

## Machine Learning Ex1 Part 2

The number of iterations requested was 10. Therefore I ran the k-means algorithm 11 times, in order to first print the original centroids as well as to display the original image, and then proceeded to iterate over the centroids, update them, and run it again, and I continued in this manner 10 times.

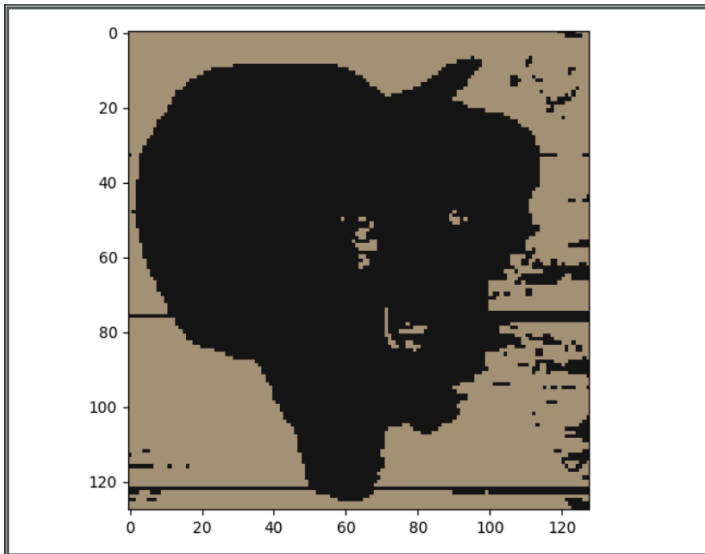
The centroids chosen were the centroids provided in the script.

The loss output is as follows:

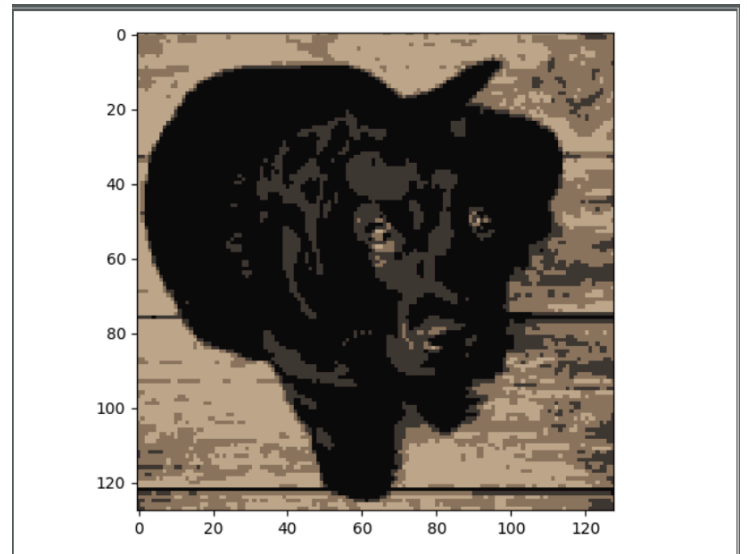
	iter 1	iter 2	iter 3	iter 4	iter 5	iter 6	iter 7	iter 8	iter 9	iter 10
k = 2	0.2050225	0.14266532	0.14033871	0.14131654	0.14162167	0.14167792	0.14167792	0.14167792	0.14167792	0.14167792
k = 4	0.0791736	0.07905602	0.07901893	0.07907108	0.07913012	0.07920958	0.07923422	0.07927817	0.07932132	0.07938918
k = 8	0.0610749	0.05407698	0.05141512	0.05002293	0.04912823	0.04850522	0.0480591	0.04770966	0.04741093	0.04713981
k = 16	0.0328989	0.03108834	0.03024989	0.02990965	0.02975437	0.0296581	0.02958955	0.0295476	0.02948261	0.02943582



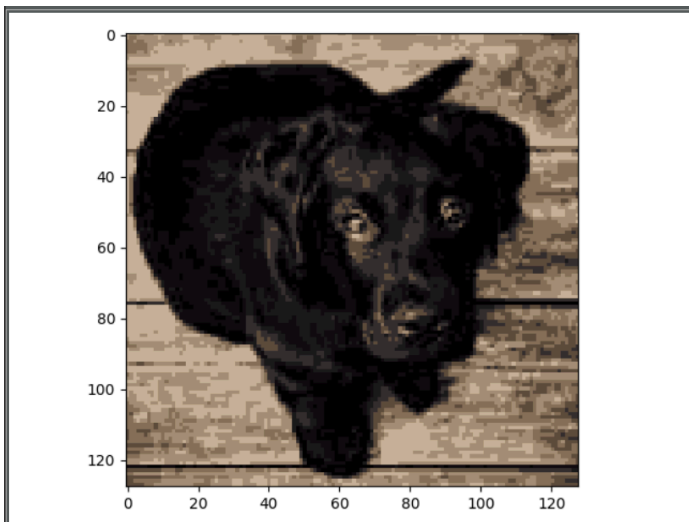
$k = 2$



$k = 4$



$k = 8$



$k = 16$

