

Historically Preserving Trim Castle using 3D Scanning Technology

Historical preservation of buildings is an effort to maintain an accurate record that can be used to rebuild historic structures and to understand the history of the building, as it was when it was first constructed. Methods of historical preservation have been improving with the introduction of new technologies such as 3D laser scanning. 3D laser scanners are used to historically preserve buildings because they can create a point cloud that accurately depicts what a structure looks like in 3D. You can think of it as a 3D picture, where pixels in an image would be like points in a point cloud. These point clouds allow us to be able to look at what the historic building looked like at the time the scan was taken. What's more is that using the program Cyclone, a point cloud imaging program, we can manually change what the building looked like. For example if a building is missing a wall when we scan it, we can add a wall later when working in Cyclone. Furthermore, 3D laser scanners are efficient. They can scan a large structure, such as a castle, in under 3 weeks. This is a huge improvement on traditional methods of recording what the building looks like; before 3D scanners, drawings and pictures would be taken to collect as much information on the architectural features of the building as possible and would take up to a year depending on the size of the project to accurately record information and measurements. 3D laser scanning is the most efficient method to preserve historic buildings.

Over the summer of 2016, a Ithaca College research group, led by Professor Michael 'Bodhi' Rogers, was granted permission by the Irish Government to be the first to use 3D laser scanning technology to preserve Trim Castle, located in Trim, Ireland. Trim Castle is the largest Norman Castle in Ireland and was also the castle used for the movie Braveheart. We got to learn many interesting facts about the castle while scanning. We were given four weeks to scan the exterior of Trim Castle, including the Keep, the Barbican Gate, and the Curtain Wall. We started the scanning process by setting up our coordinate grid. This means that we placed the scanner over a fixed primary location; in our case it was a manhole cover so that if we went back we could set up on it again. Next we set out a target over a different fixed location and in the northern direction from where the scanner was located. This created a grid that was oriented with the cardinal direction north. From here we set out more targets and scanned them into our coordinate grid. These target locations will be where the scanner could be placed in the future. If we scan at a target location it becomes a scan location. At every scan location there is a point cloud associated with it, and when we import the scans into Cyclone each point cloud will be put together. The point clouds will fit together like a puzzle, except they can overlap. Once we have everything in Cyclone we can start cleaning up the point clouds by getting rid of unnecessary parts of the scan, like cars in the road. This is what our task was when we got back to Ithaca. We spent most of the summer cleaning up scans, and analyzing the point clouds. Once completed we will send Trim Castle a copy of the point cloud so they will have access to what the castle looked like when we scanned it over the summer of 2016.

In the future, we hope to have a 3D mesh of Trim Castle. This is a smooth 3D model of what the point cloud looked like. The benefits of a mesh is that it can be

viewed online, which could allow for people to see what Trim Castle looks like from anywhere in the world. Our hope is to make a virtual tour that includes information about the castle, and will be an open space to navigate. This means there is no track that the tour will follow, but rather the user can move the camera to wherever they want, sort of like Google earth but realistic looking. For purposes of historic preservation we aim to have a mesh with notes explaining significant aspects of the architecture, and a complete history of Trim Castle, all within the same file. This makes recalling the castle to be used for future renovations or history research efficient.

Using 3D laser scanning technology to preserve historic structures is the future of historic preservation. Already it has proven to be more efficient and accurate. It was our goal over the summer of 2016 to scan Trim Castle to historically preserve the structure of the castle.

Background:

- How historically preservation worked before 3d laser scanning
- What laser scanning is and why it makes historic preservation easier and better
- What our project is in Ireland and how we will use our scanner to historically preserve Trim castle

Method:

- Explain without jargon the process of scanning, steps and all
- How to get to final point cloud

Results:

- Summer work and how we cleaned up the point cloud

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