Geoinformatics

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Preface

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Hundreds of thousands of organizations are using Geoinformatics to make maps that communicate, perform analysis, share information, and solve complex problems around the world. Geoinformatics basically deals with geographic information system (GIS), a spatial system that creates, manages, analyzes, and maps all types of data. Every day, GIS powers millions of decisions around the world. It makes a big impact on our lives and you might not even realize it.

The geoinformatics course contents are as below:

Section 1: What is geographic information system (GIS)?

- Lecture 1: Introduction to GIS
- Lecture 2: GIS information provision
- Lecture 3: Geocoding for survey and natural experiment
- Lecture 4: GIS for biodiversity management
- Lecture 5: GIS for natural resource management

Section 2: What is Geographic Data?

- Lecture 6: Spatial data collection, storage and management
- Lecture 7: Spatial data visualization
- Lecture 8: Spatial data process
- Lecture 9: Spatial data create
- Lecture 10: Spatial data analyze

Section 3: How Geographic Data Applied in the Study of Real-World Issues?

- Lecture 11: Social applications of GIS
- Lecture 12: GIS to solving real world problem (Nankai trough hazard map 1)
- Lecture 13: GIS to solving real world problem (Nankai trough hazard map 2)

- Lecture 14: GIS to solving real world problem (CO_2 emission)
- Lecture 15: GIS to solving real world problem (Biodiversity)

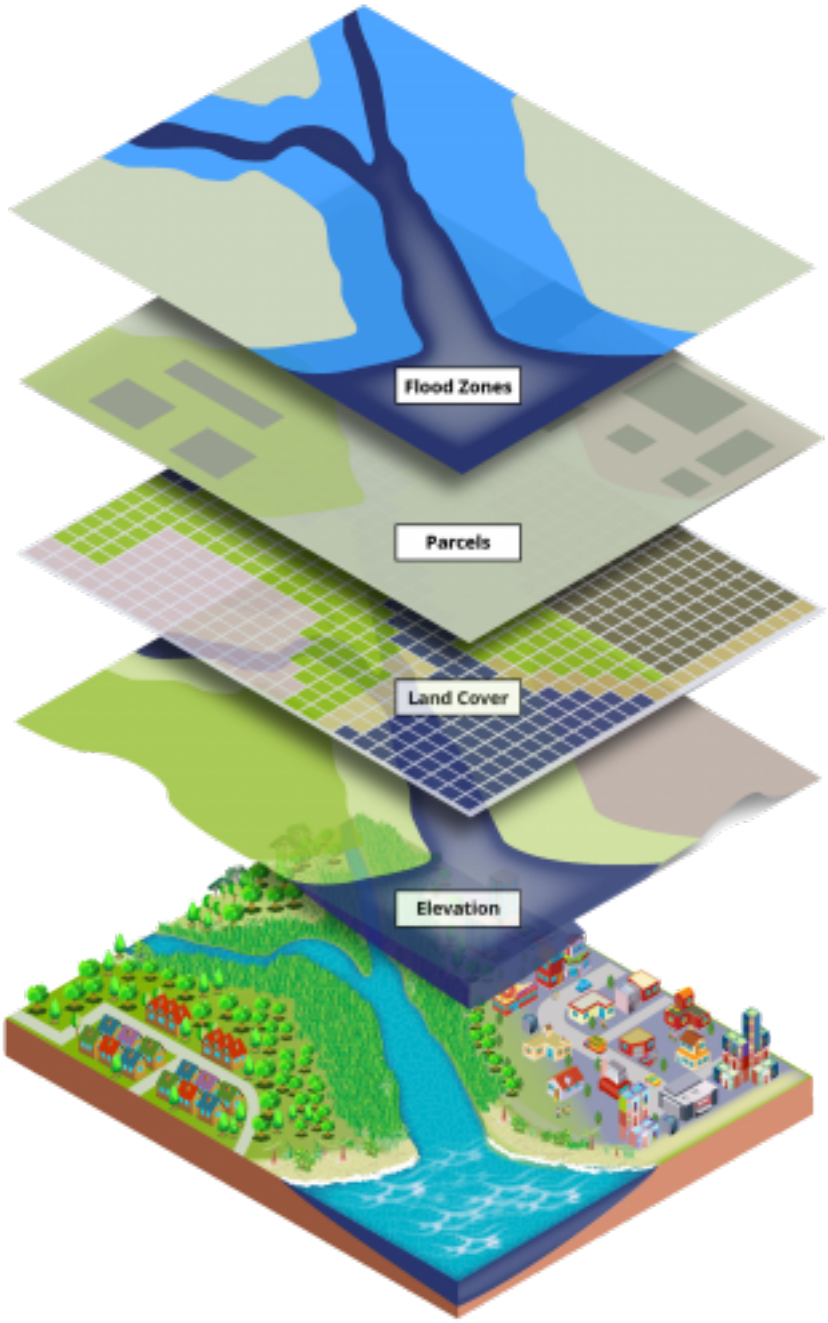

Figure 1: Geographic Information System

1 Introduction to GIS

1.1 Defination of Geoinformatics

- Geoinformatics is the science and the technology which develops and uses information science infrastructure to address the problems of geography and related branches of science and engineering.

1.2 Why we need to study Geoinformatics?

- Geoinformatics become very important technology to decision-makers across a wide range of disciplines.
  - Agriculture
  - Climate change
  - Oceanography
  - Business location planning
  - Architecture
  - Telecommunications
  - Criminology
  - Aviation
  - Biodiversity conservation
  - Urban planning
  - Land use management
  - Navigation systems
  - Public health
  - Environmental analysis
  - Military
  - Transport network planning
  - Maritime transport

1.3 Geographic coordinate system (GCS)

- A geographic coordinate system is a three-dimensional reference system that locates points on the Earth's surface. The unit of measure is usually decimal degrees. A point has two coordinate values:
  - Latitude and
  - Longitude

1.4 How to find coordinates on Google Maps on the mobile app?

- Open the Google Maps app on your iPhone or Android phone
- Enter the location, or select and hold to drop a pin on the map of the location you want the coordinates for
- Scroll down to find the coordinates.
- Tap the coordinates to copy to your phone's clipboard
- Paste the coordinates

1.4.1 Find coordinates on Google Maps on your phone or computer, to identify and share the location of Eikokuji Campus of Kochi University of Technology.

1.5 Software

- We will primarily use QGIS and R software.
- Why?
  - These are powerful and free
  - Industry standard GIS
  - You are likely to see it again
  - Available in this lab
  - You can install in your own machine

2 GIS information provision

3 Geocoding for survey and natural experiment

4 GIS for biodiversity management

5 GIS for natural resource management

6 Spatial data collection, storage and management

7 Spatial data visualization

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References