New Techniques for 3D Mapping the Mansfield University Campus
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ABSTRACT

With the implementation of three dimensional technology, new doors in the mapping industry have been opened. Through the use of programs such as ESRI’s ArcMap, ArcScene and other programs, many different 3D visualizations can be created to show different perspectives of campus that can be used for a variety of applications. The 3D mapping research project was established in order to use new technology to enhance maps and mapping experiences here on Mansfield University campus, hopefully to aid in marketing and attracting potential students to the university.

This project is particularly interesting because very little research has been done in this field regarding three dimensional mapping. With using many of these techniques there can be a way in which they can be used for a variety of purposes, including marketing, presentation of information, and even for potential students to the university.

The purpose of the project is the testing of the viability of using ESRI’s CityEngine program is being examined as a way to view realistic building features. The PIX4D program will be the focus of the next step of the project as it progresses past this semester into the next few years. There are also plans to render the buildings in the PIX4D visualization program, thus providing a more realistic experience for audiences and viewers. The buildings that are represented in the imagery. This type of visualization in three dimensions can be created for the entirety of campus and surrounding areas.

METHODS

The project was launched by collecting data that was needed to successfully create a raw render of the campus topography in three dimensions. After successfully locating a two foot contour, that contour was then clipped to the Area of Interest (AOI).

This clip (Fig. 2A) was then exported to ArcScene and a triangulated irregular network (TIN) was created from the contour (Fig. 2B). An orthophoto was then draped over the TIN and rendered with a vertical exaggeration of 1.5 strength (Fig. 2C).

A Mansfield University buildings layer was then added to the TIN. Using the height field designated in the attributes table of the shapefile, the buildings were successfully extruded to represent rough heights of the buildings. This gives the appearance of the university buildings being raised above the surface of the TIN in the raw rendering (Fig. 2D).

After the raw rendering was completed, each building in the buildings shapefile was exported into its own layer. This was done to extrude each building to a specific height in the SceneViewer on ArcGIS Online. The buildings are initially represented by a two dimensional polygon that can be extruded into a three dimensional which in turn can be given a unique height value. The pictures below and to the right are renderings that were created using the SceneViewer application and then including an imagery base map from Google.

The buildings are geo-referencing in such an accurate spot that the shadows from the imagery match up with the building footprints, creating a sense of the buildings actually casting the shadows seen on the imagery. This type of visualization in three dimensions can be created for the entirety of campus and surrounding areas.

FUTURE PLANS

The future plans for this project include the implementation of a three dimensional campus tour that can be integrated with Virtual Reality to create an immersive experience for audiences and viewers. The buildings that are represented in the SceneViewer are not level on the top or bottom. Plans are currently being made to fix this minor setback.

There are also plans to render the buildings in the PIX4D visualization program, thus creating realistic building features. The PIX4D program will be the focus of the next step of the project as it progresses past this semester into the next few years.

The viability of using ESRI’s CityEngine program is being examined as a way to view campus and edit the three dimensional features in a more streamlined program. This will provide work as the project continues past this semester.