Peer Community In Archaeology

Keeping 3D data usable - the BitFROST project

Kristin Kruse based on peer reviews by *Alphaeus Lien-Talks* and 1 anonymous reviewer

Pantos George Alexis, Bonelli Letizia, Indgjerd Hallvard, Uleberg Espen (2024) Experiences from the BItFROST Project: Developing a 3D repository at the Museum of Cultural History. Zenodo, ver. 5, peer-reviewed and recommended by Peer Community in Archaeology.
https://doi.org/10.5281/zenodo.8310062

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10.24072/pci.archaeo.100412

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3D technologies are now standard methods for documenting artefacts and archaeological sites. In order to make the resulting digital cultural heritage accessible to current and future generations, a long-term approach to data management is required, with continuous adjustments and consideration of the changing needs of the users. This is the conclusion of the authors Bonelli and colleagues [1], who present a project in which such a holistic approach was applied in practice.

Introduced is the BitFROST platform (Bridging Research Across Heritage Studies) of the Museum of Cultural History at the University of Oslo. This self-hosted platform has been in existence since 2021 and is dedicated to optimising the long-term storage and reuse of 3D data. The project arose from the museum's legal obligations and long tradition of keeping archaeological information usable. The platform was developed with explicit consideration of user feedback to fulfil the different expectations and needs at an early stage. The BitFROST project is therefore a wonderful illustration of how change management should be practised.

The article repeatedly provides brief insights into the functionalities and best practices of the platform but is particularly impressive due to its in-depth contextualisation within the state-of-the-art of digital data management. The authors show a high level of expertise and provide numerous references to further literature. The results of the user feedback are also extensively analysed, and it is explained how, for example, individual technical competence or institutional awareness lead to a great diversity of needs and how this can be counteracted with cooperation, ongoing training and continuous development (as mentioned above).

I recommend this article as a very interesting case study and a well-researched white paper on complex digital data management.

References:

Bonelli L., Pantos G. A.s, Indgjerd H., Uleberg E. (2024) Experiences from the BItFROST Project. Zenodo, ver.5 peer-reviewed and recommended by PCI Archaeology
https://doi.org/10.5281/zenodo.8310062

Reviews

Evaluation round #2

DOI or URL of the preprint: https://doi.org/10.5281/zenodo.10829748
Version of the preprint: 2

Authors' reply, 12 July 2024

Dear reviewer,
thank you for the helpful and positive review.
We have implemented the text with more citations, and we have have uploaded the full resolution version of figure number 3 and 4 on the Zenodo platform as separate files.
We also have modified the description of figure number 5 as the main purpose is to show the complexity of the data-management system rather than the actual details.
We would prefer not to make the full diagram legible at this stage given the Work-In-Progress nature of this document.

Decision by Kristin Kruse, posted 12 May 2024, validated 13 May 2024

Last formal adjustments

Dear Authors,
Thank you very much for version 2. This revised version of the article really captured my attention from start to finish and I am very pleased to be able to approve it shortly. There are still two formal issues that need to be fixed quickly. As well as a few small, final recommendations regarding the content.
See the commented manuscript in the appendix.
Formal issue:

- In lines 96-108, a paragraph has been duplicated. Please delete one.
- Figure 3 and 5 are unfortunately still not readable in my download version even after you enlared them (see manuscript). I am still not sure whether this is a technical error in the reviewing process. However, there seems to be an option to upload images as separate files. That could be the solution we are looking for.

Additional information:
In certain places I recommend a few more citations. This would be helpful for readers without a professional background in data management. For the same reason, I also asked two questions about the content, but these can be quickly processed or discarded.
Download recommender's annotations

Evaluation round #1

DOI or URL of the preprint: https://doi.org/10.5281/zenodo.8310063
Version of the preprint: 1

Authors' reply, 18 March 2024

We would like to thank the reviewers for the positive and helpful feedback.
We have tried to improve legibility with the addition of subheadings and additional descriptive paragraphs to better contextualize elements of the paper.
We modified figure 3 to include only a segment of the form to improve legibility of the data. This is intended as an illustrative figure to explain the concept of the worksheet developed rather than full publishing of the internal working document and hope that this solution satisfies publication requirements.
We have added figure 4, to illustrate how the non-specialist user may interact with this approach.
Figure 5 (previously figure 4) remains the same, but we have modified the caption to better describe the content and intention of the diagram. The specific details of each node on this working document is not intended as the subject for the current publication, but rather the complexity and intention behind such systematization work. As such we hope that the legibility of the figure is not considered problematic.

Decision by Kristin Kruse, posted 04 December 2023, validated 04 December 2023

Dear Letizia,

Please excuse my very belated decision.

The reviewers and I are very interested in your article. The article contains a very informative overview of the current situation regarding the long-term archiving of 3D models and presents the repository of the Oslo Museum of Cultural History with important background information. The thing that could be improved is the structure, especially the presentation of the research question and its results. I would therefore recommend the following.

Recommendations:

(1) Structure:

Divide the chapter "The bitFROST project" into thematic blocks. A lot is done at once in this chapter. Firstly, the bitFROST project is presented as a use case studie, with the explicit aim of making access to 3D data more user-specific (focus on the DIP and the users). The following sections then deal with the challenges of long-term storage as a hole (focus on the AIP) and the chapter concludes with a description of the bitFROST platform (technical solution). All three points are very informative, but I would recommend a clear separation into separate chapters. This would also allow the results to be presented according to the research question.

(2) Language:

It is assumed that the work has already been proofread. Therefore, the language is not checked here. Recommender's personal comment: The frequent use of dashes may affect the reading flow.

(3) Citations:

Additional citations for the quoted solutions in lines 150-154 are needed.

(4) Quality of materials:

Unfortunately, in the version on Zenobo, the figures are of unreadable quality. I am not sure if this is a purely technical error. However, since the supplements contain the results of the project presented, they must be available in high resolution.

The original detailed reviewer comments are provided below for your orientation, and they should help in revising and thereby strengthen the chapter. I look forward to seeing your revised version.

Reviewed by anonymous reviewer 1, 09 October 2023

This paper offers a concise explanation of the project and the use of 3D technology and archiving in museums.

The authors take a user-centered and critical look at their own project as well as 3D publishing as a whole by examining the pitfalls and limitations in the field.

While motivations are outlined in the introduction, the research questions could be more clearly expressed.

Reviewed by Alphaeus Lien-Talks, 20 September 2023

Review of "Experiences from the BItFROST Project: Developing a 3D Repository at the Museum of Cultural History"

Overview:

The paper titled "Experiences from the BItFROST Project" discusses the Museum of Cultural History's efforts to create a 3D repository, offering a fascinating insight into the challenges and advancements in preserving and disseminating 3D data in the field of cultural heritage. This comprehensive review examines the paper's key points, strengths, areas for improvement, and ultimately recommends it as a valuable resource for professionals in the domain of 3D data preservation.

Review:

The paper opens with an introduction to the Museum of Cultural History's rich cultural heritage collection, emphasising its significant role in developing documentation practices and data storage within the Norwegian heritage and archaeology sector. It highlights the museum's commitment to standardising vocabulary, terminology, and interoperable data systems, making archaeological documentation accessible online.

The paper discusses the introduction of 3D technology in the early 2000s, starting with the laser scanning survey of a Viking ship, and its subsequent adoption for documenting artefacts. The transition to employing Structured Light Scanning (SLS) and photogrammetry marked an increase in 3D data production. Notably, the paper emphasises how 3D data has been utilised for diverse purposes, including condition monitoring, research support, and public outreach.

The introduction of the BItFROST project in 2021, aimed at promoting 3D data use in university education and improving compliance with FAIR principles, is a significant focus of the paper. The project's web platform, which contextualises 3D data with metadata, is introduced as a solution for enhancing the accessibility and usability of 3D resources.

The paper delves into the challenges faced in managing and disseminating 3D data, highlighting the complexities arising from the growing volume and varied audience of such data. It draws attention to the differences in technical knowledge and user expectations, underlining the importance of user education and clear documentation. The paper also discusses the difficulties in achieving standardised 3D data storage strategies and metadata across heritage institutions.

The authors provide an insightful schematic of the 3D data pipeline at the museum, which aids in understanding the complex interplay of data management within the institution. The discussion concludes by emphasising the necessity of taking a long-term view when developing data systems, acknowledging the importance of investing in personnel, culture, and collaboration.

Improvements:

While the paper provides a comprehensive overview of the challenges and experiences in managing 3D data, a few areas could be further improved:

1. Data Outcomes: The paper could benefit from including more specific outcomes or achievements of the BItFROST project. Providing concrete examples of how the project has contributed to education, research, or public engagement would enhance the paper's impact.

2. Recent Data Statistics: Including more recent statistics or growth trends of the MCH's collection and data would provide readers with a clearer picture of the institution's evolving needs and challenges.

3. User Feedback: Incorporating formal user feedback or surveys could add quantitative insights into the challenges faced by different user groups when interacting with 3D data.

Conclusion:

In conclusion, the paper "Experiences from the BItFROST Project" offers a valuable contribution to the field of 3D data preservation in cultural heritage. It sheds light on the practical challenges faced in managing and disseminating 3D data while emphasising the need for long-term planning and user education. Despite minor areas for improvement, this paper is recommended for professionals and researchers working in the realm of 3D data preservation, providing valuable insights and lessons learned from the BItFROST project.