Assignment 3 Report

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Grab Cut

We implement Grab Cut algorithm as mentioned in this paper
https://cvg.ethz.ch/teaching/cvl/2012/grabcut-siggraph04.pdf. The idea is that we assign
energies to the pixel based on gaussian mixture modeling of the foreground and background
and then do graph cut on it. We run some experiments on its hyperparameters to understand
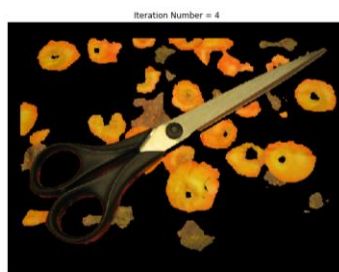its effects.

Different number of iterations of GMM
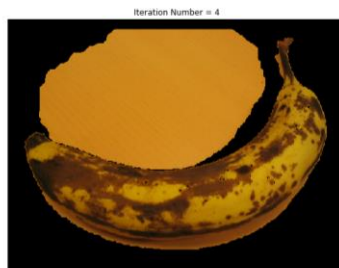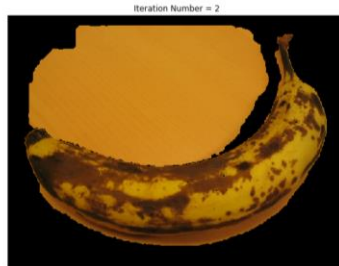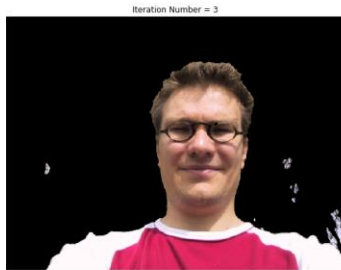
As we can see the number of iterations increase the effectiveness of the segmentation. Especially in the last scissors image we can see the effect.

Different number of Components in GMM
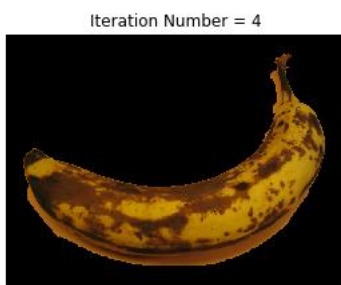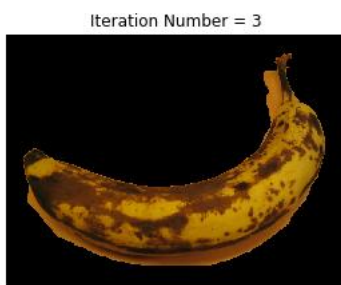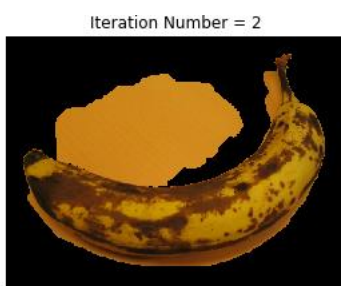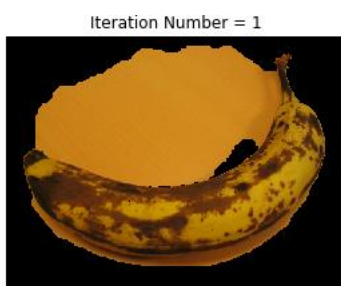
For No_of_components = 1

Iteration Number = 1

Iteration Number = 2

Iteration Number = 3

Iteration Number = 4

For No of Components = 5

Iteration Number = 1

Iteration Number = 2

Iteration Number = 3

Iteration Number = 4

For No of Components = 25

Iteration Number = 1

Iteration Number = 2

Iteration Number = 3

Iteration Number = 4

For No_of_components = 1

Iteration Number = 1

Iteration Number = 2

Iteration Number = 3

Iteration Number = 4

For No_of_components = 5
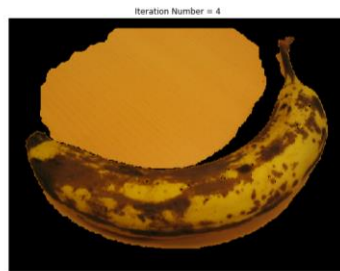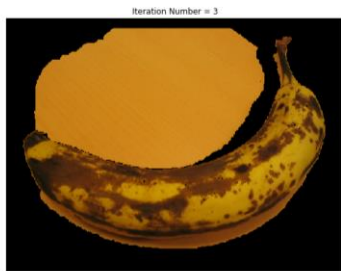
Iteration Number = 1 Iteration Number = 2

Iteration Number = 3 Iteration Number = 4

For No of Components = 25

Iteration Number = 1 Iteration Number = 2

Iteration Number = 3 Iteration Number = 4

For No of Components = 1

Iteration Number = 1

Iteration Number = 2
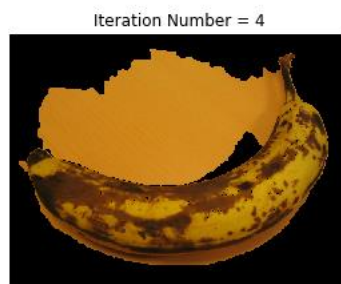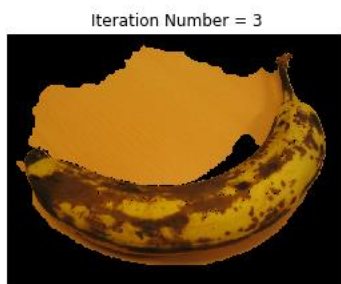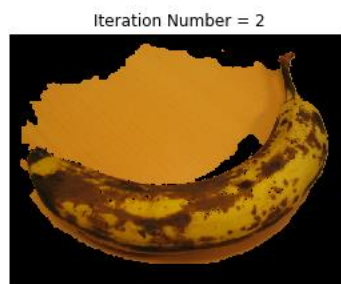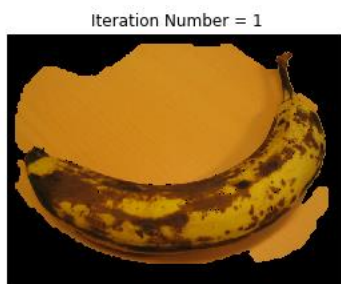
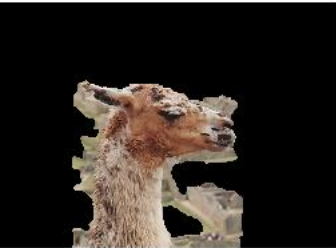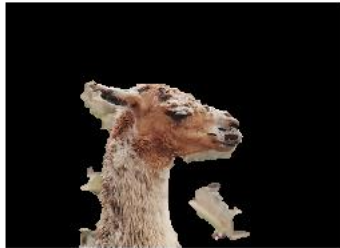Iteration Number = 3

Iteration Number = 4

For No of Components = 5
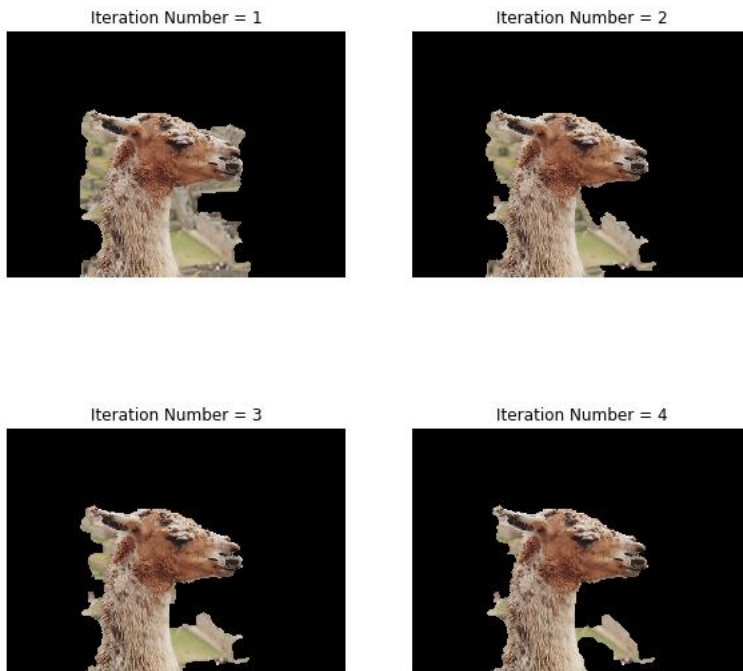
Iteration Number = 1

Iteration Number = 2

Iteration Number = 3

Iteration Number = 4

For No of Components = 25

Iteration Number = 1   Iteration Number = 2
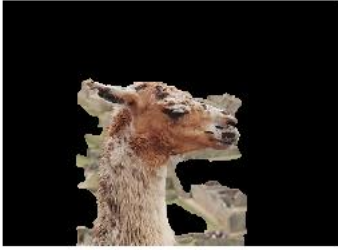
Iteration Number = 3   Iteration Number = 4

Here we notice that number of components depends on the foreground and background. Usually k=5 is a good choice and is stable. In earlier images k=1 was the best choice however in last image k=5 was the best choice.

Different Color Spaces

We experiment with different color spaces namely RGB, LAB and YCrCb. The idea is to see where the clustering of GMM is better

Color Space = RGB

Iteration Number = 1 Iteration Number = 2
Iteration Number = 3 Iteration Number = 4

Color Space = YCrCb

Iteration Number = 1 Iteration Number = 2
Iteration Number = 3 Iteration Number = 4

Color Space = Lab

Iteration Number = 1

Iteration Number = 2

Iteration Number = 3

Iteration Number = 4

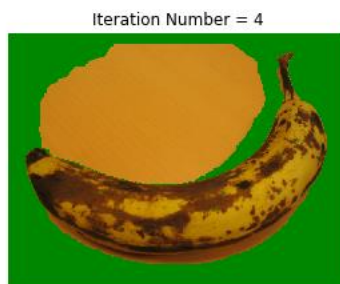**Color Space = RGB**

Iteration Number = 1

Iteration Number = 2

Iteration Number = 3

Iteration Number = 4

Color Space = YCrCb

Iteration Number = 1   Iteration Number = 2

Iteration Number = 3   Iteration Number = 4

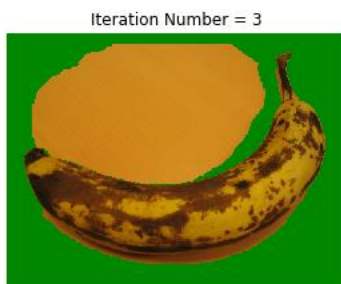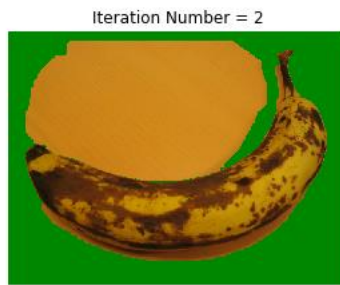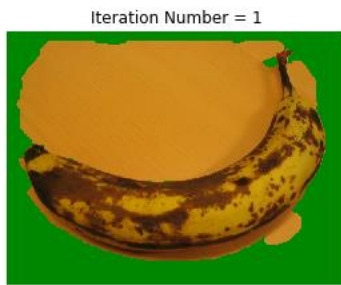## Color Space = LAB

Iteration Number = 1   Iteration Number = 2

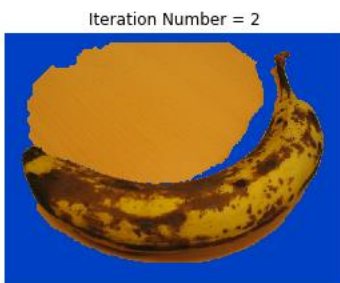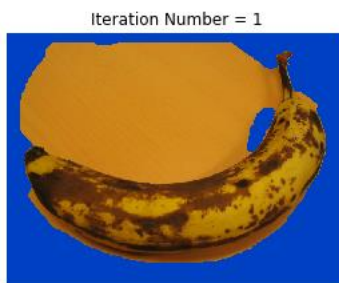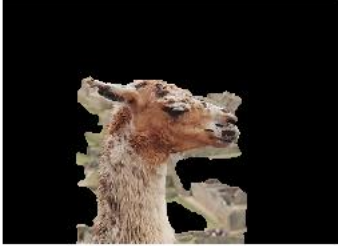Iteration Number = 3   Iteration Number = 4
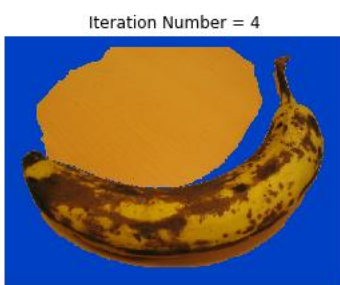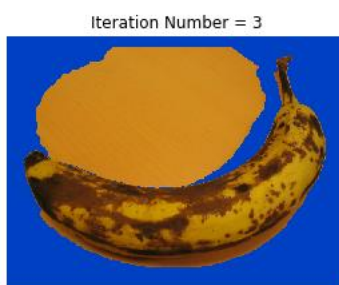
As we can observe there is no significant effect of the color space we choose to experiment in.

Effect of Gamma

Gamma = 5

Iteration Number = 1

Iteration Number = 2

Iteration Number = 3

Iteration Number = 4

Gamma = 50

Iteration Number = 1

Iteration Number = 2

Iteration Number = 3

Iteration Number = 4

Gamma = 250

Iteration Number = 1   Iteration Number = 2
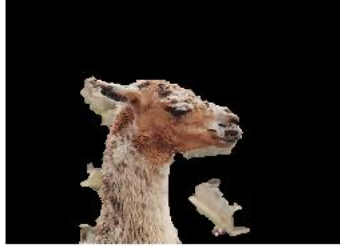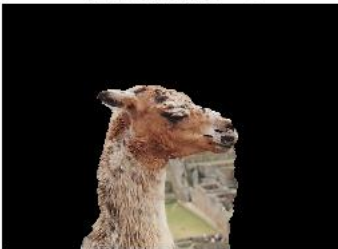
Iteration Number = 3   Iteration Number = 4

Gamma = 5

Iteration Number = 1   Iteration Number = 2

Iteration Number = 3   Iteration Number = 4

Gamma = 50

Iteration Number = 1
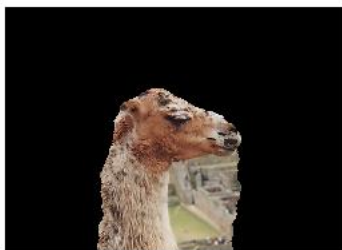

Iteration Number = 2

Iteration Number = 3

Iteration Number = 4

Gamma = 250

Iteration Number = 1

Iteration Number = 2

Iteration Number = 3

Iteration Number = 4

We observe that a good gamma is able to segment in less iterations. A large gamma is prone to errors. As mentioned in the paper as well gamma=50 works well for most cases.

Some More results

Original

Foreground

Original

Foreground

Original

Foreground

Original

Foreground