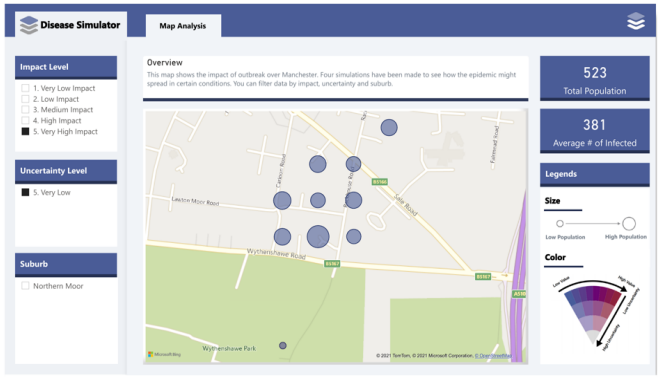
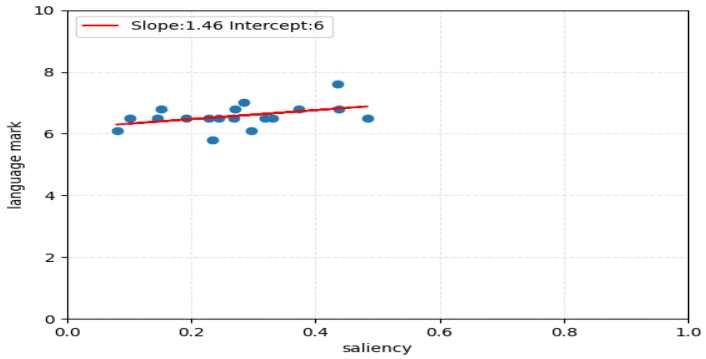
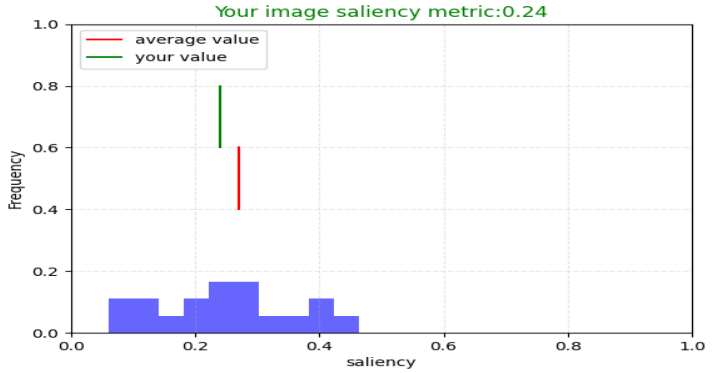
Saliency

Saliency detection is widely used and this metric can predict the human attention map of one image efficiently.
The brighter areas mean more attention. The graph below is processed by the machine predicting the attention human may percieve. The function to implement this metric is from OpenCV[2].
If your saliency value is very low, the suggestion would be make the key elements have more constast edges[1].

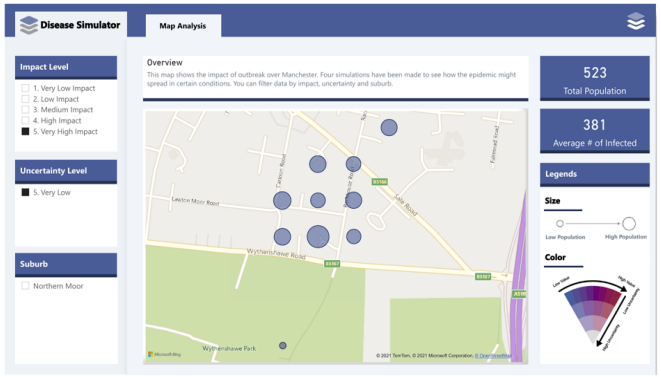


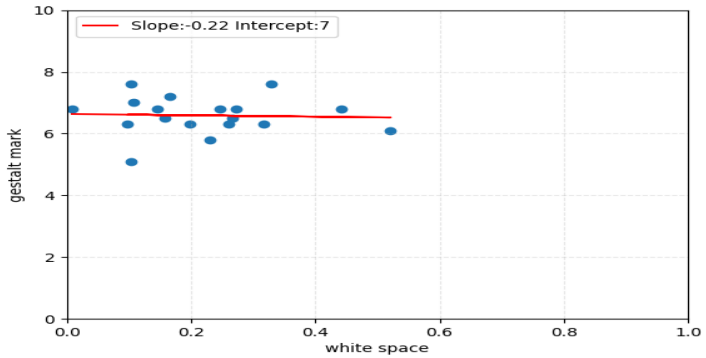


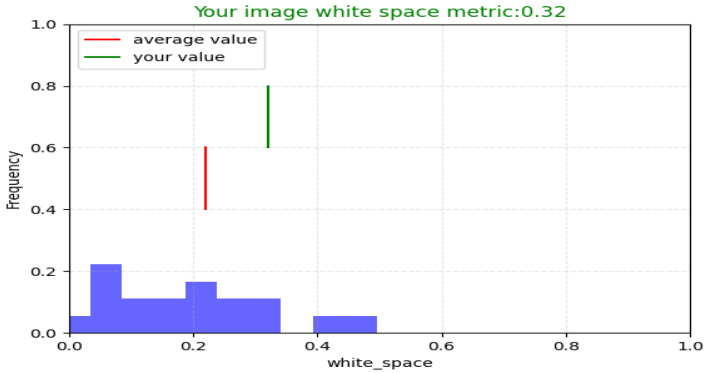


White Space Proportion

The white space that is not covered by any visual blocks in this image\cite[2]. This metric is to assess the layout of this GUI image and is considered to be negatively related to the quality of the GUI image[2]. The algorithm is to first detect the visual block and then get the uncovered space in the image[2].





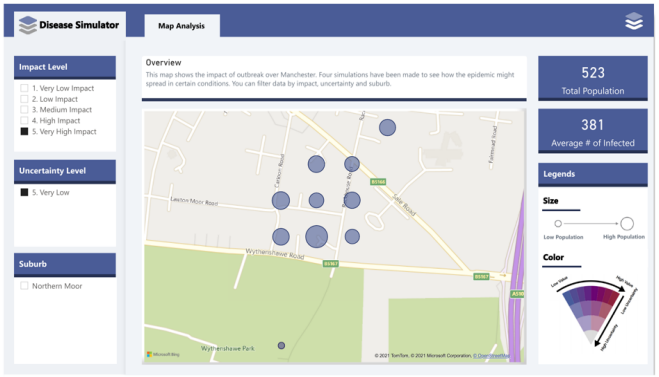


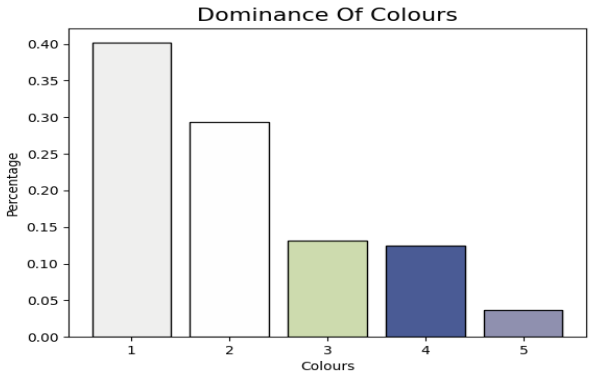
Colour Vision

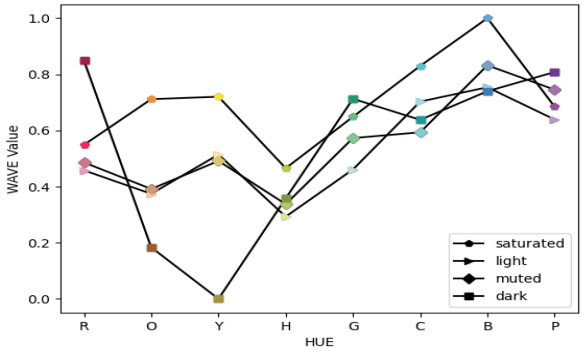
There are two metrics to assess the colour vision of one submission: Colourfulnee and Weighted Affective Valence Estimates (WAVE)

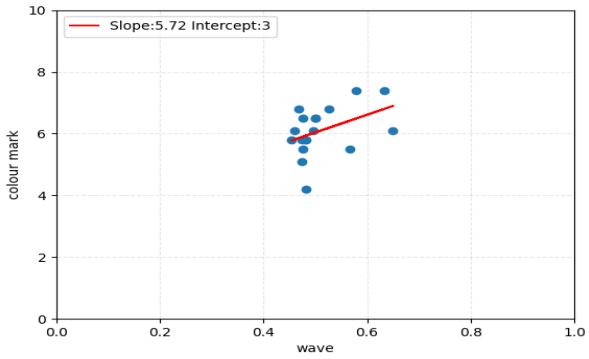
Colourfulness is to show how colourful an image is, and the algorithms use standard deviations to calculate the values[3]. The higher, the more colourful this image is. 5 Dominant colours of your submission are extracted, it could help you understand the colourfulness of your submission together with the quantity value.

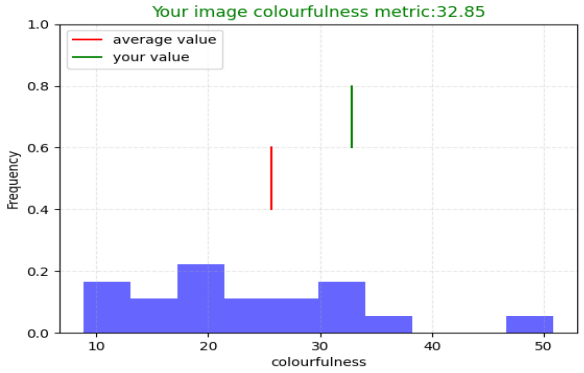
This metric is to assess the colour preferences according to human aesthetic preferences towards certain colour[4]. The colour preference result is presented as a reference to check if your use of colour.

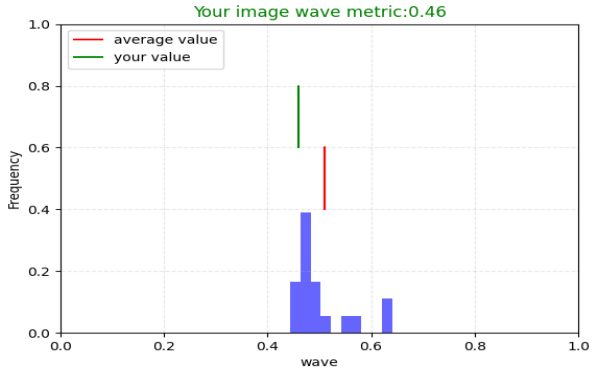






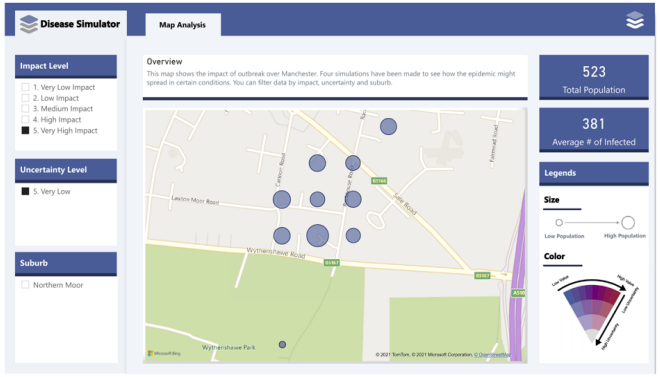


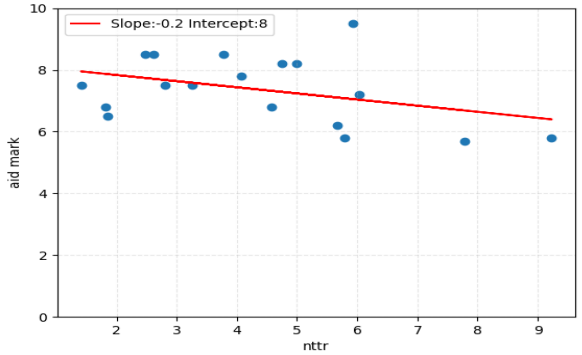


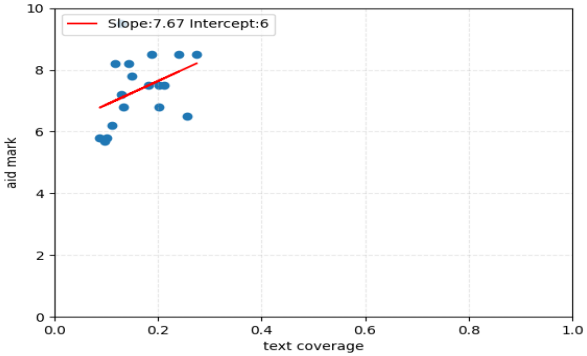


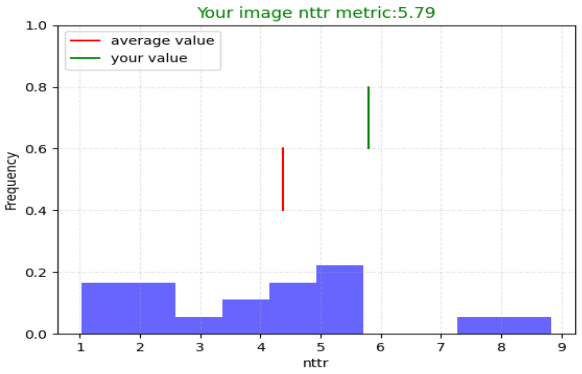
Text Layout

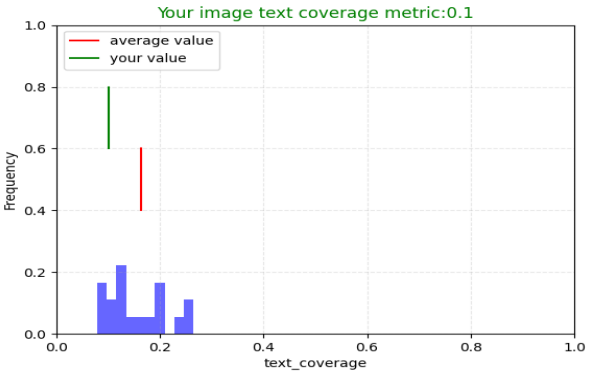
Text areas are assessed by two metrics: 1)text coverage, 2) non-text and text ratio(NTTR).
The text coverage is for showing how the text layout in the whole image, and NTTR is for showing how the text layout relative to other non-text areas.
A study shows that the text on the left side of visualisation could improve the user's comprehension compared to vertical layout which the text is above the visualisation[5]. According to the text and visualisation position distance, it is suggested that the text(e.g.: legend) should be placed near to the corresponding graphs to reduce eye movements[6]. The text in the visualisation should be not too much, but the adding back some useful text like text annotation would help with the interpretation of the visualisation[6]. Also, bigger and central text blocks would be assigned high saliency values[7], which means bigger and more central text blocks would gain more attention from people in the data visualisation. So unimportant text needs to have small areas.
You could check the nttr distribution map. If the text coverage value is too low or nttr value is too high, you may need to increase the text areas.











References

the style and layout design of this report is coming from:

[1]Nicolas Steven Holliman. Automating visualization quality assessment: a case study in higher education. arXiv preprint arXiv:2106.00077, 2021.

Saliency:

[1]https://pyimagesearch.com/2018/07/16/opencv-saliency-detection/

White Space:

[2]Aliaksei Miniukovich and Antonella De Angeli. Computation of interface aesthetics. In Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems, pages 1163–1172,2015.

Colourfulness:

[3]David Hasler and Sabine E Suesstrunk. Measuring colorfulness in natural images. In Human vision and electronic imaging VIII, volume 5007, pages 87–95. SPIE, 2003.

Colour Preference:

[4]Stephen E Palmer and Karen B Schloss. An ecological valence theory of human color preference. Proceedings of the National Academy of Sciences, 107(19):8877–8882, 2010.

Text Layout:

[5]Qiyu Zhi, Alvitta Ottley, and Ronald Metoyer. Linking and layout: Exploring the integration of text and visualization in storytelling. In Computer Graphics Forum, volume 38,
pages 675–685. Wiley Online Library, 2019.
[6]Stephanie Evergreen and Chris Metzner. Design principles for data visualization in evaluation. New Directions for Evaluation, 2013(140):5–20, 2013.
[7]Zoya Bylinskii, Nam Wook Kim, Peter O'Donovan, Sami Alsheikh, Spandan Madan,
Hanspeter Pfister, Fredo Durand, Bryan Russell, and Aaron Hertzmann. Learning visual importance for graphic designs and data visualizations. In Proceedings of the 30th
Annual ACM symposium on user interface software and technology, pages 57–69, 2017.