436-1416: Christine Chichester. Visualization Valorization ('Position Paper').

- The background seems to be lacking some of the more recent literature, as pointed out by reviewer 1, but also the other two reviewers.

In addition to the citations already present, more recent literature has been cited. These recent citations refer to ‘omics type visualizations. The “Building visualizations” was completely re-written to reference much newer literature.

- The lack of novelty (reported by reviewer 3, but also the other reviewers) is probably related to the somewhat unclear position advocated. I assume the valorization aspect to be the novel part of this position paper, and not the technical problems with visualizations, but this is not clear. The summary, for example, addresses mostly the technical aspects of visualizations, and not its valorization in the scientific community. Given the title, I expected more of latter thoughout the paper. A stronger focus on the valorization would strenghten the paper and distinguish it more clearly from other work and would thereby make it more novel.

Throughout the paper, new text was added to emphasize that measuring new scientific knowledge acquisition from visualization tools in multi-omics domain is challenging. Because of the difficulty, there are very few ways to quantify it and therefore often not attempted. I have not seen another paper that tries to outline this issue, so I would conclude that it is actually novel.

From the editor
I would like to add two minor comments on my own:

- To me it was not clear whether your position paper is only about the omics fields (then the title should probably be more specific) or intends to be general and uses omics fields only as a use case or example (then this should be made clearer).

The title has been changed to be more specific. Many of the statements within the paper probably can be more generally applied but as I have only worked with ‘omics domain data, I have limited the scope in the title.

- "The introduction of data visualization tool" > "... a ..." or "tools"

Fixed

Reviewer 1:

I think this paper could be much improved by teaming up with a biology visualization expert and bringing the recommendations more in line with the current state of the art in visualization.

I very much agree with this comment. In fact the paper was written based on experiences in the field. Gaining more insight by working with an established expert would be a welcome next step.

**Further comments:**

While I applaud the general direction, I find the paper lacking in some regards. Some of the arguments seem ad-hoc. For example, the "Dangers when creating visualizations" section discusses one or two challenges one needs to overcome, but clearly isn't comprehensive. I'm unsure why the problem of biases is specific to visualization; rather I believe it to apply to all data analysis methods. Other challenges aren't mentioned.

The « Dangers… » section title has been changed to explicitly refer to bias rather than discussing all challenges. Additionally text has been modified to indicate that bias is not specific to visualization.

The author mentions (and implicitly recommends) visualization techniques that, while they are published and used, don't align with commonly agreed-upon best practices in visualization. Examples are 3D node-link visualizations, rose diagrams, star and glyph plots, map and landscape views. These might have been mentioned in outdated literature, such as the referenced "Readings in Information Visualization", which is an excellent book, but has to be taken with a grain of salt nowadays, as the field has matured significantly in the last 18 years.

Recent citations from the ‘omics field that mention and use many of these techniques have been added.

For the process of building visualizations targeting domain users's needs, I'd recommend to include a reference to and insights from the design study methodology paper [1].

I appreciate being made aware of the reference. I have completely re-written the “building visualization” section to refer to design study methodology for building and valorizing the omics visualization tool.

[1] Sedlmair, Michael, Miriah Meyer, and Tamara Munzner. "Design study methodology: Reflections from the trenches and the stacks." IEEE transactions on visualization and computer graphics 18.12 (2012): 2431-2440 believe there are no strong reasons to reject the paper. As a disadvantage, I'd mention that I believe that some parts could have been better explored. The paper mentions that the visualization of omics data is at its core, but very few concrete examples were described, and even those in very few details. I feel that, if possible, the author should have described one or two concrete cases of omics visualization in more details, in order to make the paper's position stronger. Most of the text is developed with general visualization in mind.

More references to visualizations ‘omics data have been added. Omics data represent the use case but this position paper also introduces a data science challenge, new knowledge discovery, as it is applied to valorizing a visualization. It is important to see this challenge from the general perspective as well as from the use case perspective.

**Further comments:**

Reasonable background:
For being a position paper/editorial, I understand that the paper is not supposed to cite the absolute state-of-the-art works on the area, but instead it should use a good set of examples. In that case the paper succeeds. Still, I was left with an overall feeling that the author is not deeply acquainted with the publication venues for visualization, specially when she mentions that "...visualization research can be overlooked and not interpreted as a valuable publishable scientific effort." Maybe she means that, for this specific venue (Data Science), that is the case; if that is so, I can understand the statement and agree with it.

The reviewer correctly understood my intention behind the statement. I have rewritten the statement to be more explicit to the context of Data Science.

Limited novelty:
It is a position paper/editorial, so I expect that it is not supposed to be novel.

**Reasons to reject:**

This paper does not address a novel problem within the visualizations research. It posits that data in the omic technologies is quite complex to be able to visualize in correct manner. This is not a novel issue or specific type of data. Also, the author does not explicitly clarify the novelty of the issue addressed.

I have not seen any paper that quantifies and attributes NEW scientific knowledge in the omics domain to a visualization tool. Most visualizations are can be measured on how they speed up or simplify a process but understanding that new knowledge discovery is an important challenging aspect for valorization that needs to be quantified is novel.

This position the paper takes is not quite clear, and the paper is quite repetitive, repeating the use and function of visualizations within biomedics.
The dangers of visualizations that the author points out are not well argued, while the introduction of the paper makes clear that it wants to point out the deficits of visualizations within the omics technologies.

The dangers section has be modified to be more specific to bias.
The dangers described
The arguments on the role of visualizations researchers are not well substantiated.
The summary of the paper points out developments that have not been discussed in the paper

The summary has been changed to conclusions. Additional text was added to emphasize the main position of the paper.

The structure of the paper is not clear and there are quite some language mistakes.

I have gone over the paper looking for errors. All mistakes found were corrected.

While the length is far beyond the maxim number of words, the short length might be the reason the paper misses substantiated arguments and clarifications.

The paper length falls within the boundries of the journal specifications.