GEOG 482/582 | GIScience II | FALL 2015

FINAL PROJECT: EVALUATING HEALTH SERVICES IN LANE COUNTY UNDER PROJECTED URBAN GROWTH SCENARIOS

Objective: Lane County is expected to undergo significant population increase in the next twenty years, and as a result new areas of urban development will cause a large degree of land use change. This will lead an increased demand for medical services, particularly services provided by hospitals. For your final project, you are tasked with evaluating how a growing population will increase demand on hospitals. During this project you will:

- bring together various theory and operations learned thus far in the course to provide a solution to a location problem
- create a model that will simulate urban and population growth over time
- conduct a location problem analysis
- write a professional report to describe the problem and your findings

Learning Outcome: At the end of this lab you should be comfortable performing the following tasks:

- collecting data from a public data clearinghouse
- rasterizing multiple datasets to the same spatial extent and resolution
- performing map algebra and local statistic operations
- utilizing Model Builder in ArcMap
- developing and conducting a location-allocation analysis

PART 1: COLLECT AND ORGANIZING DATA

1. Create a geodatabase in ArcCatalog and set it as default.

2. Collect data for the following variables and save them to the geodatabase:
   a. Lane County Population (can be obtained from census data)
   b. Lane County Land Use (can be obtained from zoning data)
   c. Lane County Hospital Locations
   d. Networked Street Data

PART 2: CREATE VARIABLES AS RASTER DATA MODELS

3. Create a raster data model for land use. It is recommended to use a resolution of 100 acres.

PART 3: CREATE A MODEL OF URBAN AND POPULATION GROWTH

4. Use Model Builder to create a model that simulates urban land use expansion into forest and agriculture at five-year intervals for the next fifteen years.
5. Assign a population increase to each cell that underwent a transformation from forest and agriculture land use to urban land use.
6. Assign population increase to census tracts (back to the vector data model).

PART 4: PERFORM A LOCATION-ALLOCAITON ANALYSIS

7. Use the Network Analysis Toolbar to perform a location-allocation analysis that determines which hospitals are best able to serve the population of Lane County over time given travel times to the hospitals. You can simplify your analysis by using the centroids of each census tract as the location of demand. Calculate how urban growth will impact the number of people and the average travel time it will take people to travel to the nearest hospital.

Deliverables:

A 1500 word paper with the following components:

- **Introduction**: 300 words describing the problem and why GIS analysis is a suitable approach for addressing it. Citations are a necessity.
- **Methods**: 500 words describing the methods you undertook to produce results (do not mention software). Include a diagram that illustrates your overall methodological framework.
- **Results**: Maps and figures that demonstrate:
    - land use change patterns over time
    - population change patterns over time
    - spatial allocation of hospital services based on growing demand over time
    - recommendation for location of new hospital, and how this would change the demand on existing hospitals over time. Include a 500-word narrative that describes your results.
- **Conclusion**: 200 words that summarize your research study and explain the contributions of your research.
- **References**: does not count against overall word count.

GRADING

You will be graded based on the following criteria:

- Introduction   **20 POINTS**
- Methods   **20 POINTS**
- Results   **30 POINTS**
- Conclusion   **20 POINTS**
- References   **10 POINTS**

   TOTAL   **100 POINTS**

DUE DATE:
Sunday, December 6th at 11:59 PM
Late submissions will not be accepted.