COSC 499 Milestone 3

Team 9 order of aesthetics - section 003

Algorithm used to compare images

Recall: How to build a neural network

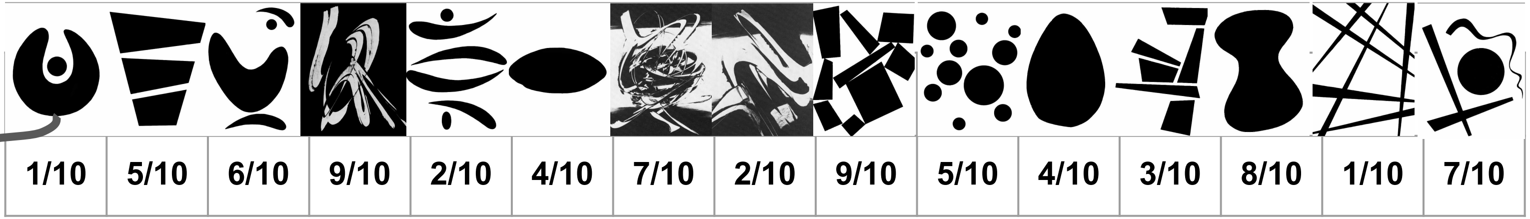
Start with unlabeled data

Recall: How to build a neural network

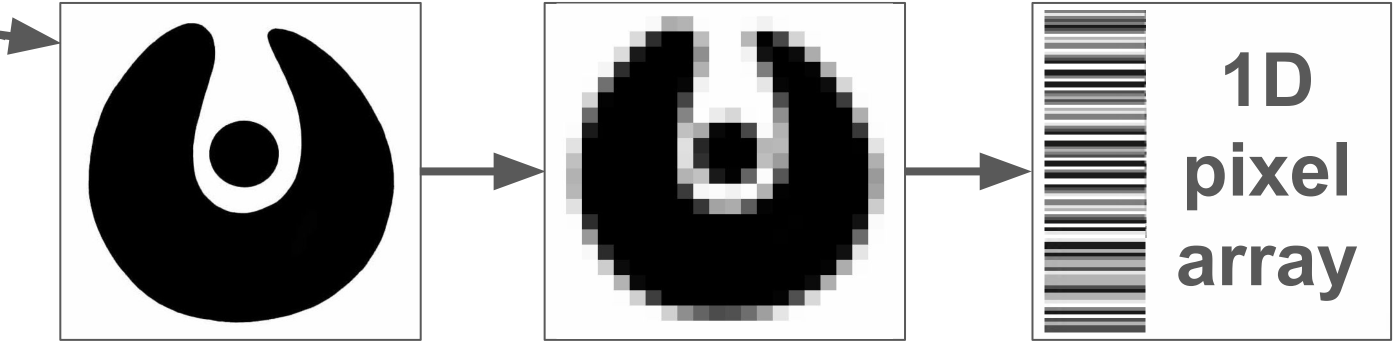
Label it using the survey in our apps

1/10	**5/10**	**6/10**	**9/10**	**2/10**	**4/10**	**7/10**	**2/10**	**9/10**	**5/10**	**4/10**	**3/10**	**8/10**	**1/10**	**7/10**

Recall: How to build a neural network

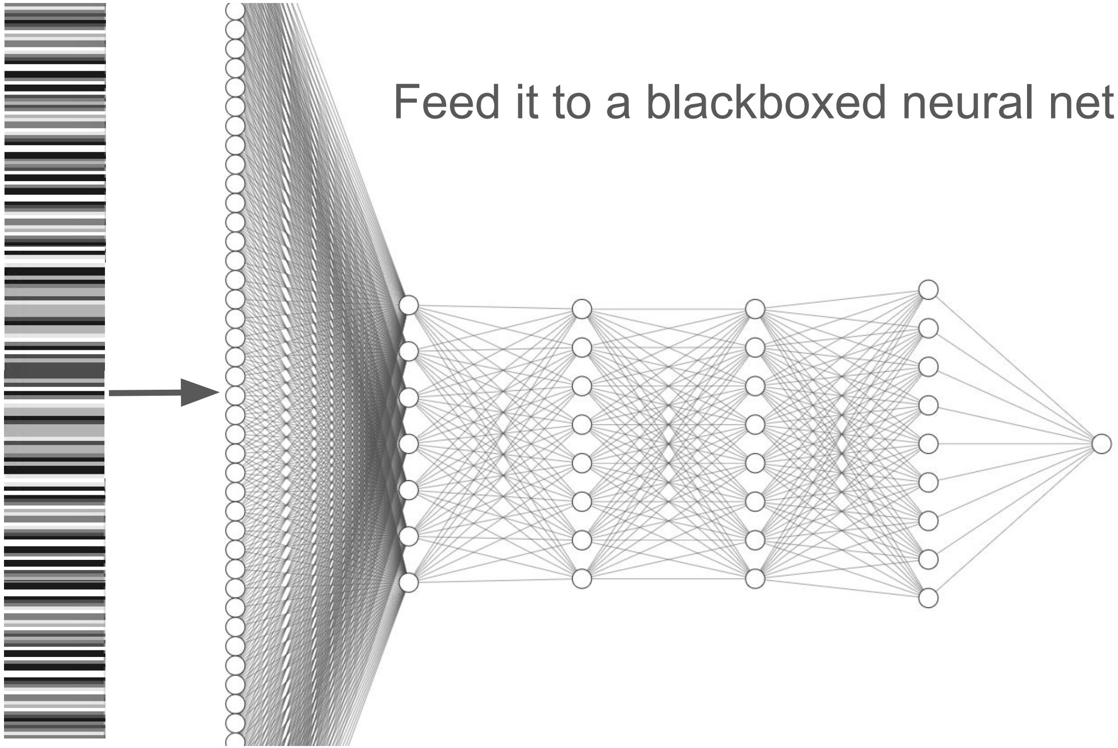


Convert each image to a set of pixels (pretraining)



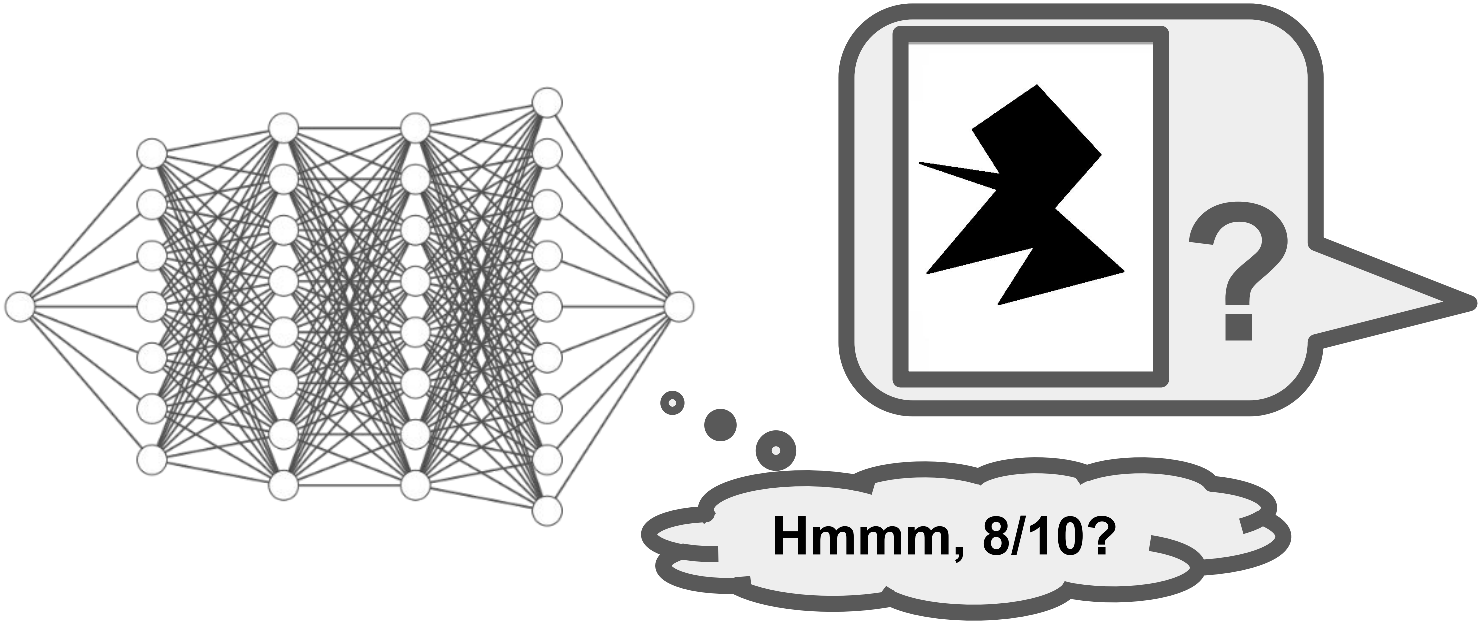
Recall: How to build a neural network

1D pixel array



Recall: How a neural network works

And just like that we have a neural network that can make an educated guess as to how aesthetically pleasing an image is



Performance of image comparison

How do we measure performance? 2 ways:

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1: implement train test split

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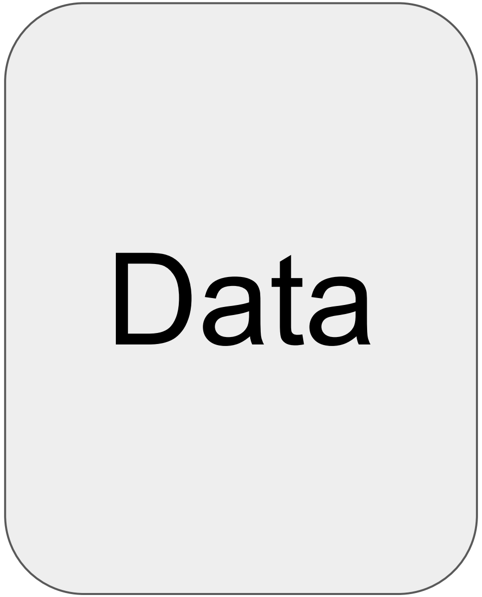
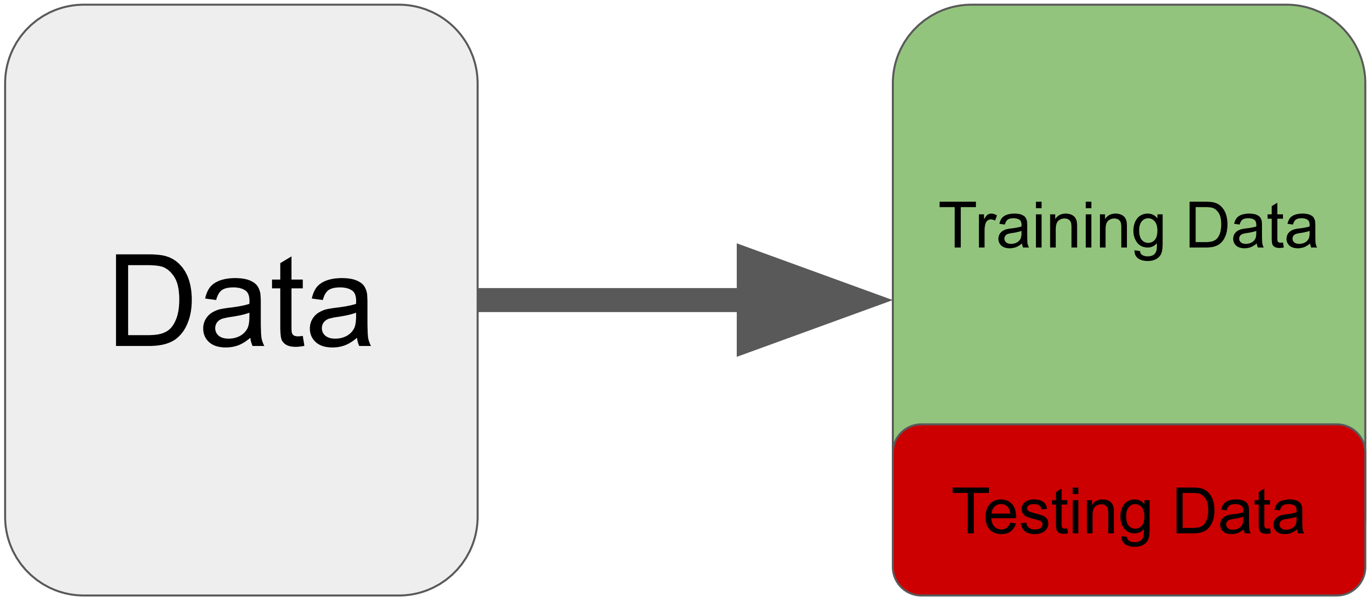
2: dedicated test data

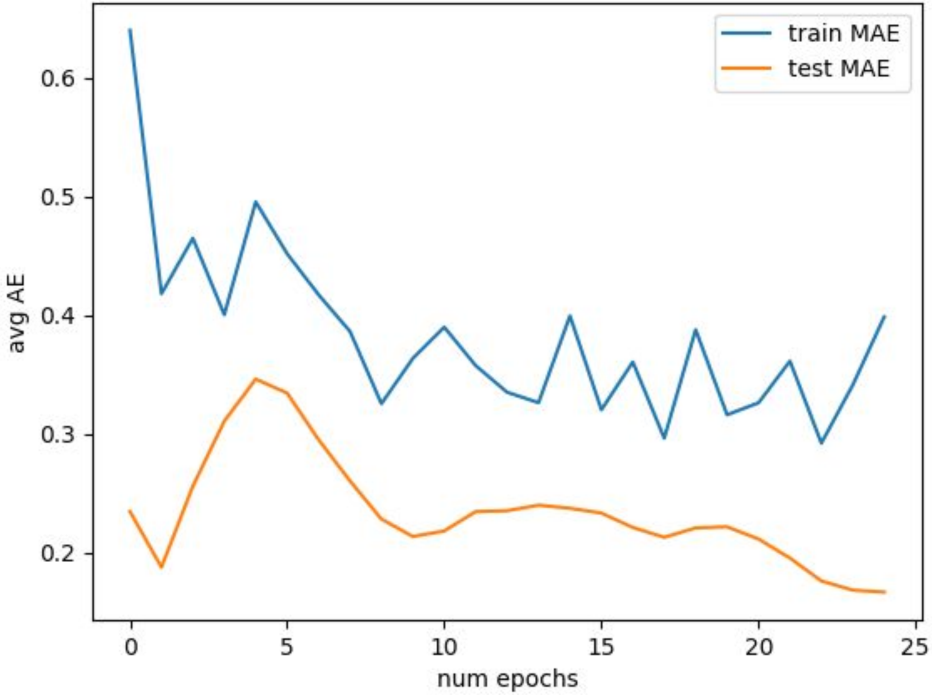
Option 1: Train test split:



Option 1: Train test split:



Option 1: Train test split:



Option 2: Test Data:

Let us test our 3 hypotheses:

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1. Does **contrast** affect the aesthetic score?

Option 2: Test Data:

Let us test our 3 hypotheses:

1. Does **contrast** affect the aesthetic score?

2. Does **shape** affect the aesthetic score?

Option 2: Test Data:

Let us test our 3 hypotheses:

1. Does **contrast** affect the aesthetic score?
2. Does **shape** affect the aesthetic score?
3. Does **symmetry** affect the aesthetic score?

Option 2: Test Data:

To do this lets manually create 3 sets of images:

high/low contrast

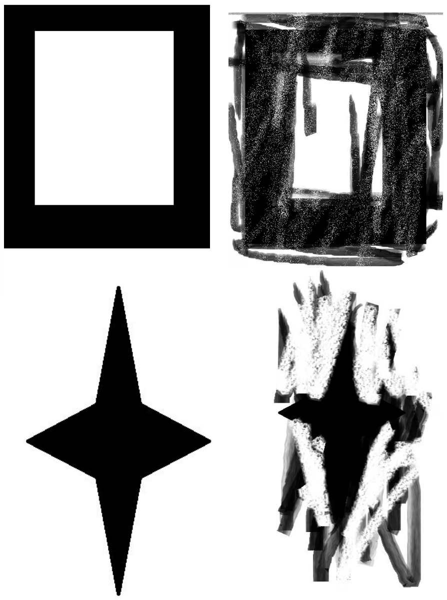
high/low shape definition

high/low symmetry

Option 2: Test Data:

To do this lets manually create 3 sets of images:

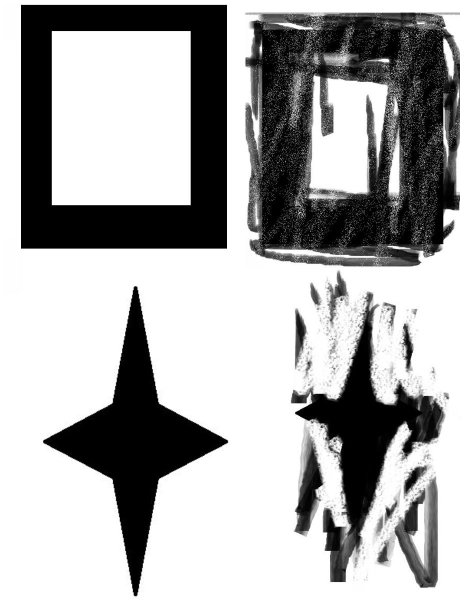
high/low contrast high/low shape definition high/low symmetry



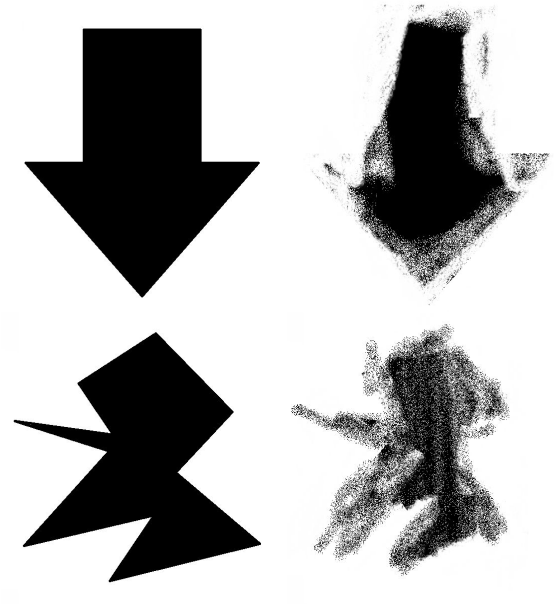
Option 2: Test Data:

To do this lets manually create 3 sets of images:

high/low contrast



high/low shape definition

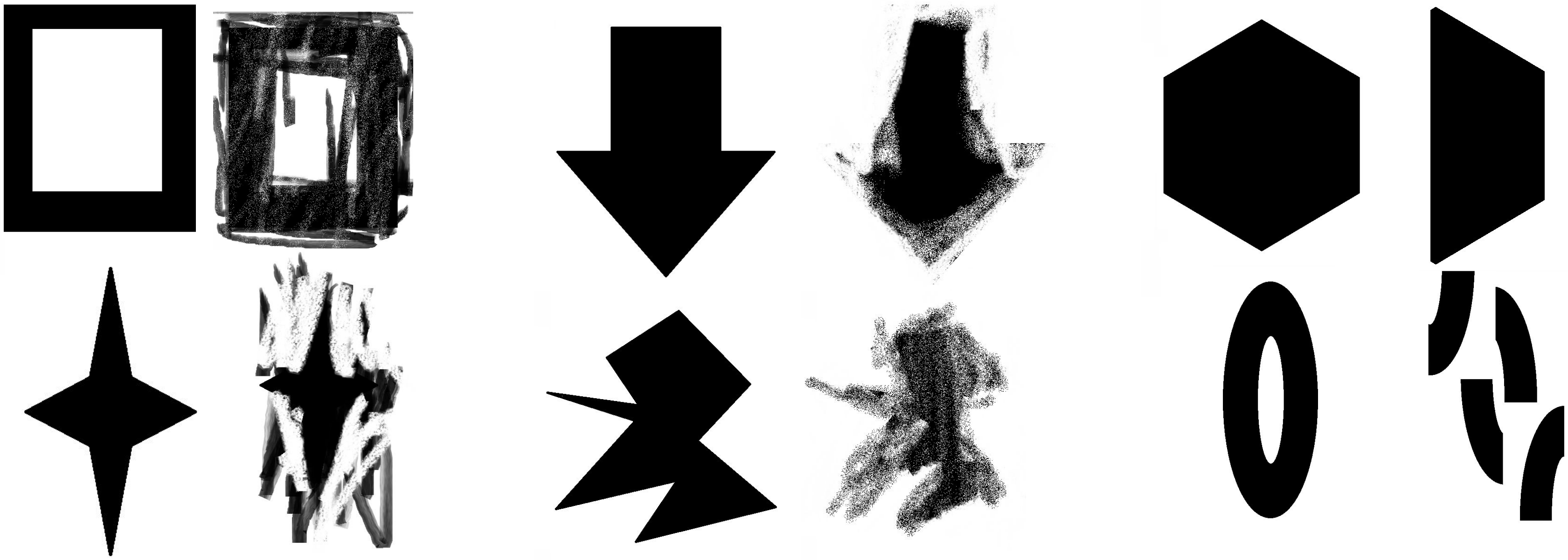


high/low symmetry

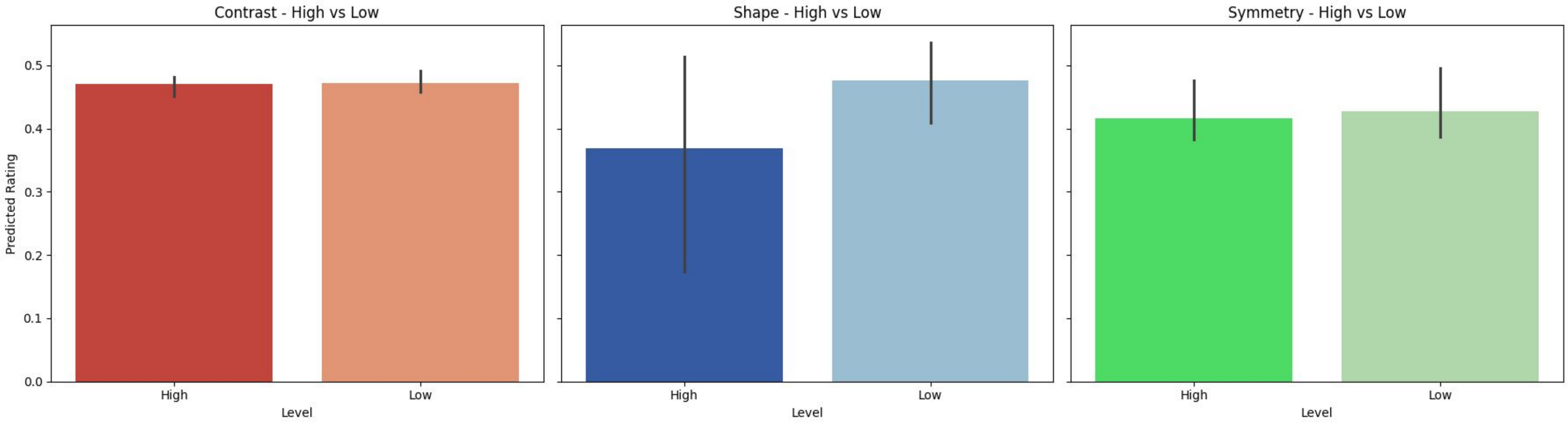
Option 2: Test Data:

To do this lets manually create 3 sets of images:

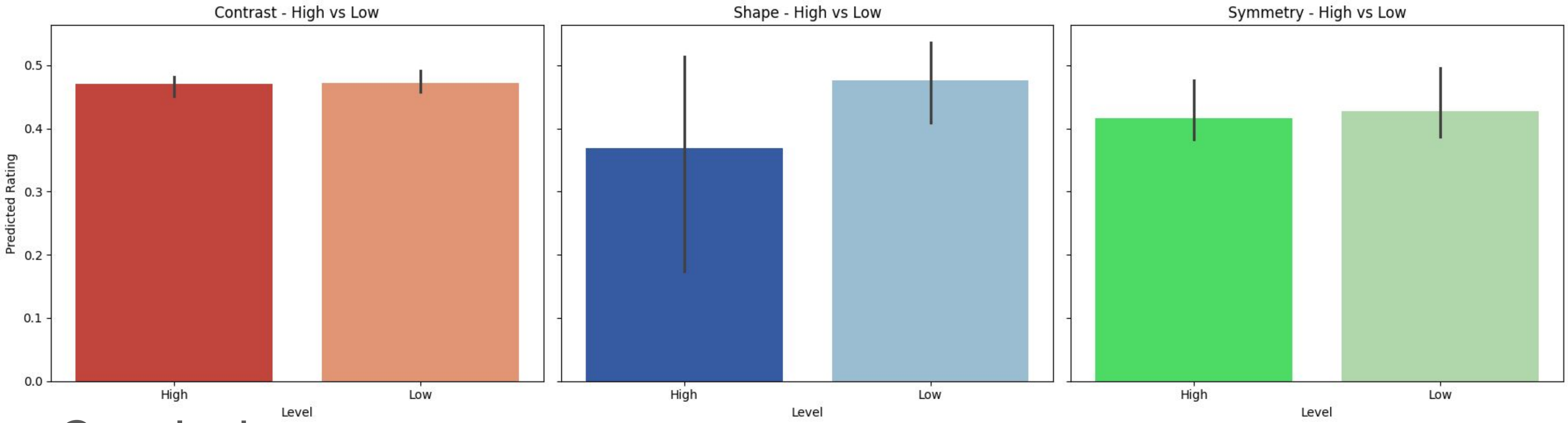
high/low contrast **high/low shape definition** **high/low symmetry**



Option 2: Test Data:



Option 2: Test Data:

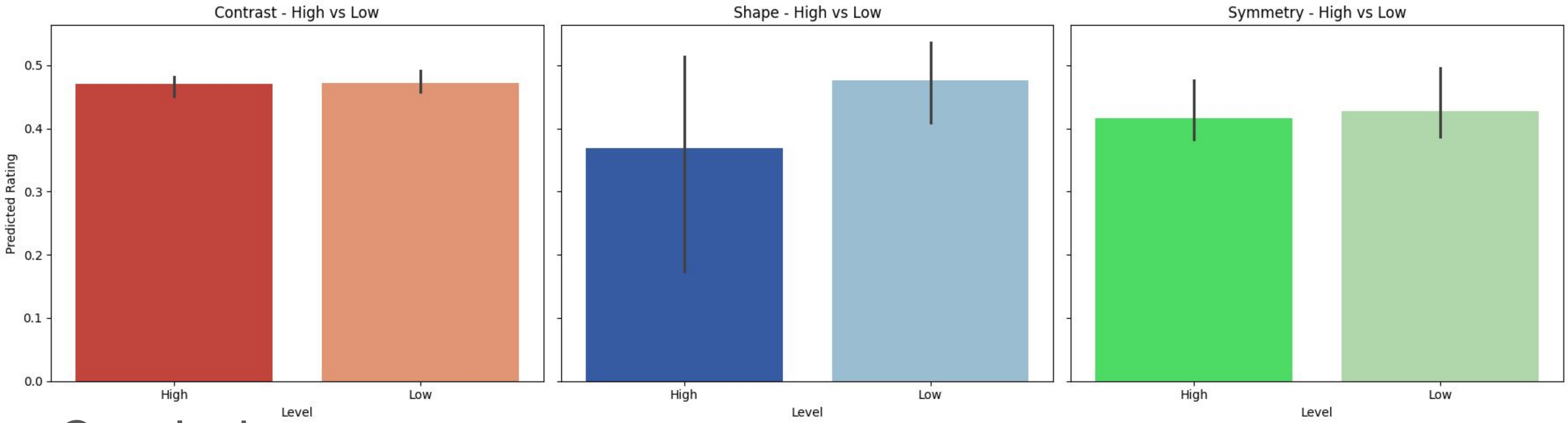


Conclusions:

The model had no preference for high or low contrast

The model & no preference for high or low symmetry

Option 2: Test Data:



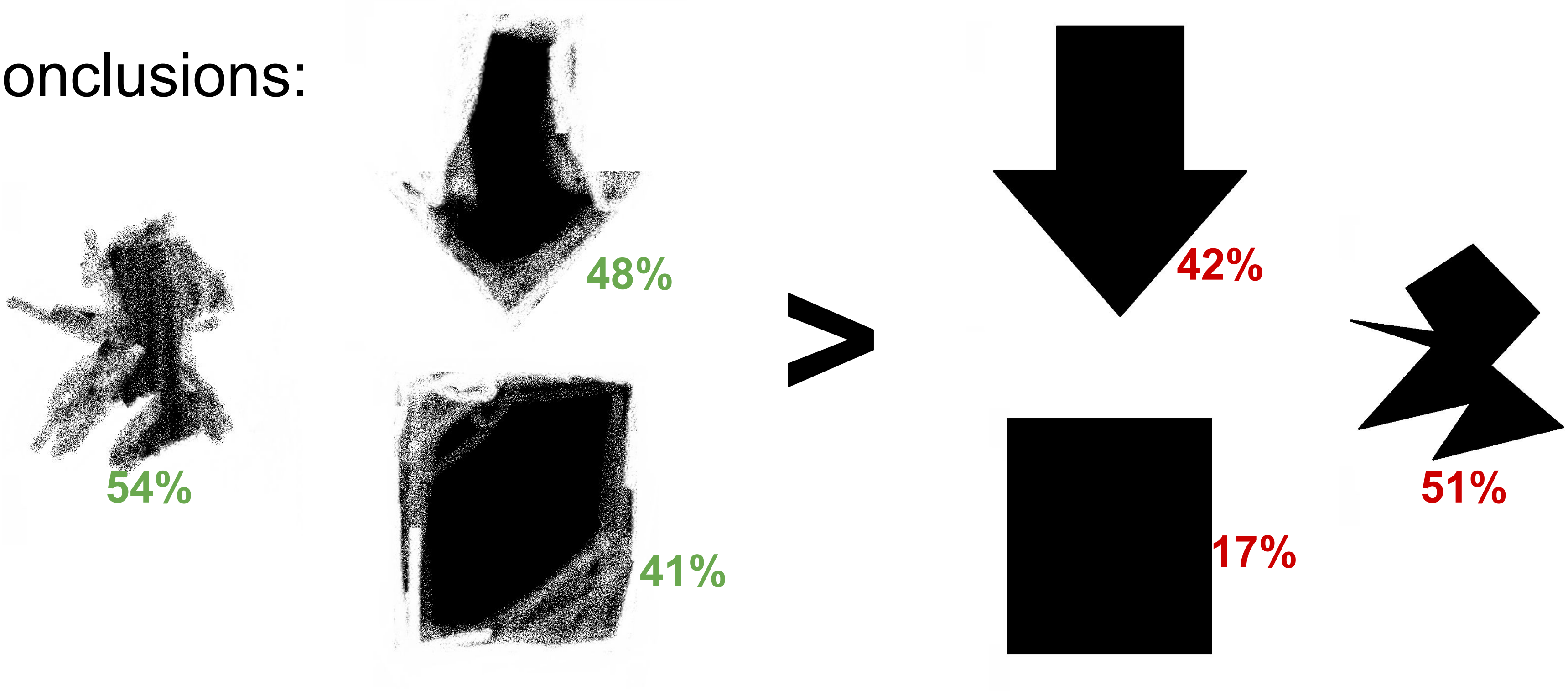
Conclusions:

The model had no preference for high or low contrast

The model & no preference for high or low symmetry

However a high preference was indicated by returning a 10% higher aesthetic rating on average when the shape was defined less strictly

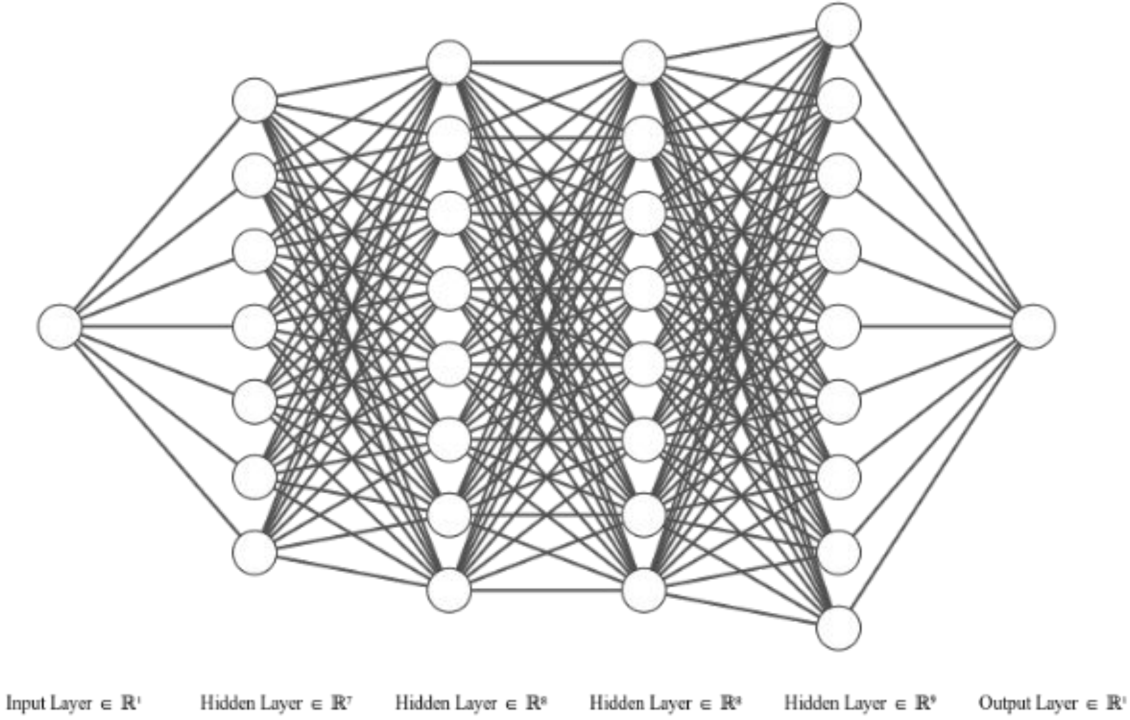
Conclusions:



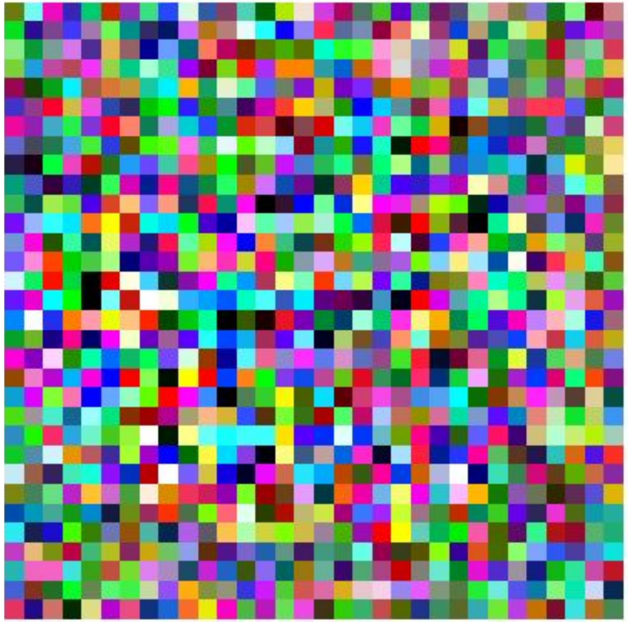
The Model consistently preferred images with more grey pixels - likely cause our data trended towards smoother images being rated higher

Algorithm used to generate images

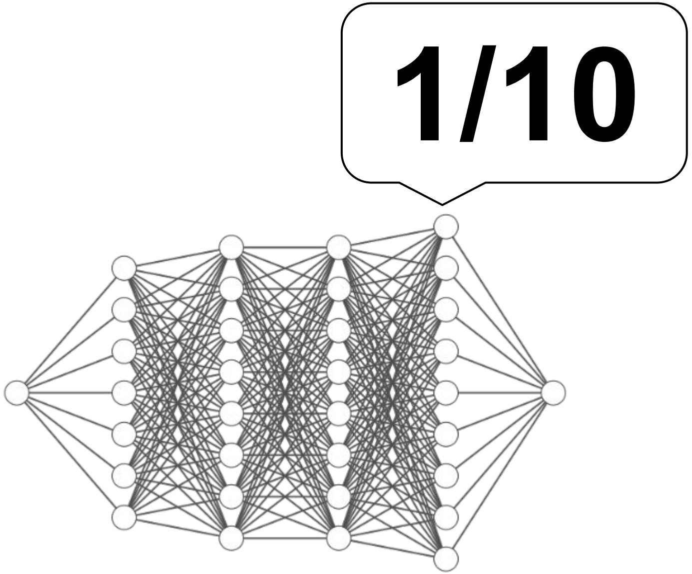
Starting out with our algorithm from earlier

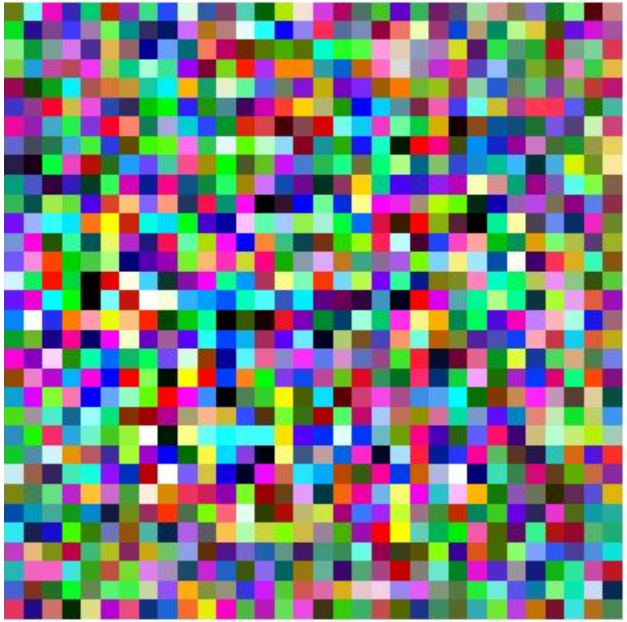


We generate an image from statistical noise

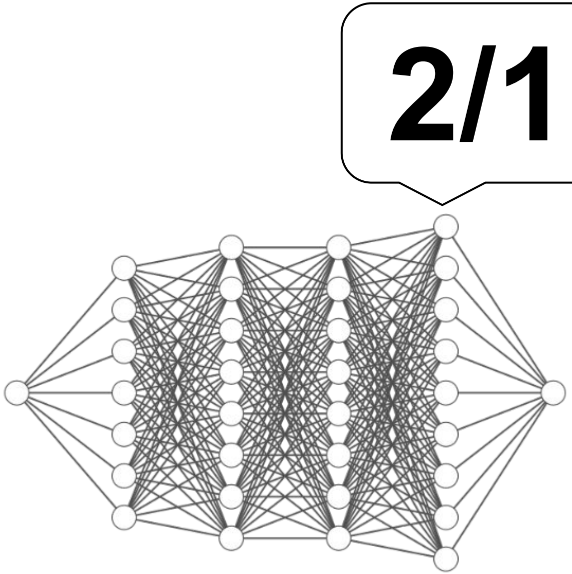


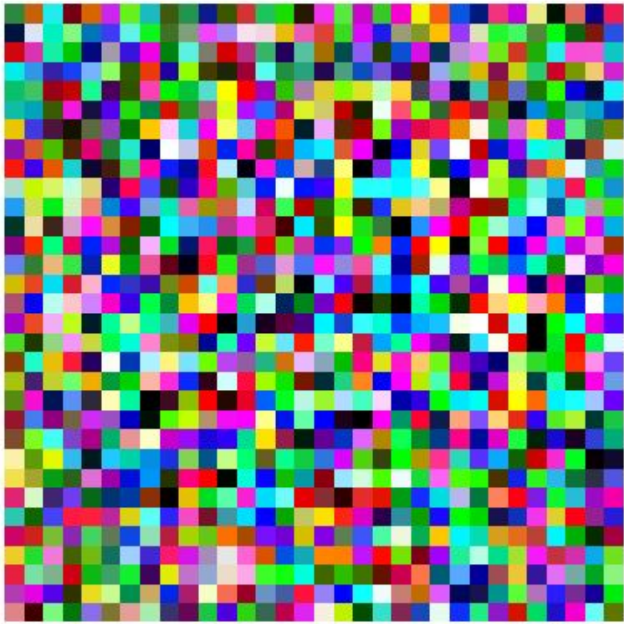
& ask our model what it thinks



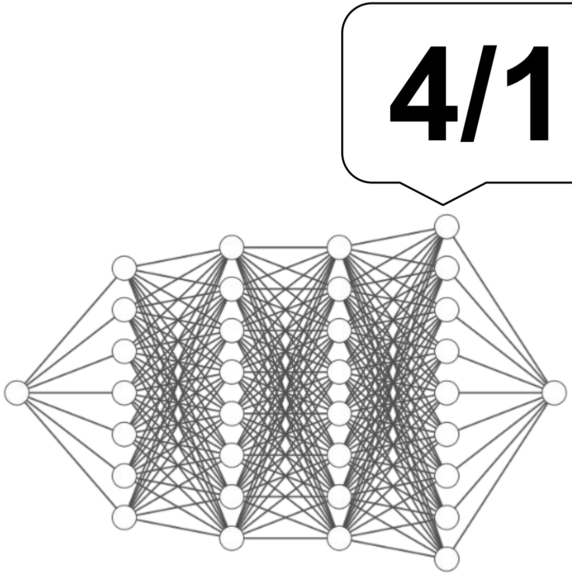


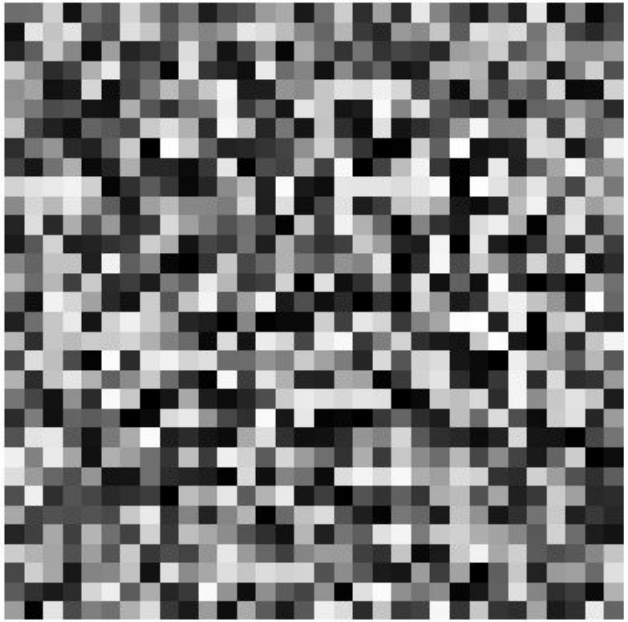
Using that we can generate a better image

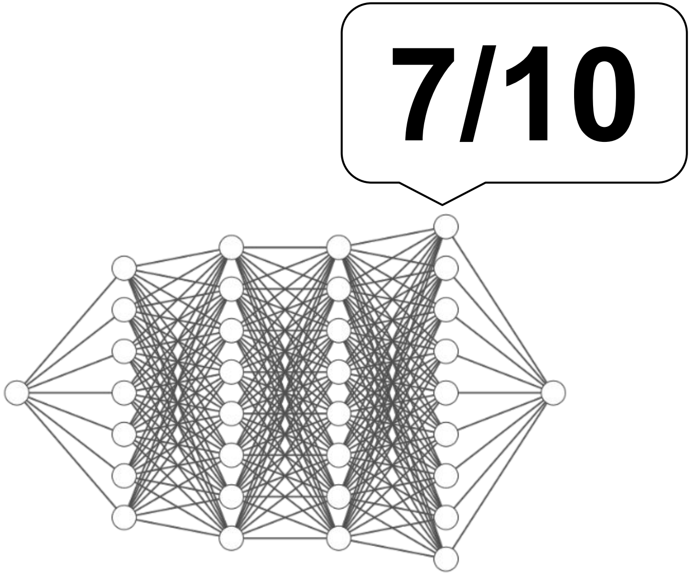


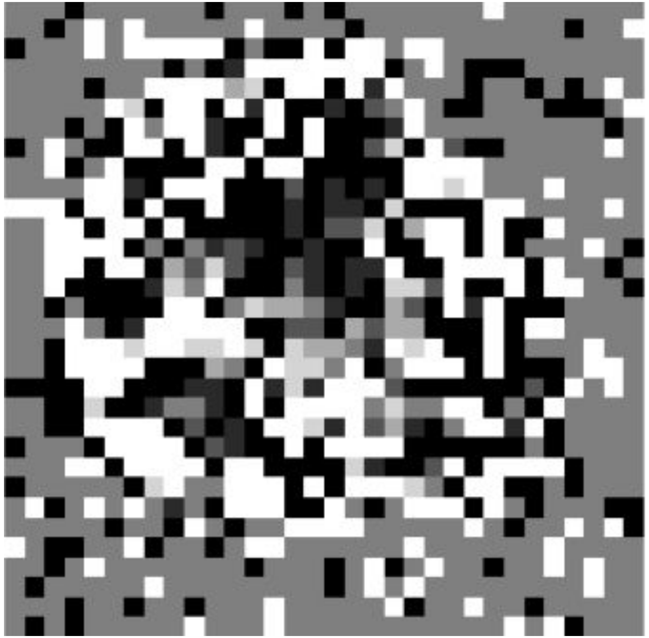


& then an even better image






7/10



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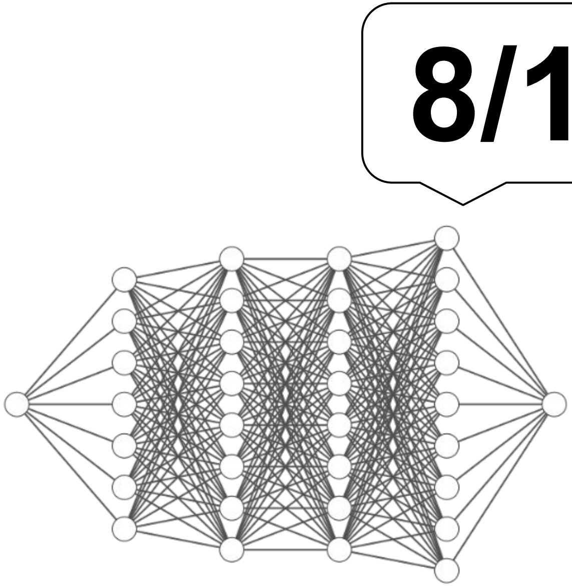
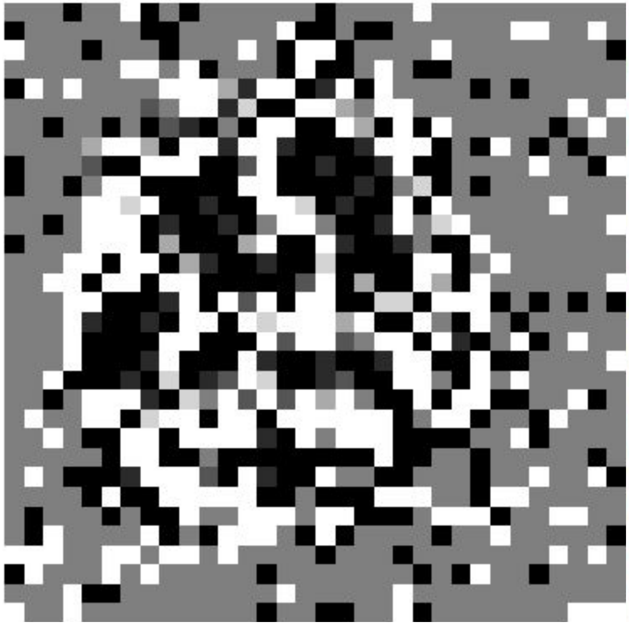
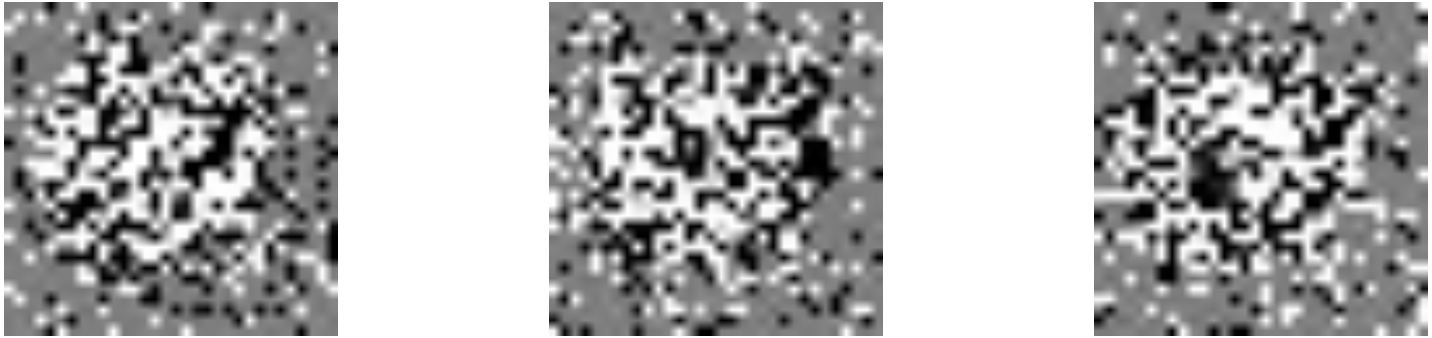




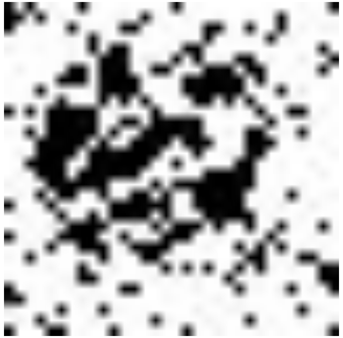
Then finally we can smooth to create a final product

Our generated images ended up looking like this raw:

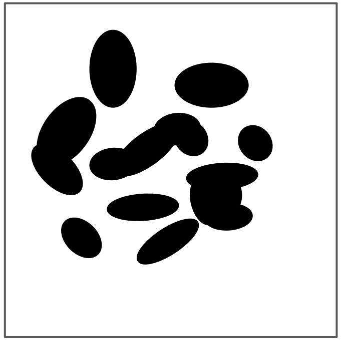
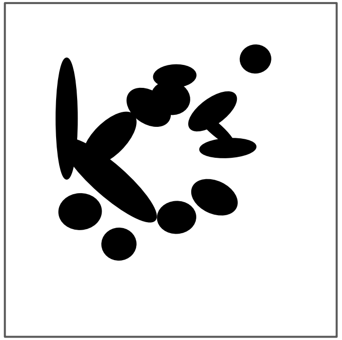
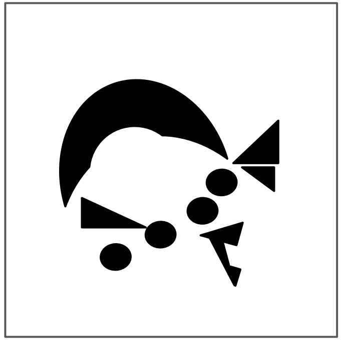


And like this after applying 4 Nearest Neighbor smoothing

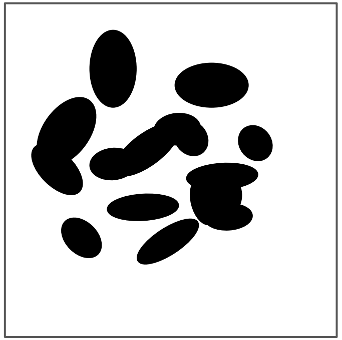
These were then manually transformed from these:



To these:

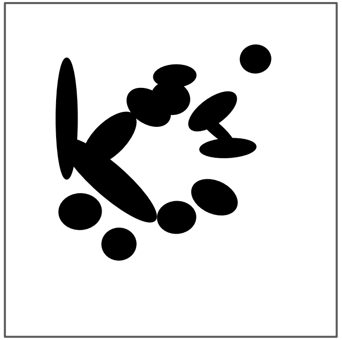




And rated by 5 people on a scale from 1-10:



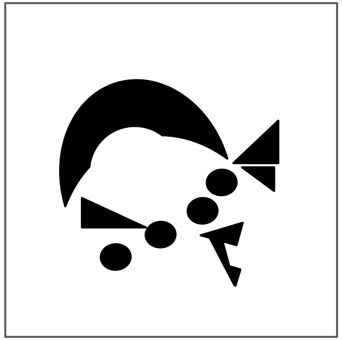
(8+9+8+7+10)/5

= 8.4/10



(7+9+7+7+5)/5

= 7/10



(6+9+9+8+7)/5

= 7.8/10

Therefore: the algorithms in place can make adequate but non excellent images - this serves as a proof of concept that with a sufficient pool of data a successful algorithm can generate images en mass

A note on small sample size

Thanks for listening

A note on dovetailing:

Some elements in this slideshow are copied from team member Samira Almuallim’s work in the client information session 3