Is it Possible to Implement Spatial Data Analysis in Computer Graphics?

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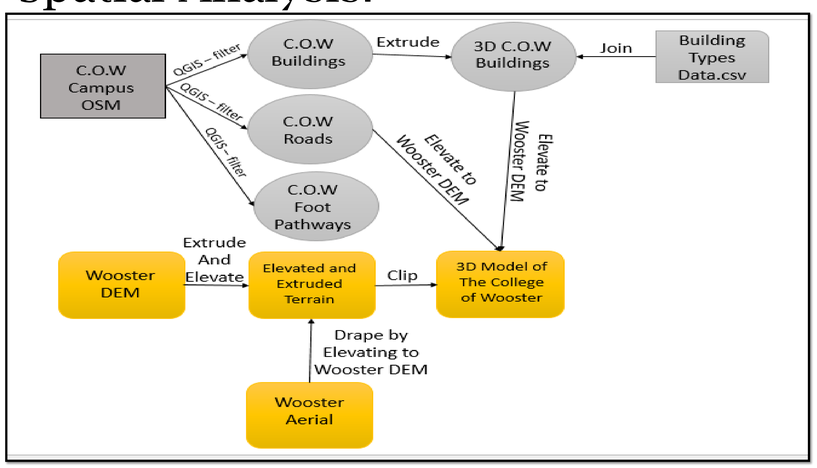
Introduction:

The purpose of this project is to answer the question in whether or not it possible to implement spatial data analysis into computer graphics. The larger scope is develop foundation points for potential future projects such as Independent Study. The reason spatial data comes into play in creating computer graphics is that is plays a role in realism. Spatial data can bring realism into graphics without having to extensive build the worlds, whether small or large, from the ground up. The spatial data is foundational start when attempting to bring the real world to graphics. The key between spatial data analysis and computer graphics is shapefiles. Object files are easy to import into a majority of graphic related programs such as blender and unity or even self-created tools.

Methods

- All data is accessible online: OpenStreetMap, The City of Wooster, Wayne County GIS Department
- QGIS:
  - Created vector layers and saved as ESRI .shp files
    - Polygons – "Building IS NOT NULL"
    - LINES – "HIGHWAY IS residential, secondary, OR tertiary"
    - LINES – 'HIGHWAY' IS Footpath
- ArcGIS:
  - Extrude and elevate Wooster DEM for terrain spot elevation
  - Extrude buildings
  - Elevate Wooster aerial, roads, and buildings to Wooster DEM
  - Join building type data to building polygons
  - Clip

Spatial Analysis:



Sources:

- Building Polygons, Roads, and Foot Pathways - OpenStreetMap
- Wooster DEM - The City of Wooster
- Wooster Aerial - Wayne County GIS Department

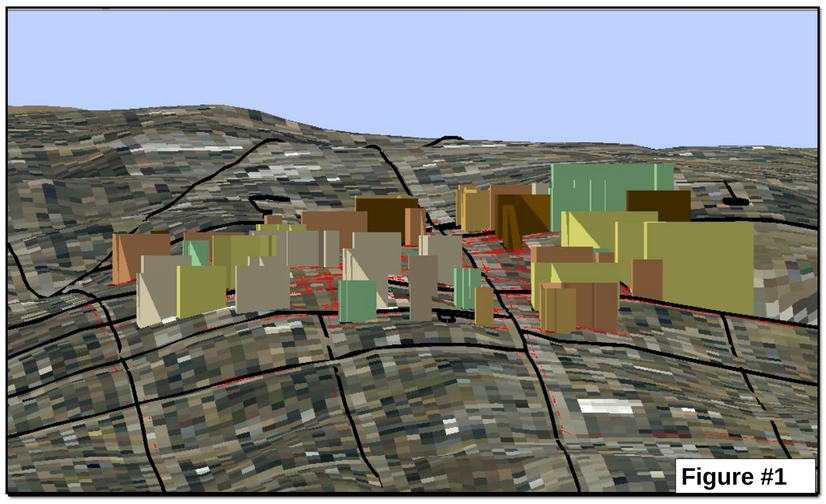


Figure #1


Figure #2

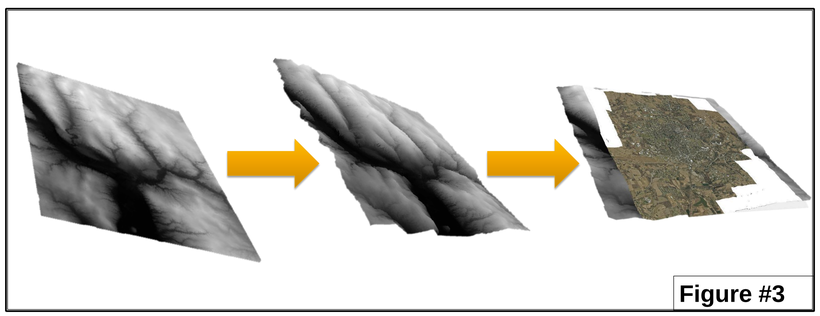


Figure #3

Results #1:

- DEM, Digital Elevation Model, of Wooster for the terrain of the scene is elevated and the aerial of Wooster is draped over the DEM by being elevated to the same height of DEM. Essentially sets the entire scene. Figure #3

Results #2:

- Elevated extruded building polygons, road lines, and foot pathways lines to the same height as the Wooster DEM then added to the scene's symbology of the polygons and lines to create the entire scene of the campus. Figure #1, #2, and #4
- Exported data from ArcGIS into Blender as separate 3D objects to create the foundation for graphic design. Figure #5


Figure #4

Conclusions

- Yes it is possible to implement GIS into computer graphics
- GIS opens the doors to geographical realism in graphics
  - Blender, OpenGL, Unity, etc…

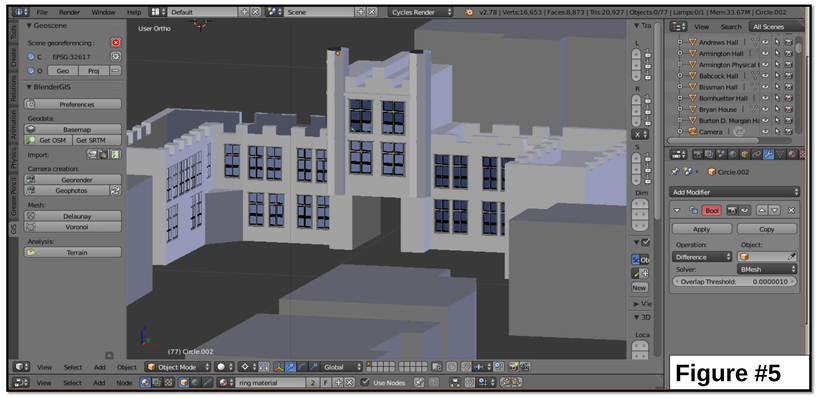


Figure #5