

Best Choice for K: This is using cosine distance as it is better than Euclidean distance which gives around (60-70%) accuracy.

I tried using K as 3, 4 and 5

For all the K's, I got an accuracy of 90% on the unknown test documents.

So my preferred K value would be any of the K values between 3, 4 and 5

The accuracy on the test document:

For K=3, accuracy=90%

For K=4, accuracy=90%

For K=5, accuracy=90%

I have also done the bonus fuzzy KNN part which says each unknown test document belongs to how much to each category in terms of percentage

This is how the console looks after running the program-

```
This document belongs to category: Airline Safety
Document is 0% of Hoof and Mouth Disease, Document is 0% of Mortgage Rates, Document
is 100.0% of Airline Safety.
```

```
K nearest neighbouring documents are as below:
```

```
1: Airline Safety
2: Airline Safety
3: Airline Safety
4: Airline Safety
5: Airline Safety
6: Airline Safety
```

```
Overall Accuracy of all 10 unknown documents is: 90.0
```

```
Recall for Airline Safety is: 0.8
```

```
Recall for Hoof and Mouth Disease is: 1.0
```

```
Recall for Mortgage Rates is: 0.5
```

```
Precision for Airline Safety is: 0.8
```

```
Precision for Hoof and Mouth Disease is: 0.75
```

```
Precision for Mortgage Rates is: 1.0
```

Actual Labels:**Airline Safety****Airline Safety****Airline Safety****Airline Safety****Hoof and Mouth Disease****Hoof and Mouth Disease****Mortgage Rates****Mortgage Rates****Hoof and Mouth Disease****Airline Safety****Predicted Labels:****Airline Safety****Airline Safety****Airline Safety****Airline Safety****Hoof and Mouth Disease****Hoof and Mouth Disease****Mortgage Rates****Airline Safety****Hoof and Mouth Disease****Airline Safety****FuzzyKNN results:**

1) Document is 0% of Hoof and Mouth Disease, Document is 0% of Mortgage Rates, Document is 100.0% of Airline Safety.

2) Document is 0% of Hoof and Mouth Disease, Document is 0% of Mortgage Rates, Document is 100.0% of Airline Safety.

3) Document is 0% of Hoof and Mouth Disease, Document is 66.66666666666666% of Airline Safety, Document is 33.33333333333333% of Mortgage Rates.

4) Document is 0% of Hoof and Mouth Disease, Document is 0% of Mortgage Rates, Document is 100.0% of Airline Safety.

5) Document is 0% of Airline Safety, Document is 0% of Mortgage Rates, Document is 100.0% of Hoof and Mouth Disease.

6) Document is 0% of Airline Safety, Document is 0% of Mortgage Rates, Document is 100.0% of Hoof and Mouth Disease.

7) Document is 0% of Hoof and Mouth Disease, Document is 0% of Airline Safety, Document is 100.0% of Mortgage Rates.

8) Document is 0% of Hoof and Mouth Disease, Document is 66.66666666666666% of Airline Safety, Document is 33.33333333333333% of Mortgage Rates.

9) Document is 0% of Mortgage Rates, Document is 66.66666666666666% of Hoof and Mouth Disease, Document is 33.33333333333333% of Airline Safety.

10) Document is 0% of Mortgage Rates, Document is 33.33333333333333% of Hoof and Mouth Disease, Document is 66.66666666666666% of Airline Safety.

Confusion Matrix:

	Actual_Airline Safety	Actual_Hoof and Mouth Disease	Actual_Mortgage Rates	Total_Predicted
Predicted_Airline Safety	5	0	1	6
Predicted_Hoof Mouth Disease	0	3	0	3
Predicted_Mortgage Rates	0	0	1	1
Total_ActualLabels	5	3	2	10