**Lab Report**

Title: Lab 2.1

Notice: Dr. Bryan Runck

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**Project Repository:**<https://github.com/mgisselbeck/GIS5571.git>

**Google Drive Link:** *N/A*

**Time Spent:** 20 hours

**Abstract**

*Problem Statement*

*Required Data and Input Data*

*Methods*

*Results*

*Results Verification*

*Discussion and Conclusion*

**Problem Statement**

* 1. Build an ETL that (1) downloads .las files from the Minnesota DNR, (2) converts .las files into a DEM and a TIN, (3) saves the DEM and TIN to disk, and (4) exports PDFs of the DEM and TIN with correct visualization.
  2. Complete a side-by-side exploratory data analysis with a 2D map of the .las file on one pane and a 3D Scene of the .las file on another pane.
  3. Build an ETL that (1) downloads the annual 30-Year Normals .bil files from PRISM, (2) converts .bil files into a space time cube and exports it to a disk, and (3) export an animation of the timeseries.

*Table 1. Required Data*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **#** | **Requirement** | **Defined As** | **(Spatial) Data** | **Attribute Data** | **Dataset** | **Preparation** |
| 1 | LiDAR (.las) | LiDAR for Study Extent | .las | Elevation | Minnesota DNR | ETL |
| 2 | Annual 30-Year Normals | Precipitation Normals (2021) | .bil | Precipitation | PRISM | ETL |
| 3 | NCLD Land Cover | Land Cover Classification | TIFF | Land Cover | Minnesota Geospatial Commons | ETL |
| 4 | Digital Elevation Model | Elevation (Wabasha, Winona, and Olmsted County) | TIFF | Elevation | Minnesota Geospatial Commons | ETL |

**Input Data**

*Describe the data in two paragraphs max. Fill out the table.*

*Table 2. Input Data*

|  |  |  |  |
| --- | --- | --- | --- |
| **#** | **Title** | **Purpose in Analysis** | **Link to Source** |
| 1 | LiDAR (.las) | To convert data to a TIN and DEM and visualize the output | [Minnesota DNR](ftp://ftp.dnr.state.mn.us/) |
| 2 | Annual 30-Year Normals | To create a space-time cube from a multidimensional raster layer and visualize it as an .gif animation | [PRISM](https://prism.oregonstate.edu/normals/) |

**Methods**

*Part 1.1*

*Part 1.2*

*Part 1.3*

*Figure 1. Data Flow Diagram.*

*Figure 2. Data Flow Diagram.*

**Results**

*Show the results in figures and maps. Describe how they address the problem statement.*

**Results Verification**

*How do you know your results are correct? This can be a qualitative or quantitative verification.*

**Discussion and Conclusion**

*What did you learn? How does it relate to the main problem?*

**References**

*Use a common format*

**Self-score**

|  |  |  |  |
| --- | --- | --- | --- |
| **Category** | **Description** | **Points Possible** | **Score** |
| **Structural Elements** | All elements of a lab report are included **(2 points each)**:  Title, Notice: Dr. Bryan Runck, Author, Project Repository, Date, Abstract, Problem Statement, Input Data w/ tables, Methods w/ Data, Flow Diagrams, Results, Results Verification, Discussion and Conclusion, References in common format, Self-score | 28 |  |
| **Clarity of Content** | Each element above is executed at a professional level so that someone can understand the goal, data, methods, results, and their validity and implications in a 5 minute reading at a cursory-level, and in a 30 minute meeting at a deep level **(12 points)**. There is a clear connection from data to results to discussion and conclusion **(12 points)**. | 24 |  |
| **Reproducibility** | Results are completely reproducible by someone with basic GIS training. There is no ambiguity in data flow or rationale for data operations. Every step is documented and justified. | 28 |  |
| **Verification** | Results are correct in that they have been verified in comparison to some standard. The standard is clearly stated **(10 points)**, the method of comparison is clearly stated **(5 points)**, and the result of verification is clearly stated **(5 points)**. | 20 |  |
|  |  | 100 |  |