ARIADNEplus Visual Media Service 3D configurator: a new tool for the visual organisation of 3D datasets

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The manuscript "ARIADNEplus Visual Media Service 3D configurator: toward full guided publication of high-resolution 3D data" by Potenziani et al. [1] provides an excellent introduction to the Visual Media Service 3D Configurator. This is an exciting tool, focused on cultural heritage, that forms part of the Visual Media Service, a web-based platform for uploading a range of complex data sets, including high-resolution images, Reflectance Transformation Imaging images and 3D models and transforming them into an appropriate format for interation and visualisation on the web. The 3D Configurator Tool provides researchers with a wizard which assist with the presentation of 3D models.

This manuscript provides a history and context for the development of the Visual Media Service and previous related tools such as 3DHOP, Nexus and Relight/OpenLIME. It also provides detailed information about the functionality of the 3D Configurator, including the Alignment, Material & Light, Navigation, Interface and Annotation steps. The Discussion section provides information about applications and users of the Visual Media Service, current limitations and planned future developments.

Reviewers Hageneuer, Champion, Trognitz and Panagiotidis all provided important suggestions to the authors which have improved the clarity and scope of this manuscript. While this manscript does not present a case study using this tool, I recommend it to readers as a detailed and clear introduction to the Visual Media Service 3D configurator which may inspire them to use this for their own research.

References

[1] Potenziani, M., Ponchio, F., Callieri, M., and Cignoni, P. (2024). ARIADNEplus Visual Media Service 3D configurator: toward full guided publication of high-resolution 3D data. Zenodo, 8075050, ver. 5 peer-reviewed and recommended by Peer Community in Archaeology. `https://doi.org/10.5281/zenodo.10894515`

Reviews

Evaluation round #1

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Version of the preprint: 2

Authors' reply, 29 March 2024

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Decision by Ian Moffat ⓘ, posted 07 November 2023, validated 07 November 2023

A high quality preprint that requires minor revision

Thanks very much to the authors of "ARIADNEplus Visual Media Service 3D configurator: toward full guided publication of high-resolution 3D data" for providing a stimulating article describing an exciting new tool (the VMS 3D configurator) which facilitates the visual organisation of 3D datasets that are uploaded to the Visual Media Service. This is an important digital product which is well described in this preprint however the reviewers, while overwhelmingly positive about this research, have made some important points that I believe can further enhance it.

Most importantly, I agree with the comments by Trognitz and Hageneuer that suggest reviewing other 3D visualisation platforms as part of the preprint, so as to place the Visual Media Service in context for a reader not familiar with this field. I also agree with Panagiotidis that further information about the potential for a configurator for high resolution 2D or RT images exisits (or is planned). Finally, Trognitz, Champion and Hageneuer have made several excellent editorial suggestions that I encourage the authors to adopt.

Reviewed by Sebastian Hageneuer ⓘ, 13 July 2023

Title/abstract/introduction
The title and abstract clearly reflect the content of the article, which clearly reports about the advancements in displaying 3D data for Cultural Heritage. As such, this article is not a study, rather than a report, without research question or hypotheses, methods or results for that matter. The introduction however clearly introduces into the topic and the VMS and the 3D Configurator are well described.Discussion
The discussion does summarize what the team has done and lists institutions that already use the system. The only minor critique would be, that throughout the whole article, no mention of other 3D visualisation attempts or projects were made. Although the ISTI-CNR is leading in that area, it is not the only institution working on a solution.

However, the glimpse into the future of this 3D viewer are more than promising and definitely a step in the right direction.References

References are few, but sufficient for an article of that type.Tables and figuresFigures are well chosen and provide good description. However, in line 290, there is a reference to figure 6a, but it should be 7a. Same goes for lines 293 and 300, most probably overseen during editing.

Reviewed by Erik Champion, 10 October 2023

This is a good paper! But needs native English proofing (verb agreement, which vs that). Below are some suggestions (and suggested corrections of paper are attached for meta-reviewer, but has this reviewer's name):

In addition to **providing** a detailed description of all the configuration possibilities, the paper will also discuss uses, limitations, and potential developments of the 3D configurator, and of the entire platform too, highlighting the value of VMS as a tool for publishing, exploring, and disseminating CH data.

This paper **introduces** the VMS 3D configurator and the key concepts behind its design. After a brief introduction of the VMS platform, useful to contextualize the application domain, the different configuration stages of the 3D setup wizard will be presented in detail and illustrated with practical examples. The paper concludes with a discussion of uses, limitations, and possible development directions of the proposed 3D data publishing approach.

relightable?? images

Finally, a few 3D scanning/processing companies use the VMS as a tool to test the 3DHOP library functions and its potential, to develop the interface, **but rarely??** to preview or present 3D and RTI material to clients.

Conversely, using the VMS platform, even a content creator with **any level of** computer programming **knowledge** can exploit them interacting with simple interfaces developed ad-hoc, without the need for coding.

This happens because the 3D model has not been oriented correctly at the time of creation, …

Download the review

Reviewed by Martina Trognitz, 02 November 2023

The article is about a service named the "Visual Media Service" (VMS), aimed at publishing high-resolution images, relightable images (RTI), and 3D models. The paper focuses on a feature targeted towards 3D models: the VMS 3D configurator. With this configurator, viewing and presentation options for the web publication of 3D models can be highly customised. As is highlighted by the authors in line 92, the scope of the service is only publication and is not intended to double as an archive or a repository.Detailed discussion of issues, including language improvementsAbstract

The first paragraph states 'the presence of digital datasets in CH archives and repositories is becoming more and more relevant' and 'the correct management of these assets' comes with issues. But, as the authors state in line 92, the scope of the VMS is only publication and is not intended to double as an archive or a repository. The paragraph concludes with 'systems enabling assisted data publishing may be a solution'. While this might hold true for the publication part of a data life cycle (e.g. https://ukdataservice.ac.uk/learning-hub/research-data-management/ (video)) many other stations of the data life cycle are not addressed by the VMS. I strongly suggest rephrasing this paragraph and focusing more on the problems related to the publication of visual assets.

Second paragraph: I would suggest to remove the final half sentence 'providing innovative services for archaeological data management'

Language edit suggestions by line

- 19: 'it's not' –> 'is not'

- 25: '3D models, transforming them' –> '3D models, and transform them'

- 26: 'VMS is an end-to-end' –> 'The VMS is an end-to-end'

- 33-34: 'options for 3D models presentations' –> 'options for the presentation of 3D models' or 'options for 3D model presentation'

- 40: 'the value of VMS' –> 'the value of the VMS'

Introduction

The introduction and the contribution could be improved by mentioning and maybe even discussing similar services. This would provide some context and help the readers to understand which are the special features of VMS.

In line 49 the FAIR guiding principles are mentioned but only by resolving the acronym. The acronym should either be included or the capitalisation of 'Findable, Accessible...' should be removed to 'findable, accessible...'.

The paragraph starting on line 56 is a single long and hard-to-understand sentence. Consider breaking it up into shorter sentences. Also, this paragraph ends by stating that newly implemented services address archaeological data management. But data management comprises much more and the VMS is aimed at the publication of the final content which should already have undergone a solid data management in the course of its creation. So this part should be rephrased to focus on the publication part of the data life cycle.

Lines 63-64 says 'configuration options already provided for'. Either 'already' should be removed or replaced with e.g. 'now' or is something different meant? Were there already some options present before the work started? If so, this should be specified.

Lines 67-68: I think the part ', appropriately divided ... they provide': can be completely removed.

Language edit suggestions by line

- 53: 'three different visual media' –> 'three different types of visual media'

- 56: 'To boost the penetration of the service in the CH community' –> 'To boost the adoption of the service by the CH community'

- 68: 'and finally Annotation' –> 'and Annotation'

Visual Media Service

In line 76 the 'large digital datasets' have to be specified a bit. Maybe as visual datasets or something similar?

Line 79 states that 'reality-based 3D models' are supported. But I guess the VMS does not care what data is coming in and just looks for a supported format. Consider removing 'reality-based' from the beginning and instead specify afterwards that the VMS is optimised for high-resolution unstructured geometries originating from the digitisation of physical objects by means of 3D scanning or photogrammetry.

It would be nice to include supported input formats in the list presented in lines 78-83.

Lines 85 and 131 mention an 'efficient web format'/'web-friendly multiresolution version'. What format is it? Can a reference be included?

Initially, I thought 'viewer download' just meant downloading the VMS software and deploying it locally or on its own server. But then later I found a comment on lines 240-241, which gives me another picture: After configuring with the 3D configurator you can download the created viewer with all its settings to then further customise it and deploy it on your own system. This is very valuable and should be explained a bit better!

A suggestion for a future feature for lines 122-124: Federated login (e.g via eduGAIN https://edugain.org/)

Does the process described in lines 122-141 apply to all three supported visual media types? Or is the last step (lines 139-141) only available to 3D content?

Language edit suggestions by line

- 75, 78, 84, 123, 126: 'VMS' –> 'The/the VMS' (please also check the remainder of the paper)

- 78: 'three different complex visual' –> 'three different types of complex visual'

- 79: ', the ones created' –> ', e.g. created'

- 132-133: 'it happens in background (so, in the meanwhile, the user...' –> 'it happens in the background (i.e., the user...)

- 136-138: 'Note that by default ... he/she has to manually change the default'. –> 'By default, media is uploaded as a private resource. But this can manually be changed by the owner.'

3D Configurator

The first paragraph is very general and it could better be moved to the introduction or the previous section about the Visual Media Service.

The descriptions following the introduction are sometimes a bit too detailed and I get the impression that I am reading a user manual and not a scientific contribution. E.g.:

- Lines 154-155: I think the part ', appropriately divided ... they provide': can be completely removed.

- Lines 163-165: The description is a bit too detailed, the part after 'one for each axis' can be omitted.

- Line 166: Avoid using adjectives like 'very annoying', just 'another issue' is sufficient.

- Line 166-171: Please give a short explanation of 'the UP'. From what I gather the 'up vector' that indicates the upwards side of a model is meant?

- Line 171: consider removing 'with a simple button'

- Line 172: I am not sure if 'straightening' is the appropriate term to describe what can be done. Maybe 'orientation' or 'alignment'?

- Lines 181, 183: omit to list all options in the brackets

- Lines 194-200: are one long sentence that can be split up

- Lines 207-211: omit to list all options in the brackets

Language edit suggestions by line

- 155: 'and finally Annotation' –> 'and Annotation'

- 219: 'annotations' –> 'annotation'

Discussion

This section is very long and the topics covered might be grouped into smaller sections like 'Adoption and use of the VMS' and 'Road-Map and future developments for the VMS'. I would also suggest first discussing any future plans and then presenting the numbers around the users and institutions.

In the discussion, I missed a discussion on the relation of the VMS as a publication platform and any archives and repositories. Maybe this is something that can be thought about in future developments where e.g. an archive could integrate with the VMS. So a media asset stored in the archive would then be also sent to the VMS where the presentation layer is configured, maybe with some default settings set by the archive.

Are there any plans on integrating the service with the ARIADNEportal?

The lines 244-249 should be presented together with the lines 232-234.

Line 235: Only restricted and open access is mentioned. Can licenses applicable to the content be included?

Line 237: I am not sure if saying that 30% of the content is publicly available deduces the 'usefulness' of the access option. Maybe just state that 30% of the content is open access.

240-241: After reading these lines I fully understood what is meant by 'viewer download' in line 100! (see above) Also: 'just to create the viewer' –> 'just to create and configure the viewer'

Line 242 mentions 'other online services' but as I already mentioned for the introduction none are mentioned.

Line 251 is unclear: What is meant by 'so far we have received any news about a more systematic or structured use of the platform'? Does it mean you don't know if there are any systematic use cases of the platform? Or did you receive requests by users to allow for more options to enable a structured use?

Line 261: You mention that the configurator is tailored to 3D models but in line 79 you even have a much narrower view with 'reality-based 3D models'. So the configurator might not even be suitable for all 3D models.

265-267: The part with 'Future developments … to content creators' can be omitted.

268: 'The first step of this process': What process is meant here? I think mentioning the road-map here might make more sense.

Language edit suggestions by line

- 243: 'penetration of the VMS in its target' –> 'adoption of the VMS by its target'

- 256: 'applying the same configurator to' –> 'applying the same configurator settings to'

- 263, 264: '2D Images' -> '2D images'

- 290, 293, 300: 'Figure 6 A/B/C' –> 'Figure 7 A/B/C'; Maybe even consider splitting up the image into one with A and B and another one with C?

Reviewed by Vayia Panagiotidis ⓘ, 18 October 2023

The abstract is concise and effectively encapsulates the main points of the paper's scope. The introduction provides an overview of the general project and platform before moving to the main focus of the study presented. The paper centers on the presentation of a major part of the online platform developed within the ARIADNE project. In that context is does not have a clear research question but rather adeptly showcases practical usage of the online platform. Given the nature of the project the paper effectively addresses the question for how to handle digital media for CH in an open, high-quality, and systematic manner.

The authors offer a clear presentation for customization of the 3D models within the content creation process via the VMS platform. The platform supports three types of digital objects. The information was straightforward with sufficient descriptions and images providing to effectively act as a user manual for 3D objects uploaded to the platform using the configurator. Usage information is provided as well as future development goals.

My only suggestions would be a very brief mention if there are similar steps in a configurator for the other two types of data, high resolution 2D images and Reflection Transformation Images (RTI) within the platform as well as some additional information on the presentation tools provided for the 3D objects uploaded using the configurator in order to provide some insight for that tool making the platform even more appealing for potential users.