Question 1 Data:

(2.76, -3.48), C1

(0.04, 3.88), C2

(-0.48, -3.36), C1

(-1.84, 2.32), C2

(-0.32, -3.84), C1

(-0.72, 1.36), C2

(0.44, -3.72), C1

(-0.12, 1.96), C2

(0.64, -1.92), C1

(0.84, 4.68), C2

Reference From Homework 1

Q 2c) onsider the problem where we want to predict the type of material (among 3 material types) of a mug
based on four measurements, namely the height, diameter, weight, and hue (color).

To evaluate the performance of the KNN algorithm, implement a leave-one-out evaluation routine
for your algorithm. In leave-one-out validation, we repeatedly evaluate the algorithm by removing
one data point from the training set, training the algorithm on the remaining data set and then testing
it on the point we removed to see if the label matches or not. Repeating this for each of the data
points gives us an estimate as to the percentage of erroneous predictions the algorithm makes and
thus a measure of the accuracy of the algorithm for the given data.
Apply your leave-one-out validation with your KNN algorithm to the dataset for Question 2 c)
for values for K of 1, 3, and 5 and report the results. For which value of K do you get the best
performance ?

Question 2 a) Training Data:

((0.1225668152943, 0.0950649634881, 0.47030737945628, 2.6730158820132), Metal)
((0.12100773262877, 0.13317476598389, 0.37913454099769, 3.9472186934841), Plastic)
((0.13900481520373, 0.089481038328764, 0.33292877629702, 4.0258295880879), Plastic)
((0.11244032192565, 0.12950176262792, 0.27006064569367, 1.3472798491841), Plastic)
((0.19068235187958, 0.15, 0.6345063863298, 1.457794761602), Plastic)
((0.092861509874033, 0.080105881398093, 0.44235591767263, 2.390045132995), Ceramic)
((0.087730578531639, 0.10327433496205, 0.58614695094388, 1.9519137465477), Ceramic)
((0.16627836774552, 0.11337685571555, 0.46115270294724, 4.7469199118889), Plastic)
((0.074815362857922, 0.09447749836157, 0.30836323031853, 3.6709913687407), Metal)
((0.14656254185582, 0.13939893780212, 0.75, 2.9879967972058), Ceramic)
((0.11322746239484, 0.10882602141735, 0.25218852991073, 4.2432112568891), Plastic)
((0.1491865764612, 0.13517964287296, 0.39897005561059, 3.7944583191581), Plastic)

Question 2 a) Test Data:

(0.078355315262644, 0.065085420750952, 0.31277762408761, 3.417448008656)
(0.14145437313793, 0.1393715964378, 0.75, 1.8576699327041)
(0.11862565386645, 0.1256911444119, 0.35580131740108, 2.8582773391215)
(0.10773778364462, 0.063314304049514, 0.38326620548611, 0.68295156340849)

Question 2 c), 2 d), 2 e) Program Data:

((0.18441330199441, 0.11381379772869, 0.46009921683291, 2.22971984071), Plastic)
((0.065970587580431, 0.04843360690118, 0.10543607078758, 2.3807729796502), Metal)
((0.18421163981943, 0.15, 0.65136387717191, 4.8647169170521), Plastic)
((0.072130003618542, 0.055109566464469, 0.17963354390241, 2.1173464316144), Metal)
((0.054062029349578, 0.032062029349578, 0.12424299240015, 2.1602577998769), Metal)
((0.078714320559414, 0.083022410001122, 0.42216771102468, 1.6862285348491), Ceramic)
((0.10366407850913, 0.1208574267146, 0.52765647535608, 2.8092804927349), Metal)
((0.066294078405381, 0.048216603158627, 0.2066197785383, 3.2987087602116), Ceramic)
((0.07023186560701, 0.055572680182601, 0.19914783280628, 3.6680834556369), Metal)
((0.064651543760024, 0.03, 0.10986098842864, 0.75180035815368), Metal)
((0.067460981883994, 0.060301473895523, 0.19598474190007, 3.4216730093695), Metal)
((0.12842495652169, 0.12595166170176, 0.75, 2.7220946791656), Ceramic)
((0.21659646116544, 0.15, 0.71076974271517, 4.4419129197456), Plastic)
((0.11136878909123, 0.099151622544679, 0.7246581543488, 4.6736358567086), Ceramic)
((0.065137771209764, 0.065696604617595, 0.20365568511757, 5.6488760025016), Metal)
((0.11173116280458, 0.082977746574794, 0.56229379478673, 1.9114922772418), Ceramic)
((0.18583860874431, 0.15, 0.61853008485711, 3.1104537377023), Plastic)
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((0.11862479143326, 0.058851807870807, 0.33162614454659, 3.8024935694878), Metal)
((0.076785481246349, 0.053038546837935, 0.1527455491328, 3.3464545033807), Metal)
((0.1693282819092, 0.15, 0.56882365603279, 3.3587907440361), Plastic)
((0.06415872614939, 0.03, 0.11389593985426, 4.0869970761289), Metal)

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