Projective Uncertainty Visualization

13 responses

Radar Plots
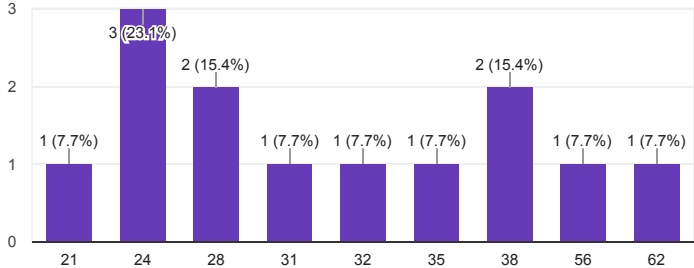
Deviation

Personal Questions
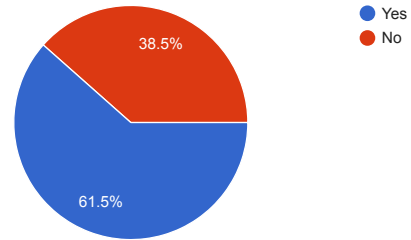
Age

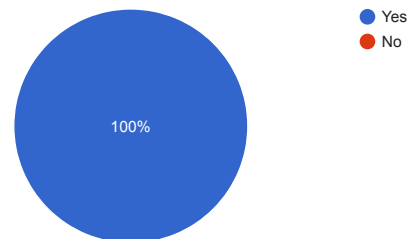13 responses

Are you a student?

13 responses

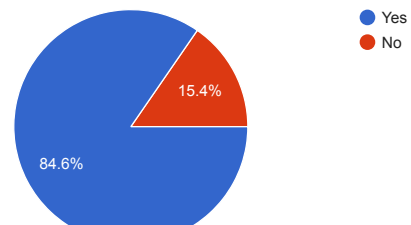- Yes
- No

38.5%

61.5%

Are you familiar with visualization (i.e., barplot, boxplot)?

13 responses

- Yes
- No

100%

Have you ever worked with mesh deformations or unfoldings (i.e., texture mapping, morphing, reformatting)?

13 responses

- Yes
- No

15.4%
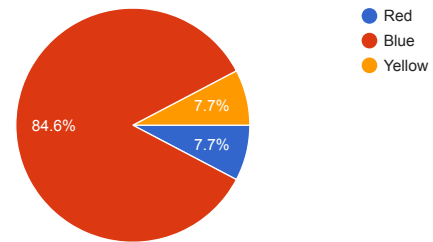
84.6%

Find Local Differences

Compare Regions

Which region suffers from the highest area distortion?

13 responses

●	Red
●	Blue
●	Yellow

Which region has the lowest overall distortions?

13 responses

●	Red
●	Blue
●	Yellow
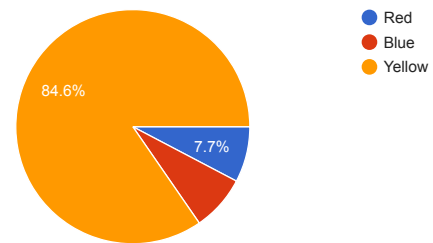
Which attribute of the red region has the highest deviations?

13 responses

- Area
- Angle
- Perimeter

100%
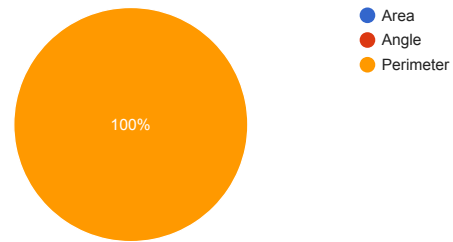
Which regions have low overall deviations?

13 responses

Region	Value
Red	0 (0%)
Blue	8 (61.5%)
Yellow	13 (100%)
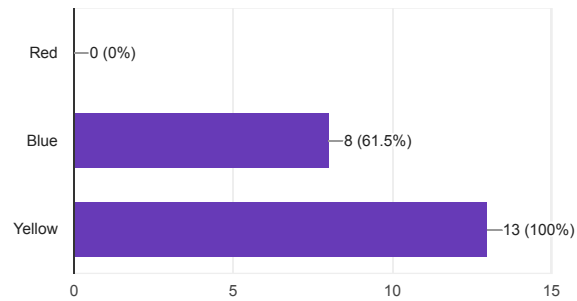
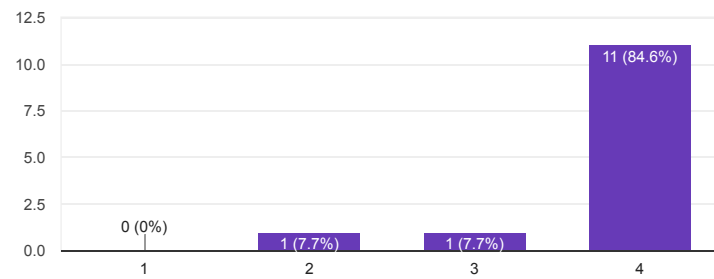## How helpful was the radar plot for comparing the regions to one another?
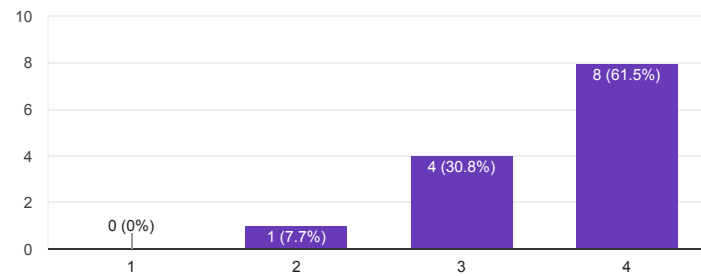
13 responses
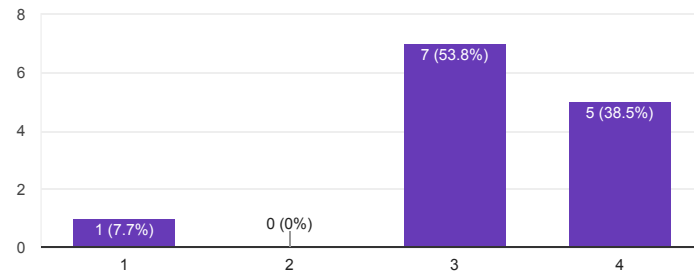
How understandable was the radar plot?

13 responses

How understandable was the encoded deviation at the radar plot?

13 responses

Do you have any comments? (especially if you selected low points)

3 responses

It would be nice to see also distribution of the properties (e.g., as small histogram on each axis) and to have linked view (with brushing on the axes) with the 3D mesh or its unfolding.

I did not look at the bunny at all, only the radar plots. So what you measured is if I understand the radar plots!
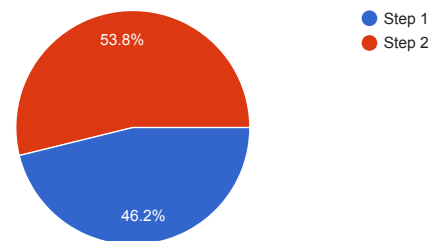
I was not sure how to interpret the first radar plot. I wasn't sure if it is the plot for the original area or the distorted one.

Compare Steps

Which step adds more area distortion?

13 responses

- Step 1
- Step 2

53.8%

46.2%

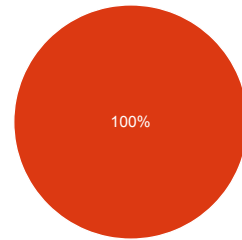## The angle stays almost constant in step 1.

13 responses

True
False

100%
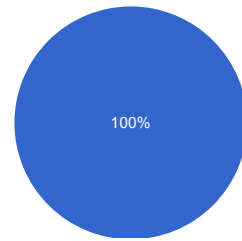
The red region seems to suffer from a high perimeter and angle distortion. Which step of the pipeline should be improved to change this?
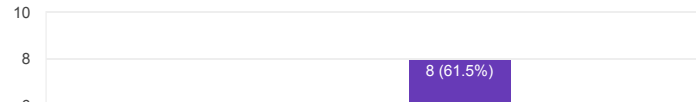
13 responses

Step 1
Step 2

100%

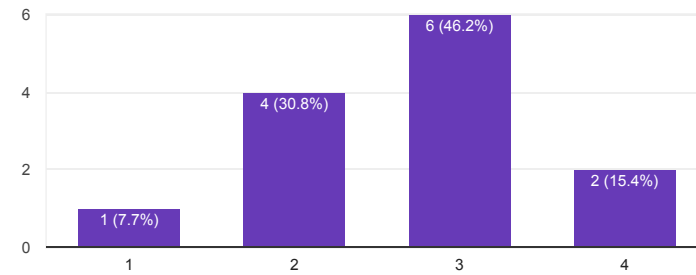How helpful were the boxplots for comparing step 1 and 2?

13 responses

                                              8 (61.5%)

How understandable were the boxplots?

13 responses

Do you have any comments? (especially if you selected low points)

6 responses

Again, you measured only if I understand the boxplots. I did not look at the bunny any more...

the boxplots has many parts (box, mean value, ...) which makes it more difficult to understand.

The boxplots itfself were fine but combining 2 steps into one diagram makes it harder distinguish between the two steps. Furthermore, the attribute (perim, angle, area) was not highlighted enough, so it took me quite a long time to figure out which boxplot corresponds to which attribute.

I didn't understand why there was a box and not just a single point. After all, as I understood it, it was only refering to the example and not to a distribution of distortions.

I don't really understand why the yellow region plot was in the negative range - why would the region become smaller?

It was actually not clear what exactly the boxplots show. To compute e.g. variance and mean you need several data points, but here we have only one region. Did you sample the bunny surface, where these the vertices? Vertices would be a bad choice, sampling would be better, e.g. blue noise.
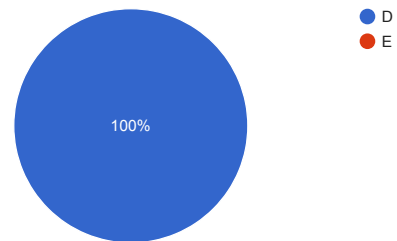
If you want to have the least possible overall distortions for both the red and blue region, which option should you choose?

13 responses

- A
- B
- C

100%
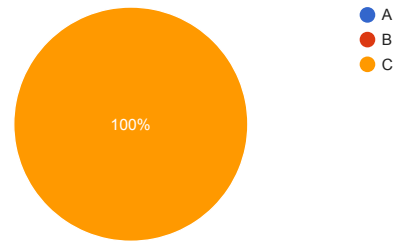
If you want the projected area to be as close as possible to the original area which of the two options D and E would you choose?

13 responses
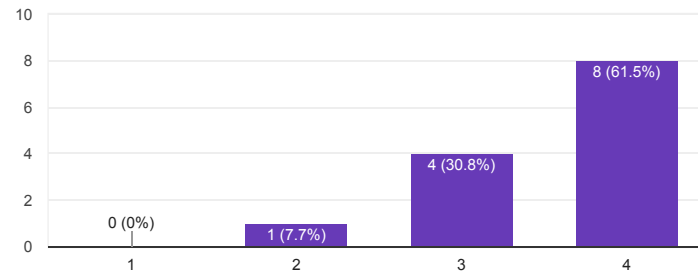

- D
- E

100%

How helpful were the radar plots for comparing different options?

13 responses

Do you have any comments? (especially if you selected low points)

5 responses

Again: answers ONLY from the radar plots...

without the radar plots I would not have been able to judge which projection is more distorting, especially with regards to area, angle and perimeter

Without axis annotation it is ambiguous that D is best, it could be that all three areas are strongly distorted in the same way in D. Maybe in E the read area is the undistorted one, whereas the other areas are strongly distorted. Baseline should be shown on the axes.

I still don't get if the radar plots encode the change of the area etc or just the new area, and if it's just the new area I don't understand how this should help without knowing the original area.

Make sure to highlight in your paper that comparing the area in the unfolded mesh is difficult for humans if the angle and perimeter are not preserved. I think this might be a benefit of your technique

Final Overview

General Comments

6 responses

It is unclear what the tool is for, what job someone shall perform with it!?

In the last step when comparing different options with radar plots, there was a dim region around the middle line (like a shadow) which was quite different from the deviation visualization before. I did not know if it was meant to show the deviation or if it is a visual artifact.

Looks cool. Should there be a baseline in the plots to indicate where there is no distortion (zero-line or 1-line?)? How is enlargement distinguished from diminishment? Is one type of change better visible in the radar plot then the other? Would this be better in parallel coordinates (where positive and negative values get the same screen space?). Nice work.

What are the axes/color legend of the parallel coordinates? Should be explained in the video.
If there exist more than 3 axes for comparison, is it an option of using many-to-may parallel coordinates?

Looks nice!

Nice tool, but I am not entirely sure what it is good for. Usually meshes are not mapped to a sphere and then to a 2D texture map but rather into a texture atlas where the distortion can be controlled. I remember the Geometry Images from Hugues Hoppe that use your mapping but there are different works that optimize the overall distortion. I think you need good examples of applications where your technique is really needed.

Thank you very much for your time and effort :)