

# Chapter 4

## Geographical Information system (GIS)

# Introduction

- ▶ Geographical Information system (GIS) are computer based system that enable users to collect, store, process and analyses and present spatial data.
- ▶ It provides an electronic representation of information called spatial data, about the earth's natural and man-made features
- ▶ A GIS system stores each category of information in a separate layer for ease of maintenance, visualization and analysis

# Definition of GIS

- ▶ A GIS is a computer-based system that provides the following four sets of capabilities to handle georeferenced data:
  - 1 data capture and preparation
  2. Data management including store and maintenance
  3. Data manipulation and analysis
  4. Data representation

# Types of GIS

1. Four dimensional GIS
2. Multimedia/hypermedia GIS
3. Web GIS
4. Virtual Reality GIS

# Multimedia and Geographical Information System(GIS)

## Multimedia

- ▶ Multimedia is a technology that encompasses various types of data and present them in an integrated form.
- ▶ There are several types of data that are used by the technology.
- ▶ Including text, graphics hyperlinks, images sound digital and analogue video and animation.

# Cont...

- ▶ Multimedia provides communication using texts, graphics, animation and video. Multimedia GIS systems is a way to overcome the limitations displayed by the technologies when they are used separately.

# GIS subsystem

- ▶ A GIS has four main functional subsystems these are:
  1. data input subsystem
  2. GIS data types
  3. Source of data
  4. Data Editing and quality Assurance

# data storage editing and retrieval subsystem

- ▶ the second necessary component for a GIS is data storage and retrieval subsystem
- ▶ the data storage and retrieval subsystem organize the data, spatial and attribute ,in a form ,which permits it to be quickly retrieved by the user for analysis and permits rapid and accurate update to made to the database.



# Application of multimedia GIS

## 1 Education:

- ▶ Education is a field where integration of multimedia and GIS can bring enormous benefits.
- ▶ Students will learn faster and more efficiently

## 2 Mapmaking:

- GIS can use and combine all layers that are available for an area, in order to produce an overlay that can be analyzed by using the same GIS.

# Cont...

## **3 Land Information:**

- ▶ GIS has aided management of land information by enabling easy creation and maintenance of data for land records, land planning and land use.

# Infrastructure and Utilities

- ▶ GIS technologies are also widely applied to the planning and management of public utilities.

## **Environmental**

- The Environmental field has long used GIS for a variety of applications that range from simple inventory and query ,to map analysis and overlay ,to complex decision making systems.

# Cont...

## **Archaeology**

- ▶ Archaeology , as a spatial discipline ,has used GIS in a variety of ways. At the simplest level, GIS has found applications as database management for for archaeological records, with the added benefits of being able to create instant maps.

# Currently Available GIS software

Some of the big players providing GIS software are:

- ▶ ESRI's Arc GIS
- ▶ Autodesk's AutoCAD map
- ▶ Autodesk's GIS design overlay
- ▶ Intergraph's GeoMedia Transportation

# Futures of GIS

- ▶ The advances in computer hardware, software and remote sensing technology will lead to more and more GIS adopting multimedia to represent data .these GIS systems coupled with the multimedia technologies will result in a powerful and richer presentation of information and ideas to stimulate interest and enhance information retention.
- ▶ The GIS of future will also be more user friendly and accessible to the common man

# CHAPTER 5

## Cloud computing

# cloud computing

- ▶ A cloud computing is a computing paradigm where a large pool of systems are connected in private or public networks, to provide dynamically scalable infrastructure for application, data and file storage.
- ▶ It is a practical approach to experience direct cost benefits and it has a potential to transform a data center from a capital-intensive set up to a variable priced environment.



# Cont...

- ▶ the difference that cloud computing brings compared to traditional concepts or “grid computing”, “distributed computing”, “utility computing”, or “autonomic computing” is to broaden horizons across organizational boundaries.

# cloud computing model

- ▶ cloud providers offer services that can be grouped in to three categories
  1. Software as a service (SaaS)
  2. Platform as a service(PaaS)
  3. Infrastructure as a service(IaaS)

# Software as a service (SaaS)

- ▶ in this model a complete application is offered to the customer, as a service on demand. A single instance of a service runs on the cloud and multiple end users are serviced.

# Platform as a service(PaaS)

- ▶ here, a layer of software, or development environment is encapsulated and offered as a service, up on which other higher levels of service can be built .the customer has the freedom to build its own application, which run on the provider's infrastructure.

# Infrastructure as a service(IaaS)

- ▶ IaaS provides a basic storage and computing capabilities as standardized services over the network . servers, storage system, networking equipments, data center space etc are pooled and made available to handle workloads.

# Understanding Public and Private clouds

- ▶ Enterprises choose to deploy applications on public ,private or hybrid clouds.
- ▶ Cloud integrators can play a vital part in determining the right cloud path for each organization. Major categories s of cloud computing are,
  1. Public
  2. Private and
  3. hybrid

# Public cloud

- ▶ Public clouds are, owned and operated by third parties they deliver superior economies of scale to customers, as the infrastructure cost are spread among a mix of users, giving each individual client an attractive low cost , 'pay as you go' model. All customer share the same infrastructure pool with limited configuration, security protections, and availability variance.

# Private cloud

- ▶ Private clouds are built exclusively for single enterprise. They aim to address concerns on data security and offer greater control, which is typically lacking in a public cloud,
- ▶ Two variations to private cloud are:
  - On-premises private cloud
  - External hosted private cloud



# Hybrid cloud

- ▶ Hybrid cloud combines both public and private cloud models. With a hybrid model, service providers can utilize 3<sup>rd</sup> party cloud providers in a full or partial manner thus increasing the flexibility of computing .the hybrid cloud environment is capable of providing on-demand, externally provisioned scale.

# Cloud computing benefits

- ▶ Some of the typical benefits are:
  1. Reduced cost
  2. Increased Storage
  3. Flexibility

# Cloud computing challenges

- ▶ the benefits outweigh the drawback and the model is worth exploring. Some common challenges are:
  - Data protection
  - Data Recovery and Availability
  - Management capabilities
  - Regulatory and compliance Restrictions