

Digital Reconstruction of St Andrews Blackfriars Chapel

Description, Objectives, Ethics, Resources
CS5199 — University of St Andrews

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1 Description

This project aims to use 3D modelling software to make a full reconstruction of the ruins of Blackfriars Chapel in St Andrews. The produced model will then be exported into the Unreal game engine. The software used for modelling will be Blender, as I have some past experience with this software from a prior project. The final version of the model is to be incorporated into a wider "Digital St Andrews" project which aims to show what much of the town and historic buildings would have looked like at their construction.

Similar projects within St Andrews have been completed by the Open Virtual Worlds team [1] including reconstructions of the St Andrews Cathedral, St Salvator's Chapel and St Andrews Castle.

Throughout the course of the project I aim to learn 3D modelling techniques and gather information about the site to result in a completed model of the friary as well as accompanying information about the project and the history of the building. This could be extended into a more interactive reconstruction using the Unreal engine and virtual reality tools.

2 Objectives

2.1 Primary Objectives

- Familiarise self with the Blender and Unreal software.
 - Use tutorials to learn the software and how to effectively model objects in 3D.
 - Document the learning process.
- Create a context survey on Blackfriars.

- Collect pictures and information about the present state of the chapel.
- Research history of the building using online resources and books as well as communications with the School of History.
- Model individual parts of the chapel.
 - Creating the exterior of the building in Blender using the gathered research to create a best guess of the look of the building.
- Assemble the chapel in Unreal.
 - Assembling the individual parts of the chapel in Unreal, including texturing and some lighting.
 - As well as the building itself, creating the terrain around it.
- Take 360 degree photos within Unreal to create a 3D tour.
 - Similar to projects by the Open Virtual Worlds Team, a web-based tour of the building should be made consisting of set areas made up of 360 degree images.
- Create a website for the project.
 - Include information about the chapel and the project as well as access to the tour.

2.2 Secondary Objectives

- Fully model and furnish the inside of the building
 - Model furnishings and decorative pieces to flesh out the interior of the building.
 - Additional, realistic lighting for the interior.
- Provide further interactability with the recreation
 - Full 3D tour using Unreal and producing an executable file. Additional scope for providing an online accessible experience.
 - Utilising Virtual Reality technology such as Google Cardboard or other headsets. This could provide a virtual museum with additional information about the building.

2.3 Tertiary Objectives

- Introduction of characters
 - Scope for experimentation with modelling more complex objects and using animations.

- Possibility to be made interactable within Unreal or have a "schedule" and a path to follow.
- Improve texture and graphical quality
 - A catch-all objective to further improve the fidelity of the recreation.
 - Research and learn how to create more realistic textures using bump and displacement maps.
 - Further improve lighting and overall model quality.

3 Ethics

A user survey may be undertaken to evaluate the interactable aspects of the recreation. For this a reason an artefact evaluation form has been completed and submitted alongside this document.

4 Resources

To undertake this project a PC with sufficient memory and graphical capabilities is required. Due to the Coronavirus pandemic restrictions access to school hardware is limited, though I do have a capable personal desktop and access to lab equipment if required. Blender is free software and a free personal licence can be obtained to use the Unreal engine.

References

- [1] Open Virtual Worlds team at the University of St Andrews
<https://www.openvirtualworlds.org>