**Homework 9**

Due **11:59 PM Nov 6 2019**

Please submit your work and name is **HW9.pdf.** The digital version is preferred, but if it is not possible, you can submit hand-writing version.

1. Giving the following training dataset:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | height | width | deepth | thickness | Label |
| Product 1 | 2 | 9 | 8 | 4 | Good |
| Product 2 | 3 | 7 | 7 | 9 | Bad |
| Product 3 | 10 | 3 | 10 | 3 | Good |
| Product 4 | 2 | 9 | 6 | 10 | Good |
| Product 5 | 3 | 3 | 2 | 5 | Bad |
| Product 6 | 2 | 8 | 5 | 6 | Bad |
| Product 7 | 7 | 2 | 3 | 10 | Good |
| Product 8 | 1 | 10 | 8 | 10 | Bad |
| Product 9 | 2 | 8 | 1 | 10 | Good |

Use k-NN with k = 7 to predict to label of the product either good or bad using the following testing set

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | height | width | deepth | thickness | Label |
| Product A | 3 | 2 | 1 | 5 | ? |
| Product B | 8 | 3 | 1 | 2 | ? |
| Product C | 6 | 10 | 8 | 3 | ? |
| Product D | 9 | 6 | 4 | 1 | ? |

You will need to show step by step how k-NN is used to decide to outcome. (It will be

quick if you use programming to calculate the “distance”)

2. Giving the following training dataset:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | R | G | B | 3D | Label |
| Image 1 | 0-100 | 171-255 | 0-150 | Yes | Tree |
| Image 2 | 101-170 | 0-100 | 151-255 | No | not Tree |
| Image 3 | 171-255 | 101-170 | 151-255 | Yes | Tree |
| Image 4 | 101-170 | 0-100 | 151-255 | No | not Tree |
| Image 5 | 171-255 | 101-170 | 151-255 | No | Tree |
| Image 6 | 101-170 | 0-100 | 0-150 | No | not Tree |
| Image 7 | 0-100 | 101-170 | 0-150 | Yes | not Tree |
| Image 8 | 0-100 | 101-170 | 151-255 | Yes | Tree |
| Image 9 | 101-170 | 171-255 | 0-150 | No | not Tree |
| Image 10 | 171-255 | 101-170 | 151-255 | Yes | not Tree |

Use Naive Bayes to predict to label of the image either Tree or not Tree using the following testing set

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | R | G | B | 3D | Label |
| Image A | 0-100 | 0-100 | 0-150 | Yes | ? |
| Image B | 171-255 | 171-255 | 0-150 | No | ? |
| Image C | 171-255 | 101-170 | 151-255 | Yes | ? |

You will need to show Naive Bayes model and how use it to decide the outcome.