Planning Data Analysis

Dr. Ghada Farouk Hassan
Teacher Assistant At Urban Planning And Design Department
Faculty Of Engineering-Ain Shams University
ghadafhassan@yahoo.com
Difference between Data & Information
Forms of data
What is a document
Types of Information
Sources of Data
Data Analysis
Building an Information System
GIS As Tool Of Analyzing Data
Planning data analysis
Difference between Data & Information

- **Data is:**
  In dictionary: facts taken as true as the starting point of a piece of reasoning

- **Information is:**
  In dictionary: knowledge about something

When data is transferred to knowledge, it becomes an information

Data is useful only if it gives information
Forms of data:

Data can be in form of tables such as the max and min temperature different site or the velocity of winds in different times of the year. Basically there is relationship between columns and rows. Data in the form of spread sheet are describing different issues with no relation between rows and columns.
Forms of data

- **Forms of data:**

  Orthophotos is an accurate data form that helps in determining the natural state of urban features.

  ![Orthophotos](image1)

- **Photos:**

  Data can be in the form of photos. Such form of data may describe existing conditions.

  ![Photos](image2)
Forms of data

Forms of data:

For developing and providing settings and contexts, photographs are a crucial source. It’s a methods to determine material, culture, the behavior of groups, and able to record the use of spaces, landscape and residents. But researcher should not rely solely on photographs as source of data.
Forms of data

- **Forms of data:**

  Maps
  Data can be illustrated in form of maps
  Data provided through maps differ in level and accuracy according to their scale and used tools
Forms of data

- **Forms of data:**

  Data can be illustrated in form of charts
  It is a way to present the primary analyzed data

  ![Charts]

  Sound is source of data used in specific case (example, determine diseases, determine materials)
What is a document

**Documents** are papers, maps, photos, tapes, films where different types of data are recorded, kept or illustrated.

**Documentation** is the act of registering data in different forms.
Types of Information

Types of information
There are two types of information
1- the Qualitative information
2- the Quantitative information
Types of Information

There are two types of information:

1. The Qualitative information:
   - It is information that cannot be described through numbers.
   - It concerns to find qualities rather than quantities.

   - The Qualitative information is taken through:
     - Photos
     - Surfaces
     - Sound
     - Multimedia
Types of Information

Types of information

1. the Qualitative information

Qualitative information can be assessed through grades (high/low, – or good/bad, or positive/negative) according to the research objectives.
Types of Information

There are two types of information:

1. Quantitative information
   - it is information that can be described through numbers, it is the way to determine amounts
   - this is taken through tabular charts and maps.

2. Quantitative information
   - it is information that can be described through numbers, it is the way to determine amounts
   - this is taken through tabular charts and maps.
Types of Information

One document can provide both:

Quantitative information
Such as % of different uses

And
Qualitative information
such as the location and types of uses
## Sources of Data

<table>
<thead>
<tr>
<th>Source</th>
<th>Data Verification</th>
<th>Primary Source Consideration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Field studies</td>
<td>Data needs to be verified through more than one source.</td>
<td></td>
</tr>
<tr>
<td>Literature studies</td>
<td>Data needs to be verified through more that one source.</td>
<td>Experiments results can be considered as primary source</td>
</tr>
<tr>
<td>Experiments</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Archival studies</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Determining the convenient and available source of data represent an important step in building the Information System.
Data Analysis

What is meant by analysis:

In dictionary: to analyze something is to divide it up into the parts of which it is made, separate out the different materials of which a mixed material is made up.

Scientific Data analysis is a way to get information that leads to a specific target through the integration of different data.

It is the act that transforms data to information.

Notes

Targets

Goals
Data Analysis

Ways of Scientific analysis

1. Dividing things to its primary components:

Identifying different components and their relationship
(Example: type and amount of gases in the air)
Data Analysis

- **Ways of Scientific analysis**

1- Dividing data to its primary components:

Target is in this case to identify adequacy of proportions of different uses (components)
Data Analysis

Ways of Scientific analysis

- Summing up different data/information into one new information

Examples: overlay of different maps
**Ways of Scientific analysis**

- Comparison between different data/information or according to measurement tools.

Measurement tools can be:
- standards,
- indicators,
- criteria, .......

Datum line

- North
- West
- East

Qtr: 1st Qtr, 2nd Qtr, 3rd Qtr, 4th Qtr
Data Analysis

**Ways of Scientific analysis**

- Deducing the rate of change of data (rate of growth, evolution, ...)

Target in this case is to predict the growth direction and population after \( \Delta \) years.
Building an Information System

- Lack of spatial understanding leads to wrong decision

The problem is:

A- to determine what data and information is needed for the purpose at hand
B- to find out if it exist and where
C- to get hold of it if it exists and how to collect it if it does not
D- how to store this information in easily accessible and referenced form
E- how to interpret the data, resolve questions of quality, contradictions and incompleteness
F- to determine where information is needed and in what form
Building an Information System

- The information system is
  Formalized steps to capture information
  As well as
  Fixed procedures to retrieve this information

A GIS is
  an information system capable of **holding and using** data describing places on the earth’s surface

It can be described as an **organized collection** of computer hardware, software, geographic data and personnel designed to efficiently capture, store, update, manipulate, **analyze and display** all forms of geographically referenced information

GIS tasks are

₁- the storage, management and integration of large amounts of spatially referenced data
₂- the analysis tools
₃- the organization and management of data
GIS As Tool Of Analyzing Data

Any geographic information system should be capable of six fundamental operations in order to be useful for finding solutions to real-world problems, which are:

- Data Capturing
- Data Modeling & Storage
- Data Query
- GIS Data Analysis
- Data Display
- Data Outputting

..now let's go into it
Data Capturing

Data describing geographic features is contained in a geographic database. The geographic database is an expensive and long-lived component of a GIS, thus data entry is an important consideration.

A GIS must provide methods for entering geographic (coordinate) and tabular (attribute) data. The more input methods available, the more versatile the GIS.
GIS DATA SOURCES

Field Survey:
(Total stations – Levels – ..)

Photogrammetry
Remote Sensing
GPS
Laser Systems
Paper Maps
Documents

Files:
(Auto Cad – Sound – Video – Excel – Multimedia)
Images
More importantly, GIS has analysis and query tools to support many important uses.
Data Query

A GIS must provide tools for finding specific features based on their location or attributes. Queries, which are often created as logical statements or expressions, are used to select features on the map and their records in the database.

A common GIS query is determining what exists at a particular location. In this type of query, the user knows where the features of interest are, but wants to know what characteristics are associated with them.
GIS Data Analysis

There are many types of geographic analysis. While this course cannot cover all of them, two common types of geographic analysis are described below.

1 - Proximity analysis

Proximity analysis uses the distance between features to answer questions like:

• How many houses lie within 100 meters of this water main?

• What is the total number of customers within 10 kilometers of this store?

• What proportion of a certain crop is within 500 meters of the well?

GIS technology often uses a process called buffering to determine the proximity relationship between features.
Overlay analysis

The integration of different data layers involves a process called overlay. At its simplest, this could be a visual operation, but analytical operations require one or more data layers to be joined physically (i.e., combined into one layer in the database). Overlay analysis could be used to integrate data on soils, slope, and vegetation or land ownership data with tax assessment data.
Data Display:
A GIS also needs tools for displaying geographic features using a variety of symbology. For many types of geographic analysis operations, the end result is best visualized as a map, graph, or report.

Michigan’s Most Densely Populated Counties

- **Oakland**
- **Kent**
- **Washtenaw**
- **Genesee**
- **Wayne**
- **Kalamazoo**
- **Ingham**
- **Macomb**
Data Outputting

Sharing the results of your geographic labor is one of the primary justifications for spending resources on a GIS. Taking displays created through a GIS (maps, graphs, and reports) and outputting them into a distributable format is a great way to do this. The more output options a GIS can offer, the greater the potential for reaching the right audience with the right information.
Planning data analysis

- Determining needed data
- Searching fields
- Estimating of Different sources
- Analysis tools
- Data analysis
- targets

Unavailable data
Unaccomplished data