CS 498-AML HW6

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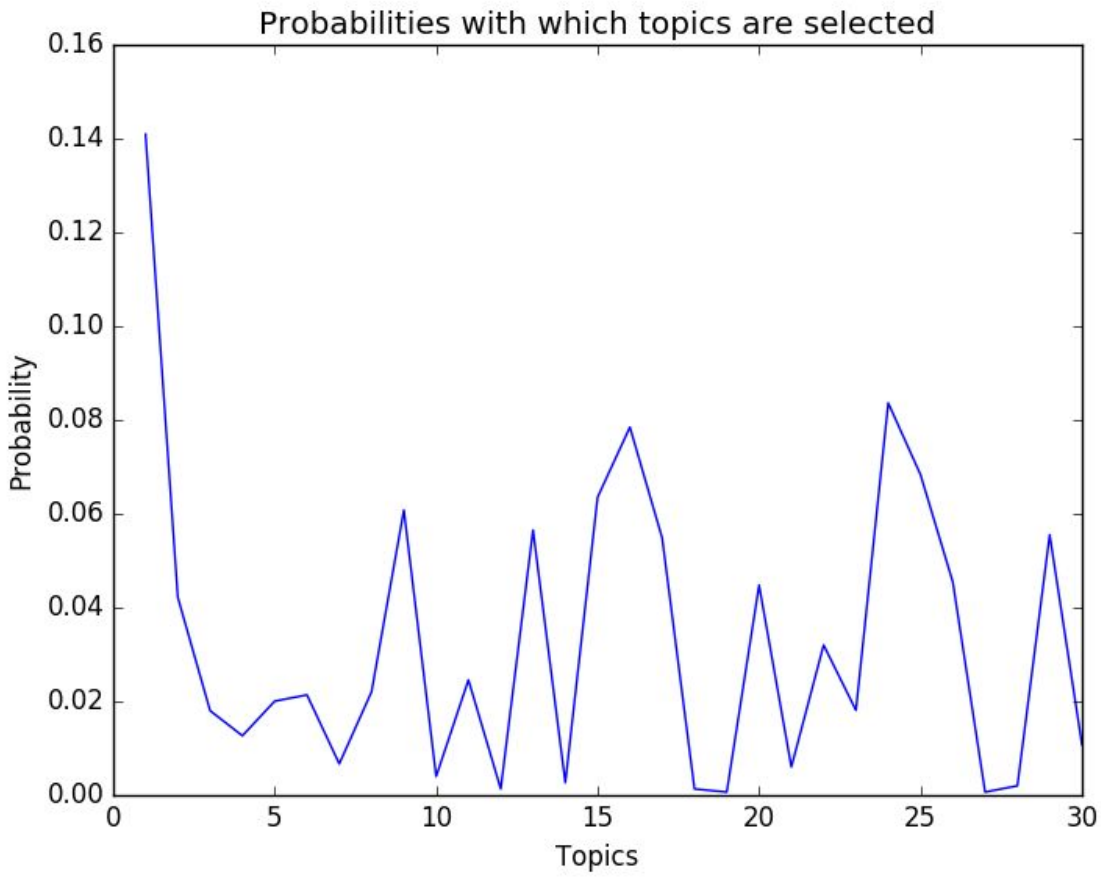
1.



This is the table of the top ten words for each of the 30 topics:

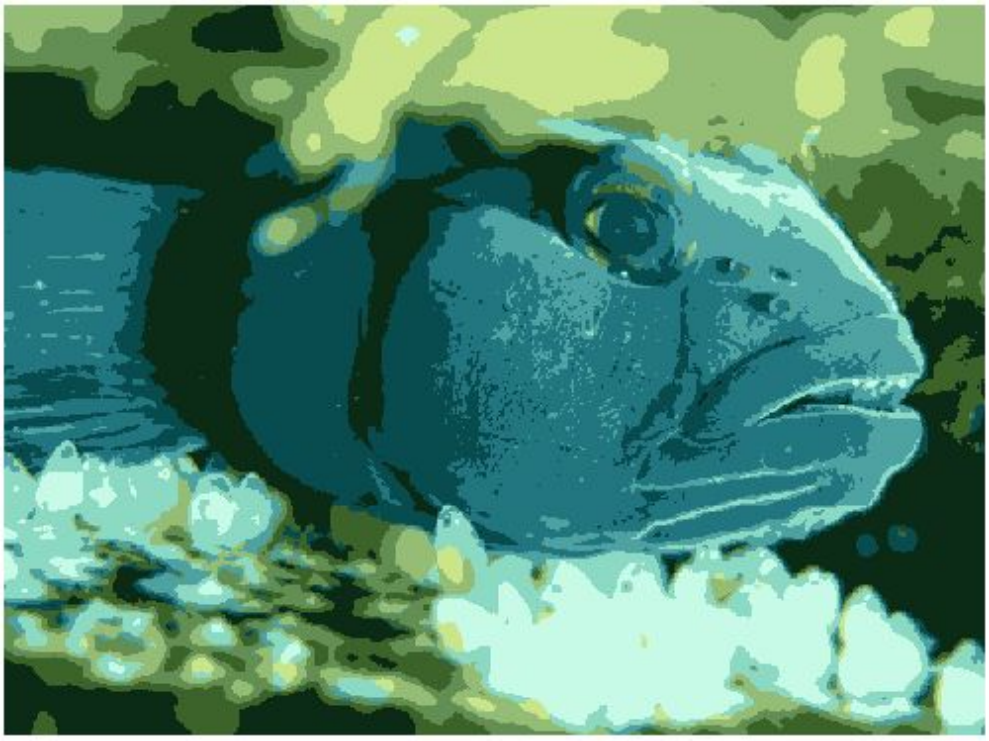
1	system	model	network	neural	function	input	output	signal	circuit	data
2	unit	network	input	learning	weight	hidden	layer	pattern	output	model
3	learning	action	model	task	control	reinforcement	function	robot	system	states
4	algorithm	vector	function	learning	loss	class	set	weight	bound	problem
5	network	unit	input	hidden	output	learning	function	training	pattern	weight
6	weight	network	error	training	set	input	noise	learning	generalization	function
7	network	task	neural	learning	training	architecture	output	problem	input	control
8	input	network	output	neural	function	noise	set	training	data	information
9	network	training	set	data	neural	error	input	output	unit	learning
10	classifier	training	network	rbf	set	error	neural	problem	center	gaussian
11	word	network	recognition	training	system	model	speech	hmm	neural	set
12	cell	head	direction	rat	model	angular	system	velocity	mcnaughton	neural
13	model	data	network	set	parameter	neural	learning	algorithm	training	function
14	character	field	system	window	network	input	net	set	word	training
15	data	model	algorithm	set	parameter	learning	point	distribution	method	function
16	network	neural	system	input	function	learning	weight	output	model	unit
17	learning	algorithm	function	policy	problem	action	system	optimal	result	model
18	hint	learning	examples	function	error	market	performance	method	information	network
19	monte	carlo	player	decision	policy	base	move	rollout	network	trial
20	object	image	network	model	images	recognition	view	system	set	feature
21	function	threshold	network	weight	neural	input	size	circuit	number	result
22	function	set	training	vector	algorithm	error	kernel	data	problem	classifier
23	speech	network	system	model	input	recognition	signal	neural	information	output
24	function	network	algorithm	learning	neural	model	input	problem	set	data
25	cell	model	input	neuron	visual	field	cortex	orientation	response	cortical
26	neuron	network	model	input	neural	synaptic	function	learning	system	circuit
27	channel	model	spike	input	information	neuron	train	ion	rate	current
28	eeg	component	response	trial	artifact	ica	data	single	visual	erp
29	learning	network	error	weight	training	input	function	algorithm	neural	set
30	model	control	learning	movement	forward	motor	field	dynamic	trajectory	system

Many of these topics seem to be machine learning related. This makes sense, as the dataset is a set of conference papers. The topics seem to make sense. Each topic could be a subfield of machine learning.

2.1. These are the segmentation results for 10, 20 and 50 segments for the three images

Image 1 Original:

10 Segments:



20 Segments:

50 Segments:

Image 2 Original:

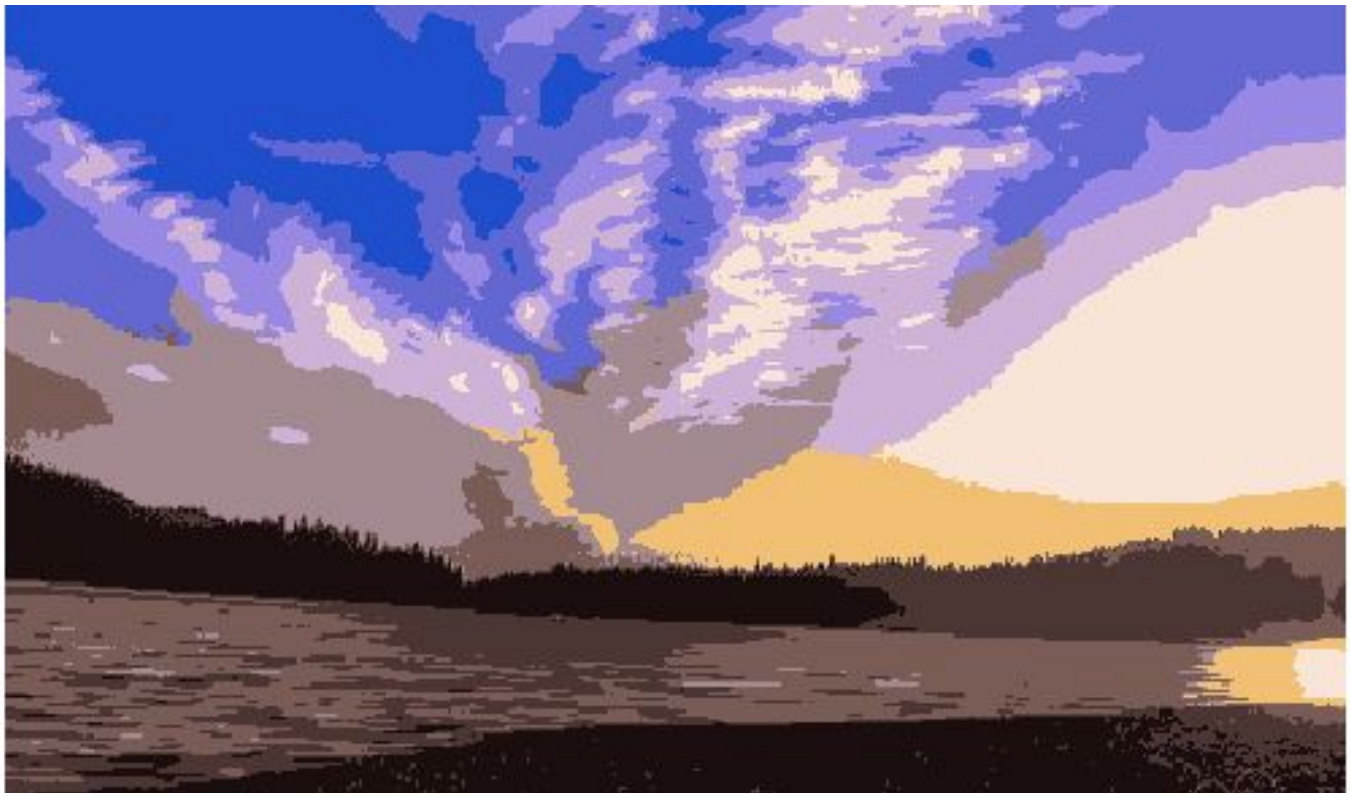
10 Segments:

20 Segments:

50 Segments:

Image 3 original:

10 Segments:



20 Segments:

50 Segments:

2.2. For this section, we ran the EM algorithm on the sunset image with 20 segment. We used K-Means clustering to generate 5 different starting points to run this on. These are the results:

There is very little variation in the images, even though there were different starting points. The clusters seem really similar. There seemed to be two slight variations in the clusters between the 5 images, but there are only minor differences.

Even though EM gives you a local maximum, it appears the local maximums are not all too different.