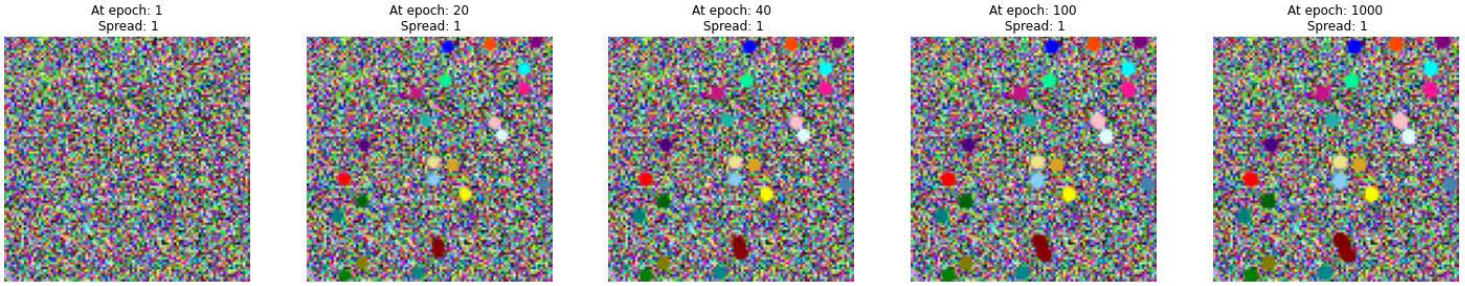
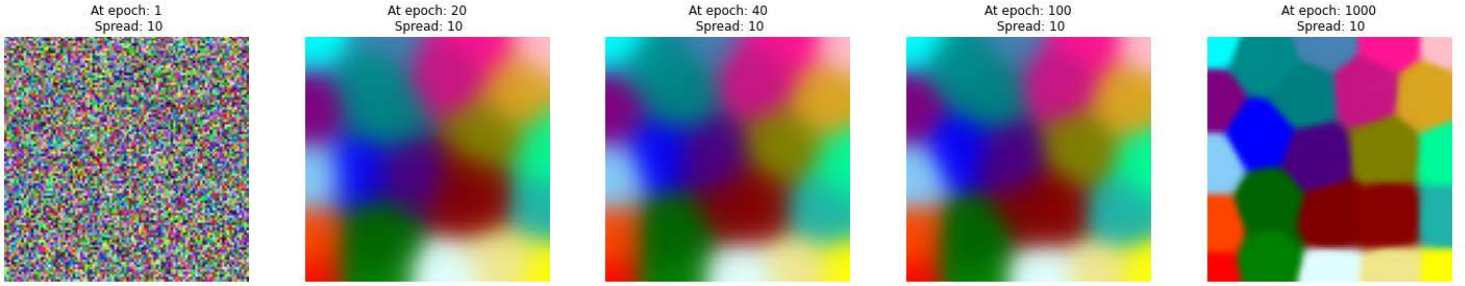
Report

Following are the results achieved for different values of Spread:

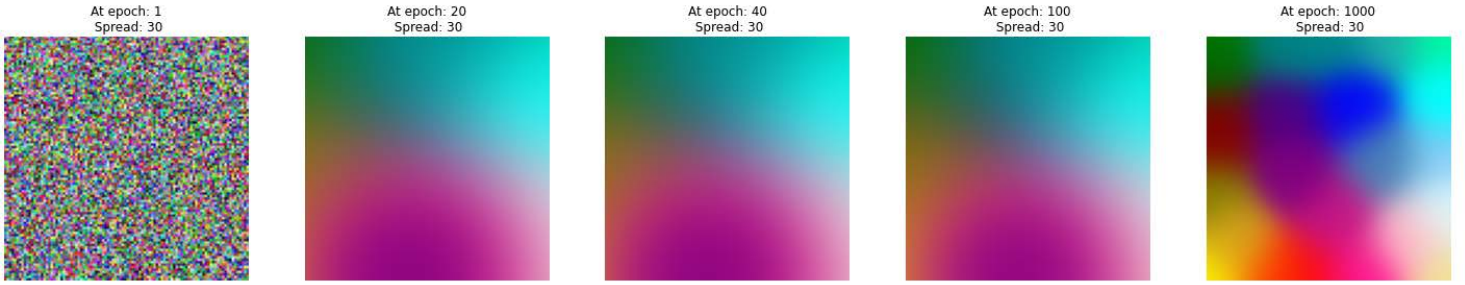
Spread = 1:



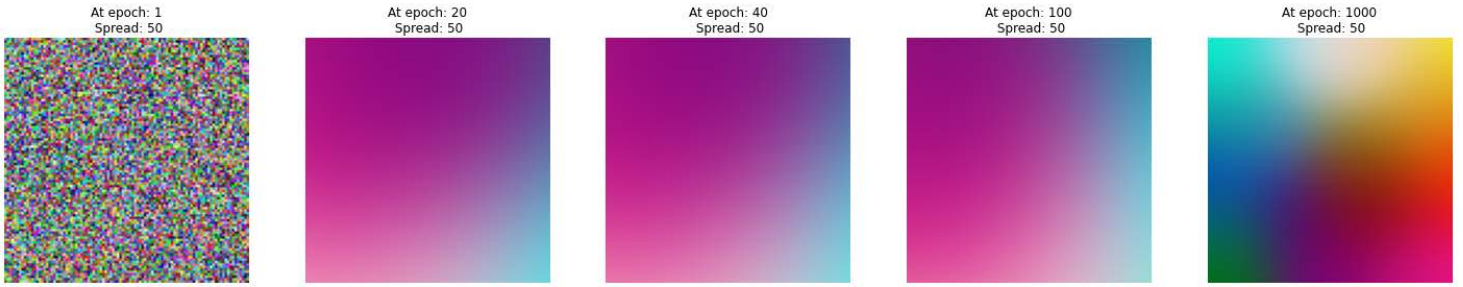
Spread = 10:



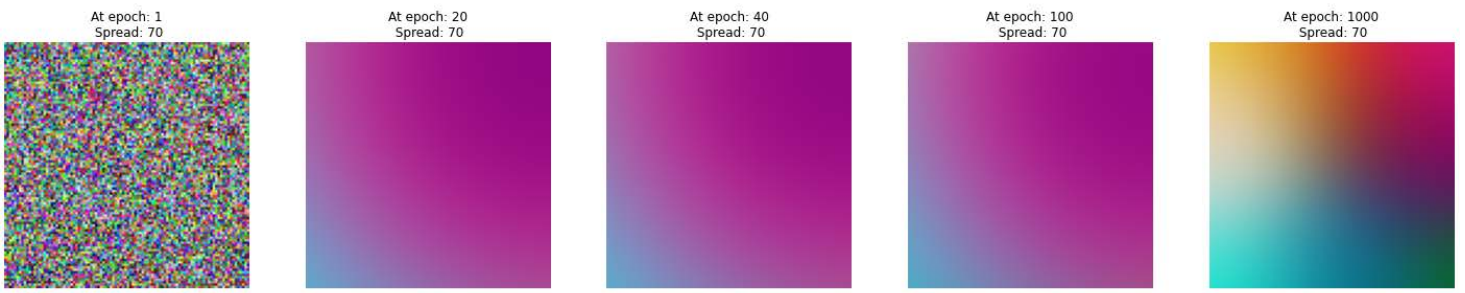
Spread = 30:



Spread = 50:



Spread = 70:



From the above results, we can make the following observations:

- With a low spread value of '1', the network is able to form small clusters with well-formed boundaries in as low as 20 epochs.
  - The clusters are very small, as is expected – due to the smaller neighbourhood size.
  - We can look at it as a case of strong specialization (even at a low number of epochs).
- With Spread = 10, we see good boundaries forming - from 20 epoch onwards, and these boundaries become more clear at epoch=1000.
  - The clusters still maintain a good amount of specialization of colors, at epoch = 1000.
- As we further increase the values of spread, we observe that the network takes longer to form clusters with clear boundaries.
  - The clusters are also larger in size due to a bigger neighbourhood.
  - We can say that the clusters are more generalized, representing a larger sample space.
- A similar trend continues as we keep increasing the value of spread. In fact, at spread values '50' and '70', we can hardly make out any clear boundaries.

From these observations, we can draw the following conclusions:

1] With lower spread values, we achieve clear boundaries in less number of epochs, forming small specialized clusters.

2] With each increase in spread value, we move towards generalization, as we achieve comparatively bigger clusters, representing a larger sample space.
- But note that, if we run the network for relatively more number of epochs (E.g. 2000, 3000, etc), we will move towards more specialized clusters, as the neighbourhood parameter would also go down with each new epoch.

Changing the Spread Values:

The choice of spread values can be changed by changing the value in '`test_sigmas_init`' parameter inside the constructor call for **assignment** under **'Train the network – with RGB inputs'** section.

```
a = assignment(alpha_init = 0.8, test_sigmas_init = [1, 10, 30, 50, 70], max_epochs =
1000, checkpoints_epoch = [20, 40, 100, 1000])
a.generate_input_data()
a.train_and_observe()
```

Simply change the values of '**`test_sigmas_init`**'**.**