IMPACT OF GEOGRAPHIC INFORMATION SYSTEMS

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Abstract:

A computerized system used to manage (store, retrieve, analyze, and display) the data related to the earth's surface is referred as geographic information system (GIS). We live in a world where anyone with access to the Internet (five billion users, in fact) can create or view maps using geospatial technology. GIS plays a vital role in creating visualizations of data layers using spatial location. GIS technology can be used by professionals in a variety of fields, such as property valuation, transport route analysis, and new project publication. Spatio-temporal data, dynamic data, and location-aware computing offer significant opportunities for research in the fields of geospatial databases and data mining. The purpose of this work is to introduce Geographic Information Systems (GIS). This paper summarizes the most important GIS features, capabilities and possibilities.

Keywords: Environmental Modelling, Geographic Information Systems (GIS), Spatial Data.

1. INTRODUCTION

GIS allows us to capture each feature that is available on the earth in separate layers (Figure 1). For example, customer locations, buildings, the street network, and land use can be captured. The GIS file format is a standard for encoding geographic information in computer files as a special kind of file format for geographic information systems (GIS) and other geospatial applications. GIS software vendors, standards bodies such as the Open Geospatial Consortium, informal user communities, and even individual developers.

Research in this area explores efficient storage, retrieval, analysis, and visualization of data for analysis and pattern discovery. This encompasses a wide range of topics including improved indexing and query languages, data compression, multimedia storage and retrieval, data clustering, pattern matching, and high-dimensional data modelling. Specific research thrusts in the department include geographical databases, mapping models, anomaly and pattern detection, query processing, and spatial and scientific data mining for applications domains like bioinformatics, cyber security, sensor networks, transportation, and the web.
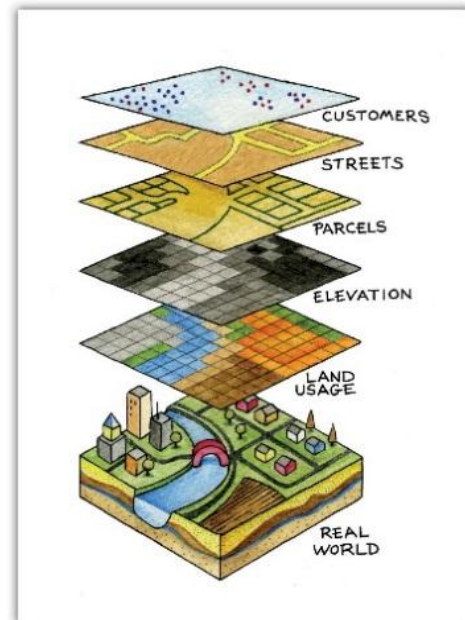

Figure 1: Layerization

KEY TERMINOLOGY

When general-purpose GIS software was developed in the 1970s and early 1980s, including programmes from academic labs such as the Hardware Laboratory for Computer Graphics and Spatial Analysis and government agencies, such as the Map Overlay and Statistical System (MOSS) developed by the U.S.

2. OVERVIEW OF GIS

A geographical information system (GIS) is a system that creates, manages, analyses, and maps all types of data. GIS helps users to understand patterns, relationships, and geographic context. It can be handled using a user interface as well as on the command line using specific programming languages like Python, etc. The usage of

Geographic Information Systems (GIS) is rapidly growing, becoming an essential tool in a variety of business sectors like engineering, environment, geography, data mining, geo marketing, and location intelligence. Figure 2 represents the functions of GIS: input (data collection), process (mapping), manage, query and analysis, visualization (share results).
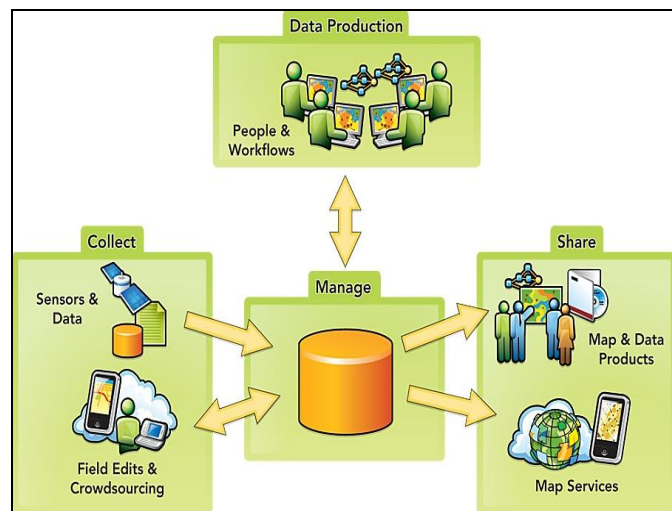

Figure 2: Functions of GIS

3. GIS IN EVERYDAY LIFE

Agriculture

GIS is being used to dissect soil data to help determine which crops would do well in certain areas. It's also helping growers develop more effective harvesting styles.

Navigation

Map operations used on smartphones and vehicles rely heavily on GIS data to optimize maps. Consumers rely on these navigation systems to reach their destinations safely.

Telecommunication and Network Services

Geographic data is used to plan and design networks for telecom companies, keeping customer needs and maintenance planning in mind. 5G mobile internet connectivity is the next big challenge.

4. IMPACT OF GIS IN INDUSTRIES

The environmental information about the land, water sources, and other natural elements can be used to discover patterns in natural occurrences such as soil erosion and help in predicting natural disasters. The local government bodies are prime users of GIS in land searches, mapping, and planning for highways, etc. Local law enforcement can use it for monitoring and tracking crime trends in certain areas in an emergency.

GIS can be used in the healthcare industry to plan hospital logistics and the fastest route to patients. It is also used to analyse outbreaks of illness in a community. GIS is a valuable tool in the planning and logistics of roadways in transportation. Mining companies can use it to create grids from old nonspatial data, map them to current information, and track changes. GIS has proven to be an essential tool for surveying, as accurate measurements are required to create an accurate mapping system.

An unusual place where GIS capability can be helpful is in advertising. Targeting consumers based on geographic regions has become one of the most innovative ways' companies have been able to reach their audience. GIS can help stores determine the optimal location to open in order to best serve

the community. They can gather socio-economic information regarding the people in an area before deciding to build. Insurance companies use data obtained from GIS-based software to analyse data in relation to risk prediction and catastrophe planning. The financial industry can benefit from his GIS technology in gathering information about consumers. It helps determine risk based on information it can gather, such as crime trends, weather patterns, and property values.

5. CAREER OPPORTUNITIES IN GIS

We should understand the fundamentals of GIS, learn cartography, and understand remote sensing. In gaining software operation knowledge one should know ArcGIS and QGIS, hands-on exercises on GIS software, etc. GIS technicians' job is to edit data, query and analyse data, and have proficiency in GIS software. Opportunities to get jobs in the top MNC companies are Infosys, TCS, Cognizant, Wipro, HCL, Tech Mahindra, Cyient, Accenture, Deloitte, NRSC, ISRO, and many more

6. CONCLUSION

In virtually, organizations are using GIS to make maps to communicate, perform analysis, share information and solve complex problems around the world by identifying the problem, monitor the changes, respond to events, perform forecasting, set priorities and understand trends. GIS is used to raise awareness and share knowledge about the environment, natural resources, potential hazards and risks, and planned urban routes.

Increasing number of AI and ML based GIS solutions support the growth of smart cities and urbanization.

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