

In this Ruby application, it tries to identify handwritten images as identifiable Arabic digits (0,1,2,3....9). It does this through the machine learning algorithm K-Nearest Neighbor. K-NN's objective is to build a neural network from preexisting data, tests it and then produces a three layered graph. Through this three layered graph, future inputs can be correctly identified without the need for a larger, static and more elaborate algorithm. I choose to use Ruby because unlike technologies like Mat Lab, I know how to reuse it with other technologies like Rails and Java.

Plots:

Table of Data

3-NN From "optdigits trial trans.dat"

Trial Index [1..10]	Euclidean distance	Output Classification
	Classifier : Distance	
1	9:28.071337695236398 3:33.704599092705436 5:40.98780306383839	3
2	5:37.94733192202055 0:39.06404996924922 4:40.74309757492672	0
3	1:36.124783736376884 3:49.77951385861457 7:51.70106381884226	1
4	5:46.57252408878007 6:46.74398357008097 3:46.8081189538738	3
5	3:34.08812109811862 9:39.89987468652001 2:41.08527716834828	2
6	4:26.851443164195103 1:51.57518783291051 6:51.93264869039514	1
7	5:26.92582403567252 3:39.585350825778974 9:43.46262762420146	3
8	6:33.406586176980134 4:41.10960958218893 0:48.45616575834287	0

9	7:27.422618401604176 1:41.617304093369626 9:46.72258554489466	1
10	8:39.6232255123179 5:40.95119045888654 7:44.13615298142782	5

For Windows:

I have built a Ruby executable .exe file 'hw1.exe'. You can double click it like any other '.exe' file. It should run properly

For Mac:

Modern Macintosh computers should have Ruby 1.8.7 installed. You will have to go into your terminal. Then navigate to the directory you have extracted the compressed file and finally run the command " ruby hw1.rb "

If you don't have Ruby installed or for some reason the windows exe won't run, a simple solution is to download RailsInstaller as it is a bundled package for Mac and Windows operating systems.

Link: <http://railsinstaller.org/en>

If you are using Ubuntu here is a link to install Ruby without Ruby Version Manager
<http://leonard.io/blog/2012/05/installing-ruby-1-9-3-on-ubuntu-12-04-precise-pengolin/>