The 3D Model of the Lost Church of San Pier Maggiore

From Primary Data to a Transparent Visualization for Public Engagement

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Introduction

Being the house of the largest community of Benedictine nuns in town, the convent of San Pier Maggiore was a major ecclesiastical building in Florence. Its visual heritage spreads across the neighbourhood with imagery of its patron saint -Saint Peter, on houses and tabernacles, further enhanced by the symbolic marriage between the newly elected bishop and the abbess of San Pier Maggiore, which made the church central in the community's ritual panorama. The church gathered donations from the wealthiest families of the neighbourhood, including the Albizzi and the Alessandri, whose imposing palaces still stand on the way leading to the piazza San Pier Maggiore. The lavish tombs used to display family splendour and works of art by the finest masters used to decorate the numerous chapels of the church interior. When San Pier Maggiore was demolished in 1787 with the justification of structural problems, the area was soon exploited as a public market and the architectural footprint of the massive building faded over the years. Only the 17th-century portico-façade outlived, now acting as the backbone to private apartments.

This particular case thus offers the opportunity to discuss a best practice template to factor data uncertainty into 3D reconstruction and to develop dissemination strategies that ensure academic reliability.

The first static reconstruction

The National Gallery in London promoted an exhibition, where the main task was to re-contextualize Francesco Botticini's *Assumption of the Virgin* within its original setting inside the lost church of San Pier Maggiore, alongside another, older artwork that came from the same church and also in the National Gallery: Jacopo di Cione's enormous high altar polyptych of circa 1370-71.[1] For the occasion, a 3D model of the lost church was obtained by stitching thousands of photographs together using Autodesk ReCap 360 to create a virtual neighbourhood. Design of the church interior was obtained by studying historical plans and sections., individual fragments within the apartments at San Pier Maggiore were modelled using photogrammetry and included in a plain model of the church. The team was immediately confronted with data uncertainty and with very hard and subjective authorial choices on textures and on the shape of architectural elements that art historical research could not uncover. Therefore, complying with the standards expressed in the London Charter for the Computer-Based Visualization of Cultural Heritage,[2] the team switched the virtual architecture to a transparent point cloud rendering, suggesting the extent of interpretation, though without making that explicit (Fig. 1).

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[1] Cooper and Sliwka (2015)

[2] http://www.londoncharter.org

Fig. 1. Photogrammetric reconstruction of the modern urban fabric containing the hypothetical reconstruction of the church of San Pier Maggiore, Florence. From the film: 'Reconstructing the lost church of San Pier Maggiore'.[3]

This first static model allowed to give a clear idea of San Pier Maggiore's footprint area, without committing to precise aspects of architectural detail. Though it did not give any information on the sources underpinning the reconstruction.[4]

Documenting the interpretative choices

New collaborations and successful funding rounds offered the opportunity for further archival research and constant updating of the reconstruction. Most the recent work has been dealing with optimizing the 3D model of the destroyed church to be deployed via AR on site in Florence and at the National Gallery, as part of the enriched version of the mobile app Hidden Florence. Continuous reworking on the model needed exchange of notes between art historians and the 3D modellers to amend the visual representation according to the latest archival finds (Fig. 2). This iterative process thus benefitted from accurate documentation of every interpretative choice, for the advantage of both current team members and future collaborators, and of the scholarly audience interrogating the model.

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[3] https://www.nationalgallery.org.uk/exhibitions/past/visions-of-paradise-botticinis-palmieri-altarpiece
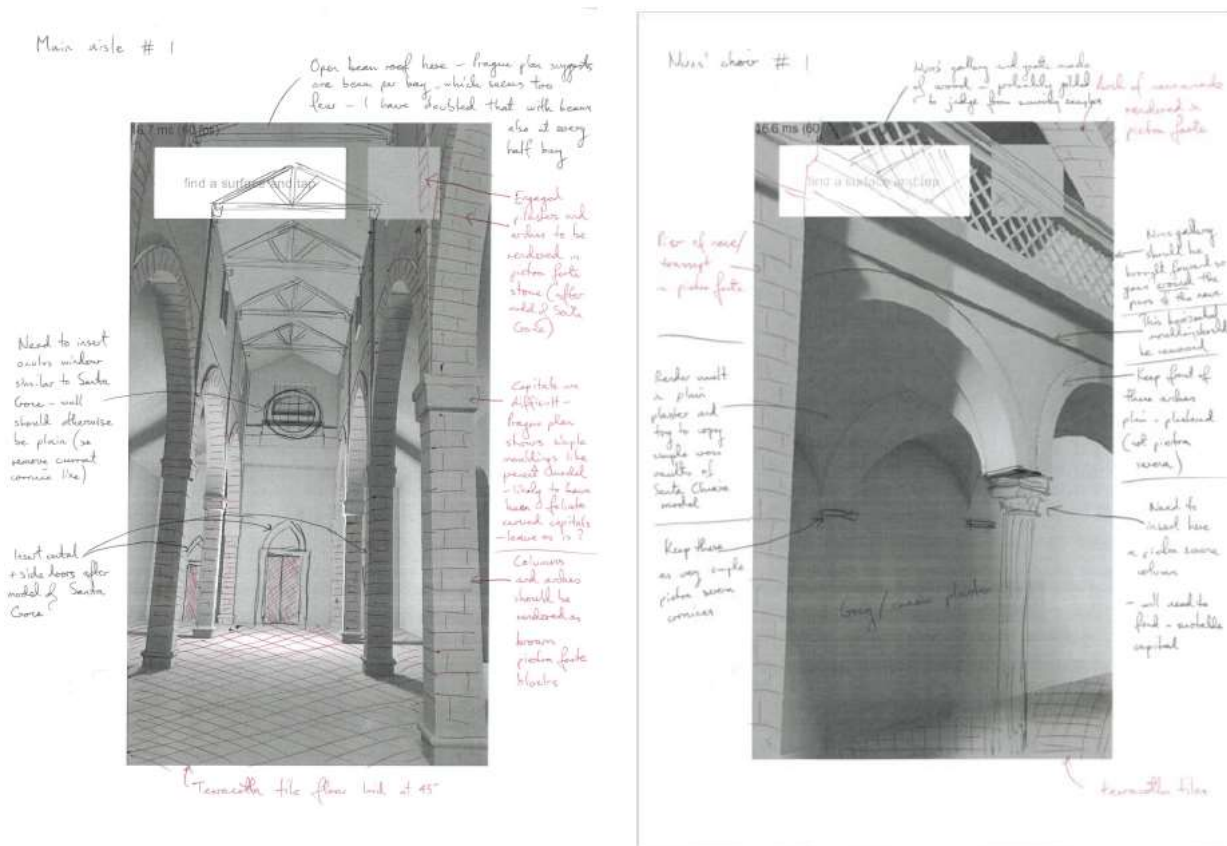[4] Cooper (2018)

Fig. 2. Marked-up screenshots of the church's reconstruction (©Cooper 2019)

This opened up the discussion on the potential of organizing all the digital resources and associated metadata in a semantically structured database, complying with ontological modelling and with FAIR principles, to ensure maximum transparency, reproducibility, and reusability. In particular, the CIDOC CRM and its extensions (CRMba) constituted an intellectual guide to model the data. A collaboration with the team at Prisma (PIN Prato) helped developing the ontological model usind the CRMba extension.[5]

As a proof of concept for the need to document and record the interpretative choices underpinning the model, the meta-case study of the nuns' elevated choir will be taken into consideration. The way the choir shall be rendered in the 3D model results from the analysis of available, though incomplete, evidence. While in most cases information underpinning 3D reconstructions is made available via textual notes, connecting the sources and arguments to the metadata structure of the 3D model seemed a more effective methodology to document the iterative process from archival research to the digital output, linking the heterogeneous sources the model relies upon. Moreover, embedding metadata via an ontological structure onto the construction of a 3D model using an appropriate vocabulary, proves successful in making digital visualizations transparent for scholarly peer-review not only within the team, but also for long-term sustainability and future collaborations, thanks to their standardised, machine readable language (Fig. 3).

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[5] Ronzino (2016)

Fig. 3. Ontological model for the nuns' elevated choir (© Ronzino, 2019)

The presentation will expand on the steps that the team followed in reconstructing and disseminating the reconstruction of San Pier Maggiore, and in the key challenges that lost buildings present. It will explore the potential of linked open data and ontologies to ensure academic reliability and facilitate the process from data collection to the digital visualisation. By acknowledging uncertainty and embedding the meta-data within the 3D visualization, the hope is that digital reconstructions could achieve the degree of scientific credibility that remains – for now – the preserve of peer-reviewed papers and monographs.

References

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