic information. The technology has developed so rapidly over the past two-decades that it is now accepted as an essential tool for effective use of geographic information. The recent and widespread introduction of the GIS has created a sudden need for users of geographic information to become knowledgeable about this technology. This technology has provided an exciting potential for geographic information to be used more systematically and by a greater diversity of disciplines than ever before.

GIS can be described as the systematic introduction of numerous different disciplinary data, connected by their shared location on the planet, which can be used to record and inventory the environment, document observations of change and constituent processes. GIS also permit predictions based on current practices and management plans. **(Ian McHarg, Forward to the History of Geographic Information Systems, 1996)**

GIS are simultaneously the telescope, the microscope, the computer, and the Xerox machine of regional analysis and synthesis of spatial data. **(Ron Abler, in: Getting Starting with Geographic Information Systems, 1996)**

Very simply put, a GIS combines hardware, software and data to spatially reference information. **(Patrick McGlammery and Melissa Lamont, in: Database, December 1994)**

A geographic information system (GIS) is a fast growing technological application, for both the public and private sectors that comprises a billion dollar market annually. This technology combines data retrieval with data display... It also represents an opportunity to create information and to manipulate that information or data...by using a GIS. Patterns and trends become apparent: the old adage, "a picture is worth a thousand words", applies. **(Peter Hernon, in: The Journal of Academic Librarianship, July 1995)**

An information system that is designed to work with data reference by spatial or geographic coordinates. In other words, a GIS is both a database system with specific capabilities for spatially referenced data, as well as a set of operations for working with the data. **(Star and Estes, 1990)**

<http://www.geog.mcgill.ca/heeslib/giS.html>

There has been several works done of this kind all over the world. One has been on University Mapping in GIS in the University of Oregon, Eugene. This was basically on Campus planning, public safety and Publications and that was in the form of Parking Map, Accessibility Map, Callbox Map, Bicycle Map, History, open-space analysis, Library and Law School site analysis, Campus Tree Collection Atlas.

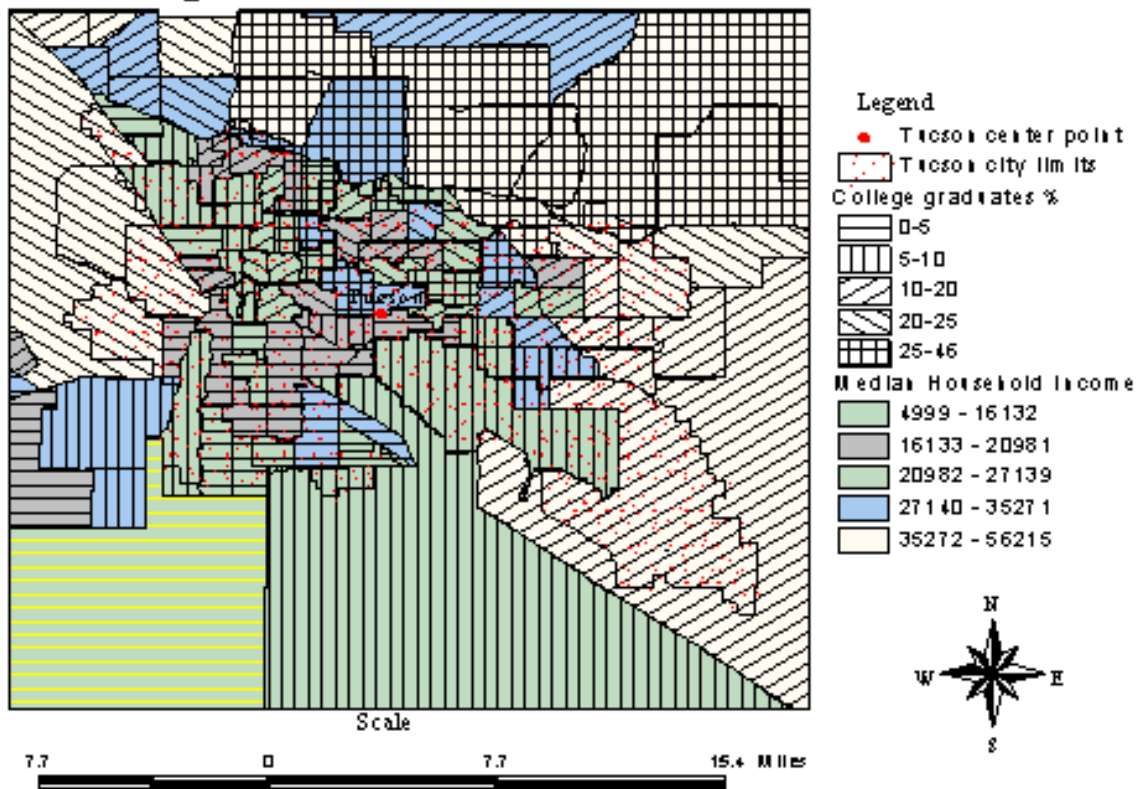
<http://geography.uoregon.edu/infographics/projects.html>

Some of these kind were done in University of Utah, New student programs on **Campus Virtual tour** in the year 1999 followed by **Parking and transportation model study**, campus design and construction between the year 1993-97.

<http://www.digit.utah.edu/digitlab/projects.html>

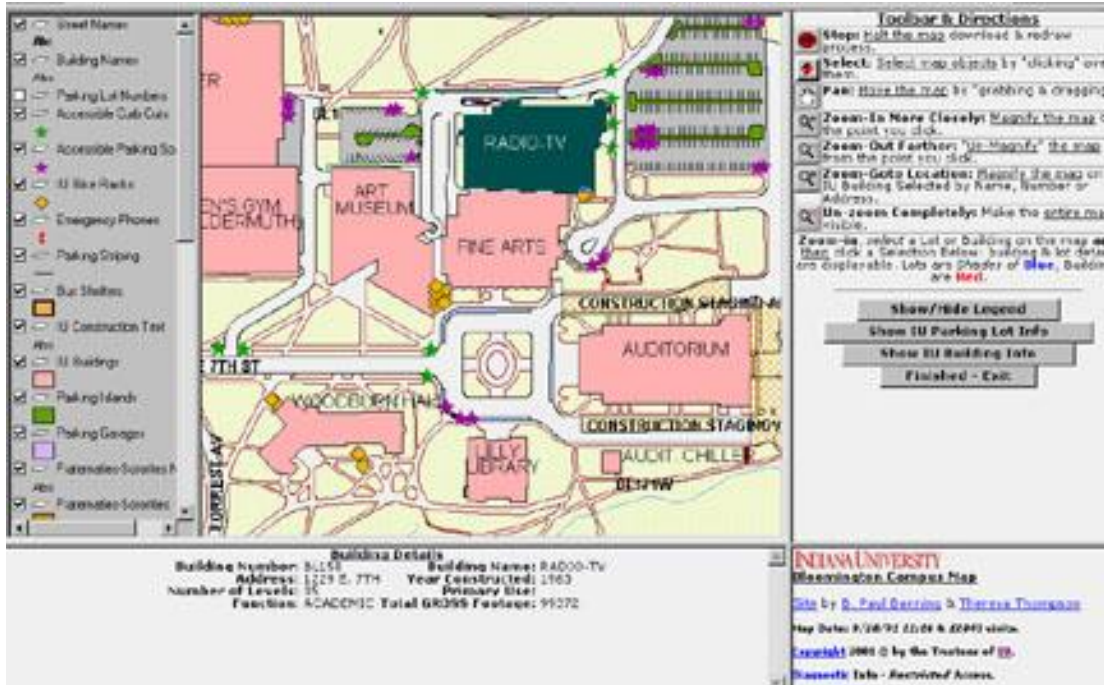
The following figure shows a project done in the University of Arizona for the median household income of the college graduates in the year 1990 and this was done using the Arcview software.

Median Household Income and % of College Graduates, 1990 in Tucson, Arizona



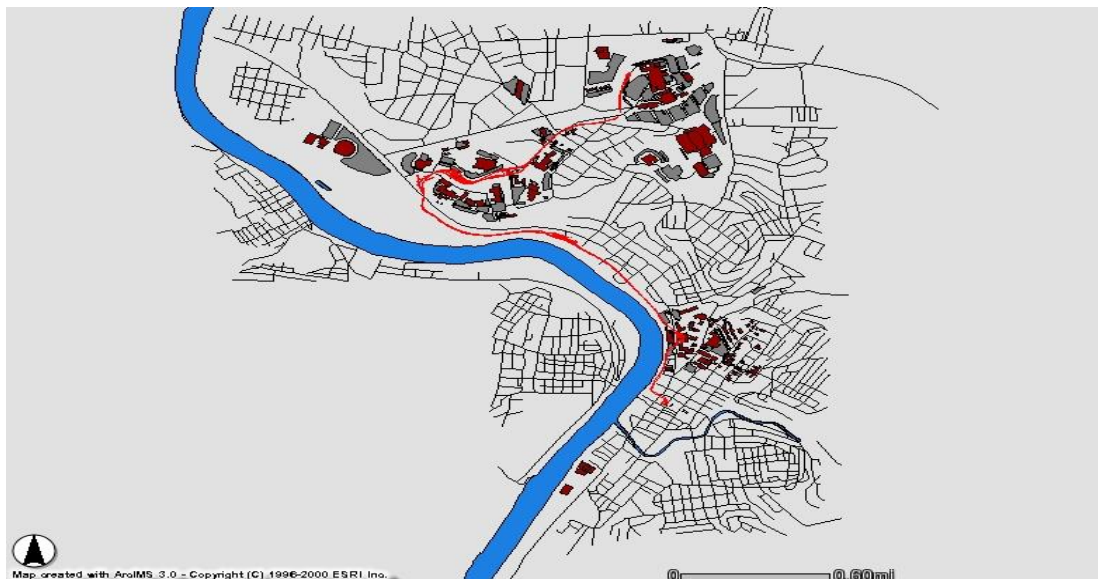
<http://www.library.arizona.edu/library/teams/set/sample.html>

The following map represents the University of Indiana with the various forms of its services.



http://www.indiana.edu/~uao/html/campus_images.html

The following is a map created on Arc IMS by West Virginia State GIS Technical center.



<http://www.earth.wvu.edu/wvucampus>

Along with that GIS has been used in various other arenas such as land use planning, forestry, municipality and transportation planning.

Area of Study

King Fahd University of Petroleum & Minerals is located in Dhahran, between the headquarters of the Saudi Arabian Oil Company (SAUDI ARAMCO) and the Dhahran Air Base. The campus is situated near the Arabian Gulf at a distance of about seven Kms from the town of Al-Khobar. The port city of Dammam, capital of the Eastern Province, is only 20 kilometers away and the oil refinery at Ras Tanura is 70 kilometers from the campus. The academic buildings are located on a 100-foot mountain, which forms the main attraction. The 900 acres of the University are divided into three Sectors: North, Central, and South. The North Sector consists of the Preparatory Year Campus, the North Staff housing compound, and the student dormitories. The Central Sector contains all the academic facilities: classrooms, laboratories, faculty offices, the University administration, the Research Institute, the Library, the Information Technology Center, and many support facilities. The South Sector contains faculty and senior staff housing.

Tools of Study

Environmental research system institute located in New York, USA as the vendor of products like ArcView, ArcInfo and ArcGIS has created havoc in the world of GIS.

ArcGIS was used here for the project.

ArcGIS is a comprehensive, integrated, scalable system designed to meet the needs of a wide range of GIS users. The three desktop GIS components of ArcGIS are:

- ArcView
- ArcEditor
- ArcInfo

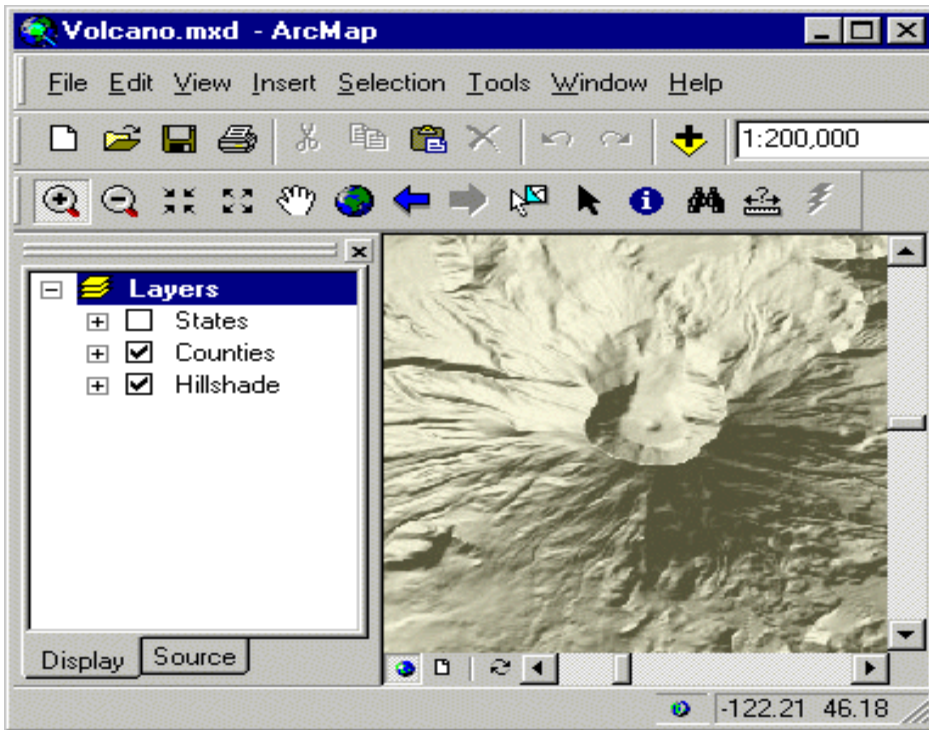
All three ArcGIS components are built from the same core technology.

- ArcView includes ArcCatalog, ArcMap, and ArcToolbox, which allow you to browse, manage, analyze, edit, and document your data.
- ArcEditor has all the functionality of ArcView plus powerful tools for editing coverages and geodatabases.
- ArcInfo provides the most functionality and includes all the capabilities of ArcEditor plus additional geoprocessing tools and a full version of ArcInfo Workstation (comprised of ARC, ArcEdit™, ArcPlot™, INFO™, and ARC Macro Language or AML™).

For completing this project I used ArcMap, ArcCatalog and ArcToolbox and the other components as being for the complex type were not used here.

ArcMap

ArcMap is the application you use to view and edit geographic data and create professional-quality maps, graphs, and reports. A map is the fundamental component you work with in ArcMap. Maps help you visualize geographic data by showing you where things are and what they look like. You can drag and drop data from ArcCatalog directly into ArcMap. When you want to work with a map, open ArcCatalog, find the desired map document, and simply drag it onto the ArcMap display area. Geographic information is displayed on a map as layers, where each layer represents a particular type of feature. In ArcMap, the Table of Contents lists all the layers shown on the map. By default, the Table of Contents is located on the left side of the ArcMap application window, but you can move it to a different position if you like. The order of layers within the Table of Contents is important; the layers at the top of the Table of Contents draw on top of the layers below them. ArcMap makes it easy to design maps for printing, embedding in other documents, or publishing electronically. For some data, other presentation methods are more effective than a map. Graphs and reports can show at a glance the information of interest. ArcMap provides many options for creating sophisticated graphs and reports.



Interface of an ArcMap document is shown above

