

Using Variational Autoencoders for Fantasy Map Generation

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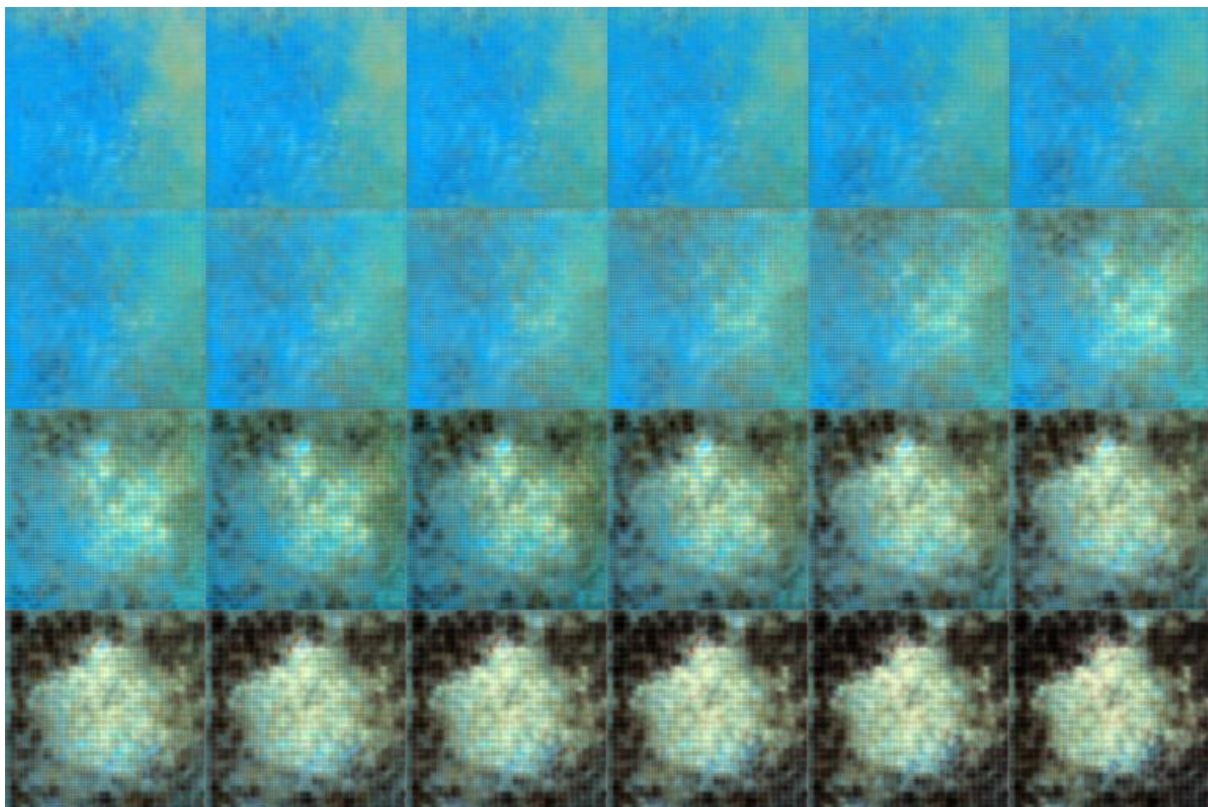
Word Count: 514

Aim: To create a model that generates new and interesting maps for fantasy writers in order to better support them with worldbuilding.

Dataset For Training: [Earth Terrain, Height, and Segmentation Map Images Dataset](#) on Kaggle. The dataset comprises of 5000 image sets with 7 terrain categories, namely: Water, Grassland, Forest, Hills, Dessert, Mountains, and Tundra. This data diversity could possibly result in some interesting outputs.

Process: After the aforementioned dataset was loaded onto the Colab notebook, the given model was trained on a subset of it to save up some time. The first two outputs generated by the model were trained on just 10 epochs, and the results were very aesthetically pleasing.

**1) First Output: Epochs = 10, Latent Dimension = 2
Interpolating points between 0 and 1**

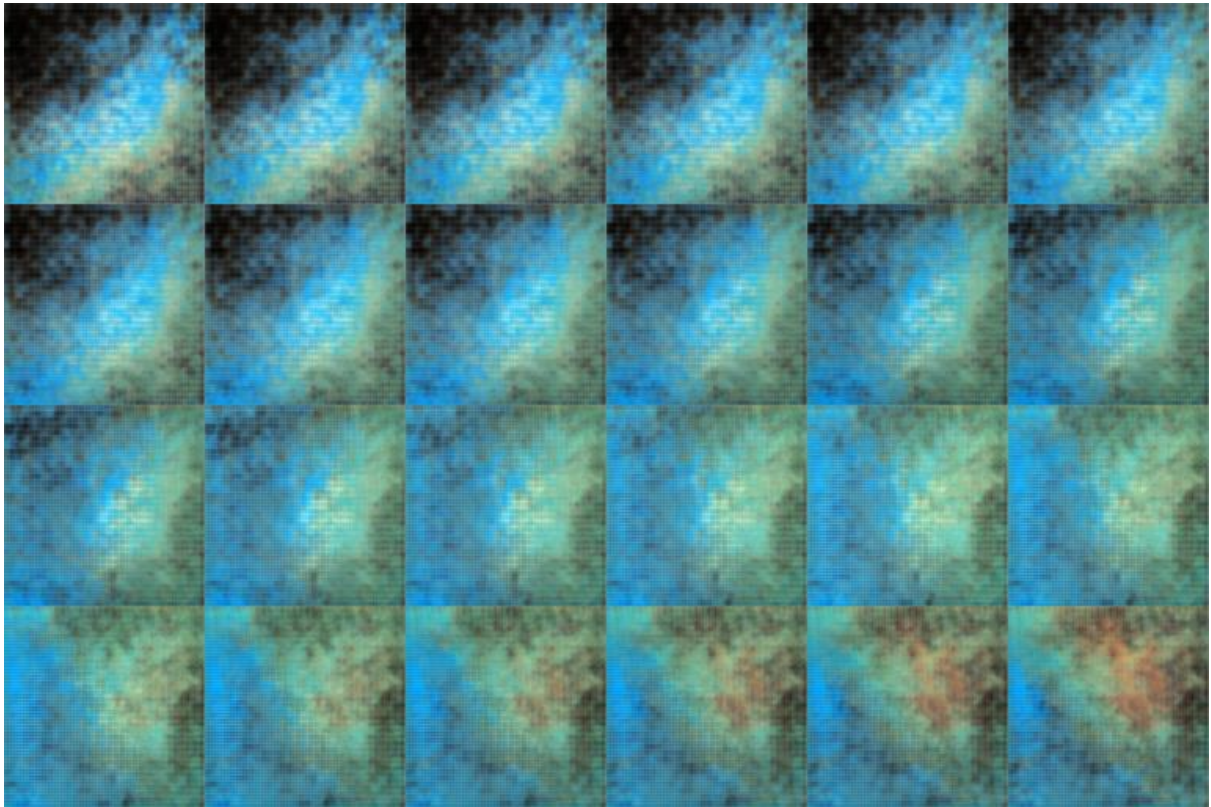


The images next to each other seem to be very colour-coordinated, and are gradually changing from blue to brown. It's hard to make sense of the pattern formed though, and it certainly doesn't come across as a map at first glance.

Therefore, for the second output, a bit of experimentation with the parameters was done to see if the output looked better.

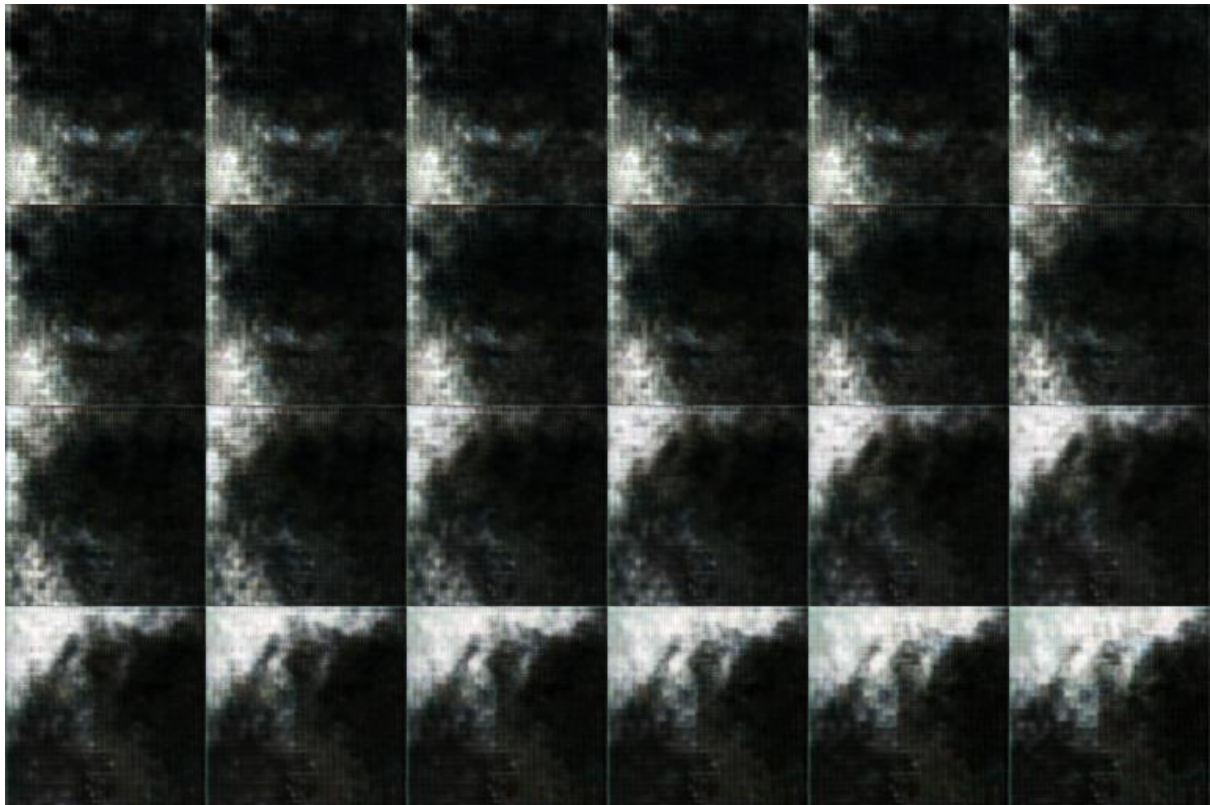
2) Second Output: Epochs = 10, Latent Dimension = 40

Interpolating points between 5 and 20



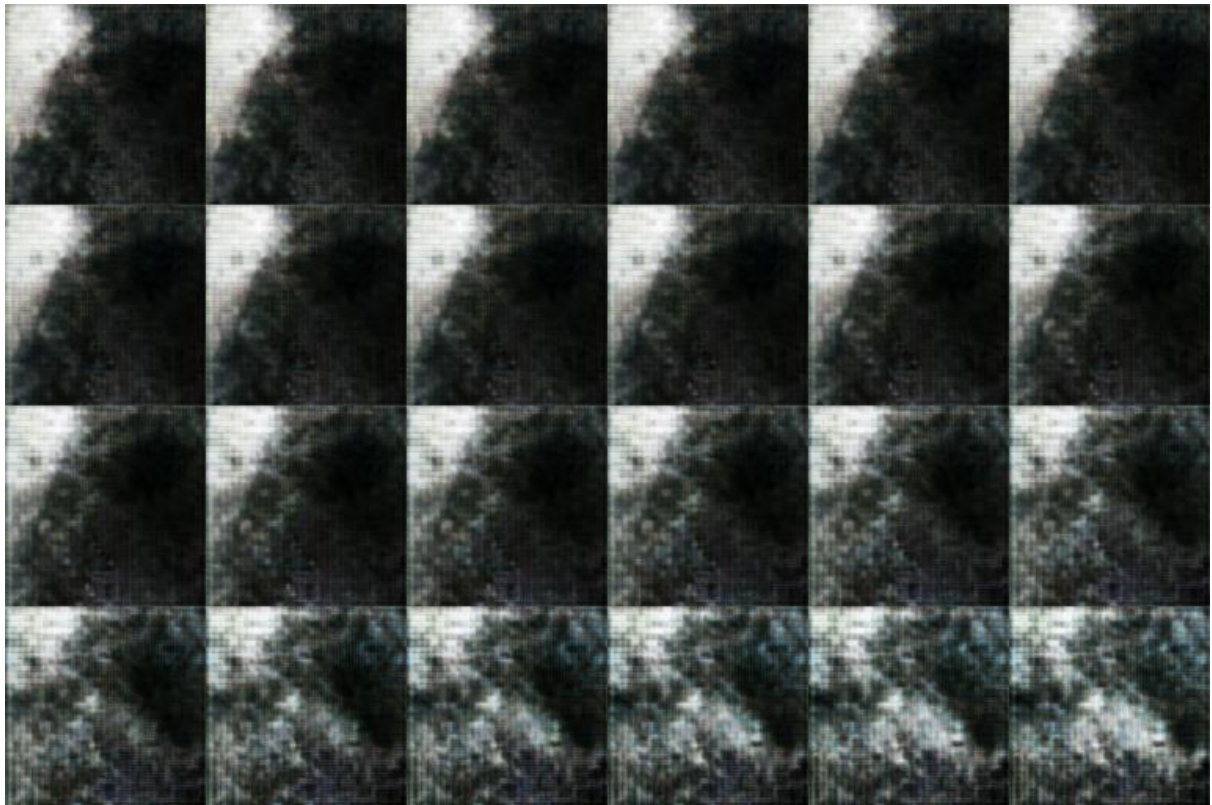
The second output looks a lot better comparatively. The images at the top resemble a coastal landform, whereas the images at the bottom look a bit like a mountainous terrain near a water body. The output isn't clear enough to be utilised as a map generator, but these images could possibly be used as elements for designing the novel's book cover art.

3) Third Output: Epochs = 30, Latent Dimension = 2 Interpolating points between 0 and 1

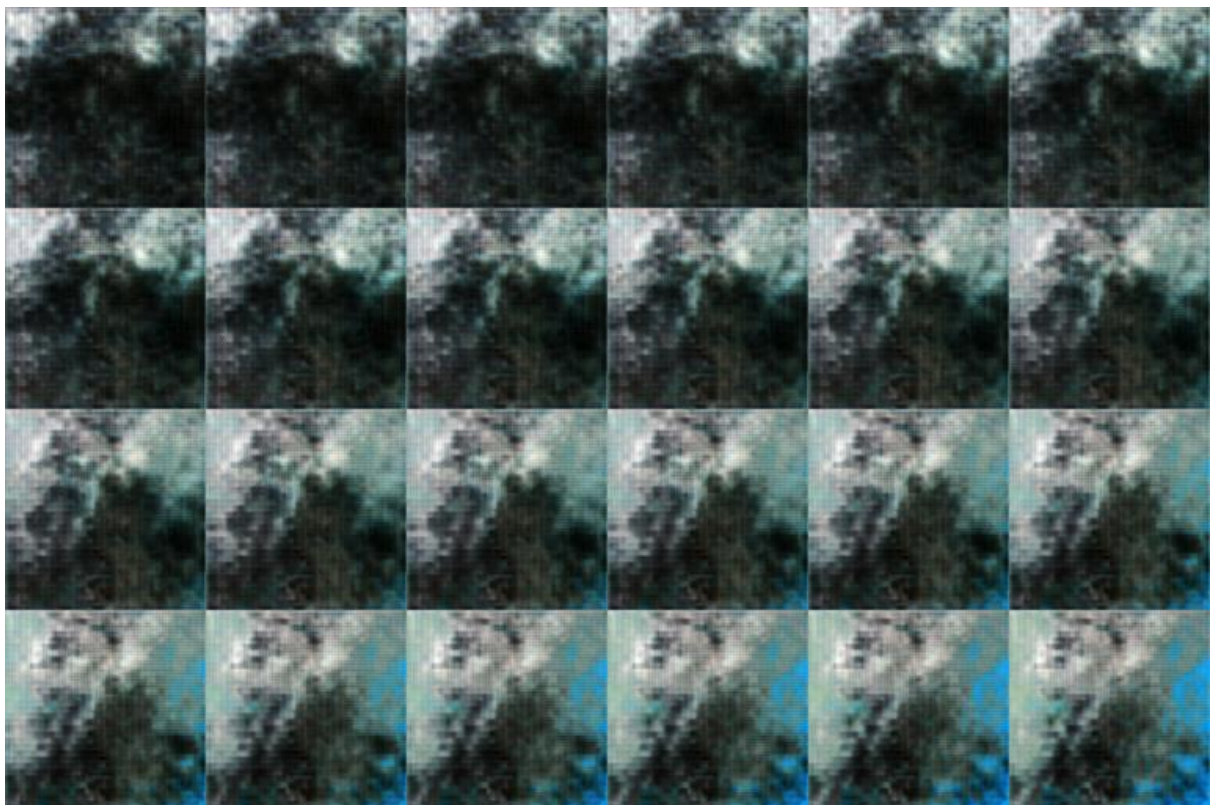


After training the model on 30 epochs, the third output looks a bit too dark. The images at the bottom could be used as maps for ice-capped mountains, but it's still quite hard to intuitively guess that when looking at it without context. Similar dark results were found for 30 epochs even after experimenting with the points in latent space (as shown below):

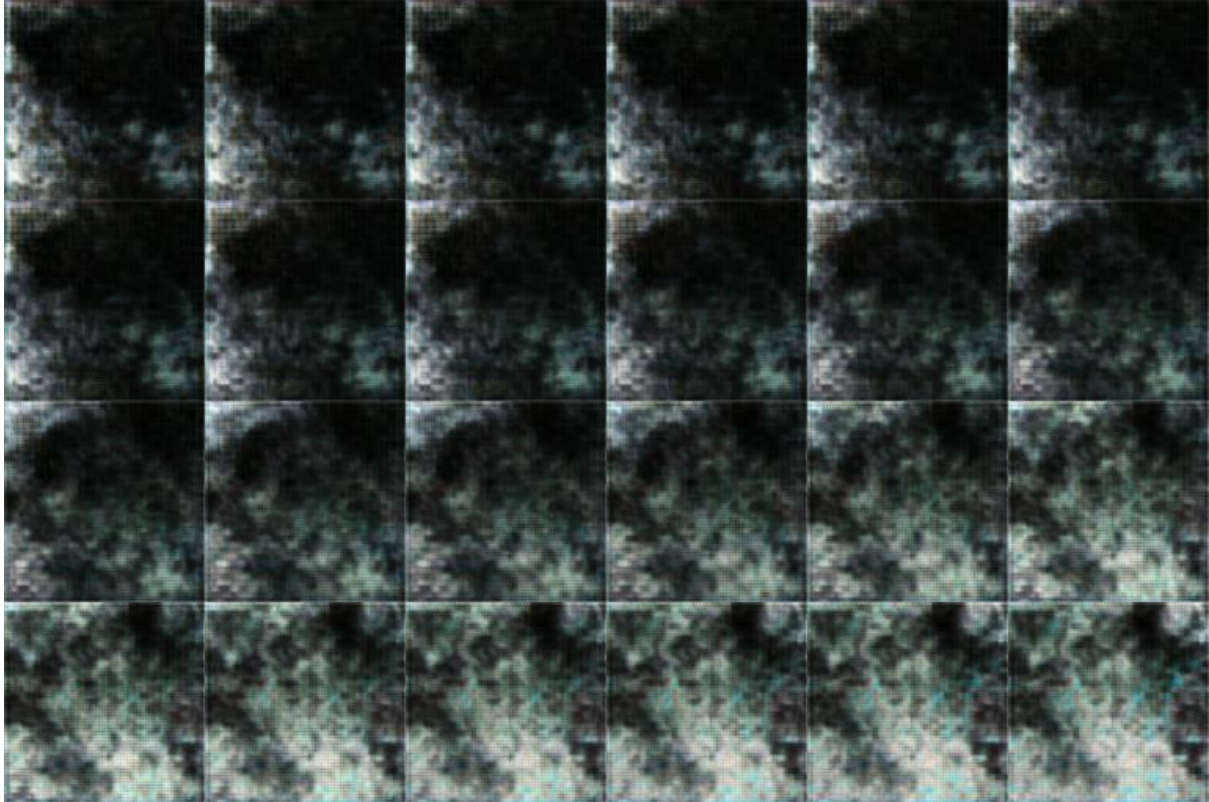
**4) Fourth Output: Epochs = 30, Latent Dimension = 40
Interpolating points between 5 and 20**



**5) Fifth Output: Epochs = 30, Latent Dimension = 61
Interpolating points between 15 and 50**



**6) Sixth Output: Epochs = 30, Latent Dimension = 61
Interpolating points between 31 and 32**



The explanation for the low resolution images could be that we're working with a simple given.

Reflection:

As discussed previously, this generative model could be used to help fantasy writers construct maps for their novels as a handy tool for worldbuilding. Employing machine learning techniques to generate the same could lead to some really interesting and fantastical map outputs, possibly stuff that might not be possible to construct manually (or even imagine). A possible disadvantage to this method could be that the writer might not be able to have complete control over how they want their maps to look like, so if they set out with a concrete idea – it would be hard for them to be satisfied with the model's result.