Assignment Report

Results

- **Original Images:**

Image 1

Image 2

Image 3

Image 4

Image 5

Image 6

Image 7

Image 8

Image 9

Image 10

Image 11

Image 12

Image 13

Image 14

Image 15

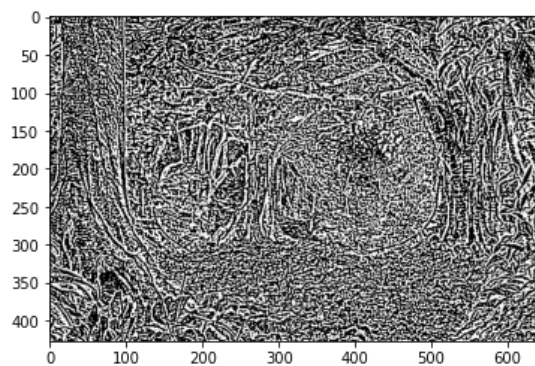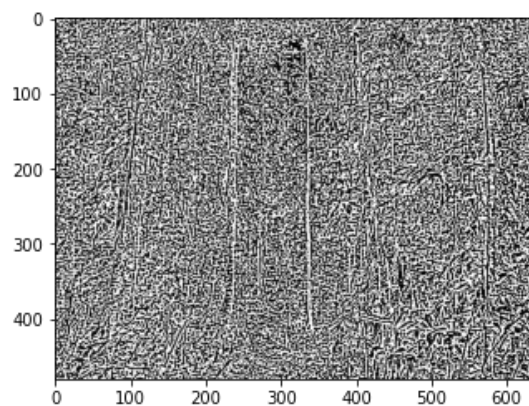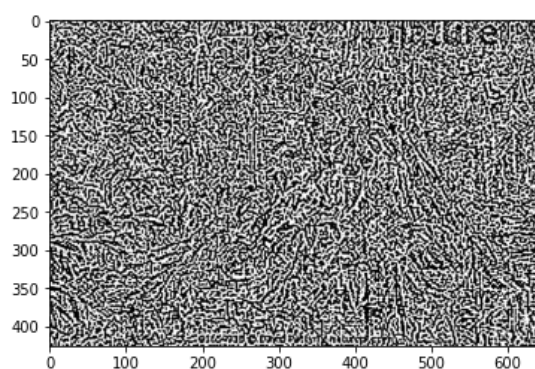
Image 16

Image 17

Image 18

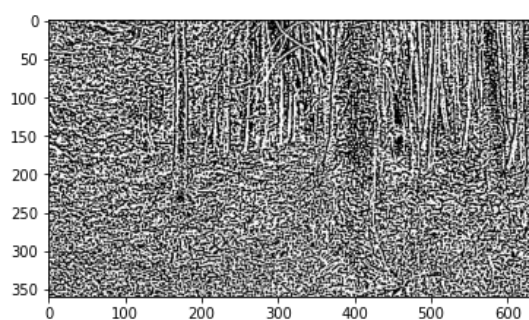Image 19

Image 20

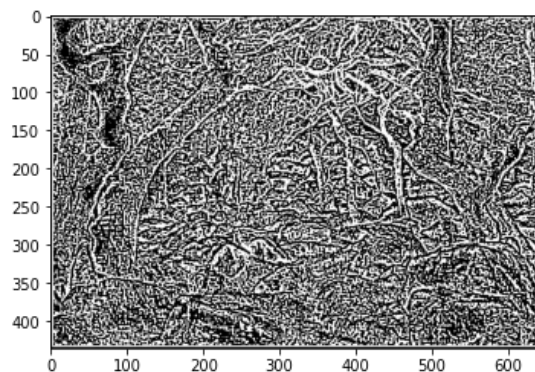- **Difference of Gaussian output:**

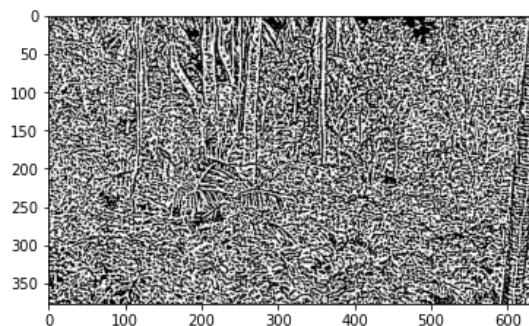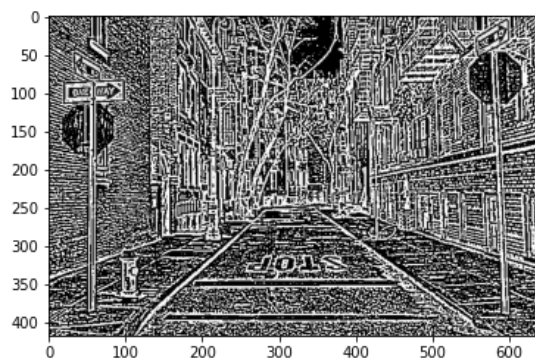DoG for Image 1
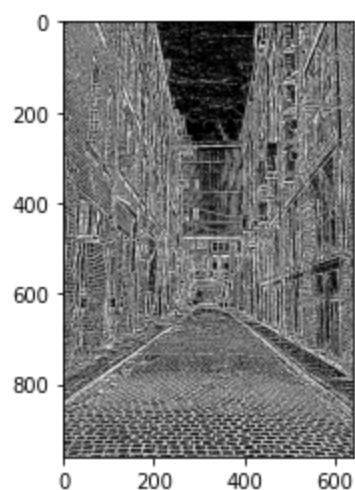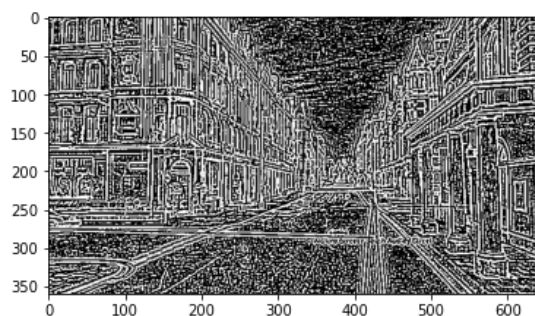
DoG for Image 2
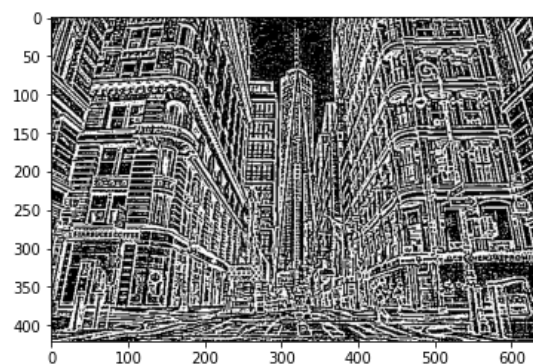
DoG for Image 3

DoG for Image 4

DoG for Image 5

DoG for Image 6

DoG for Image 7

DoG for Image 8

DoG for Image 9

DoG for Image 10

DoG for Image 11

DoG for Image 12

DoG for Image 13
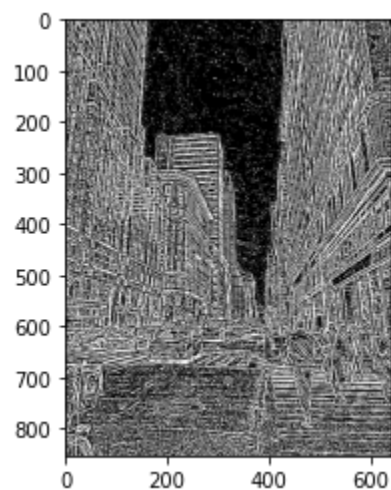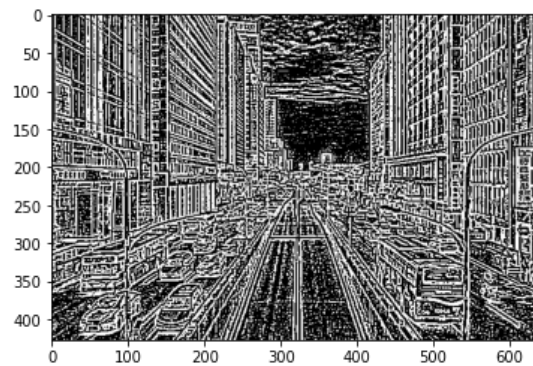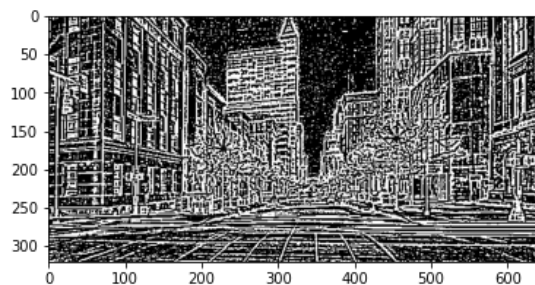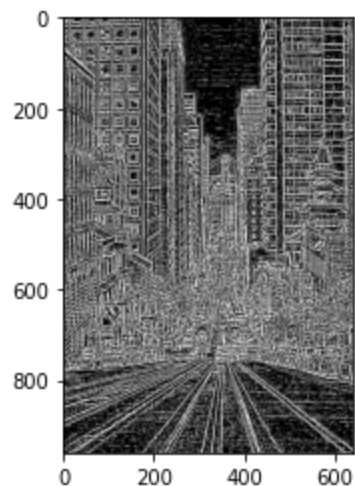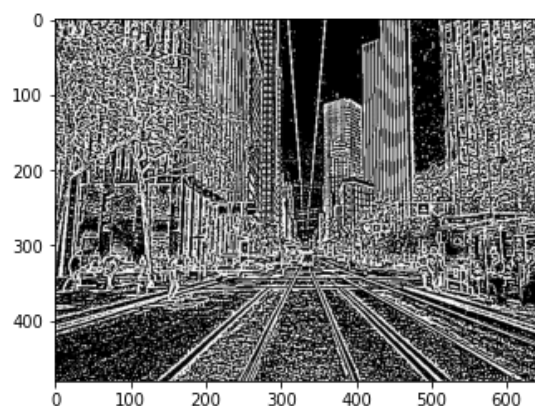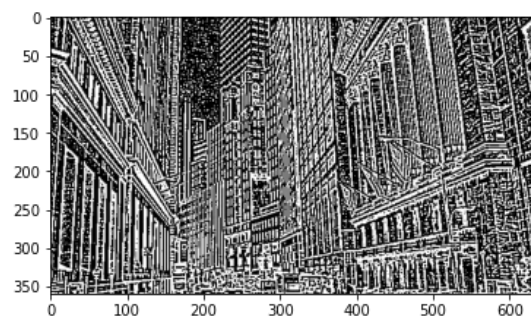

DoG for Image 14

DoG for Image 15

DoG for Image 16
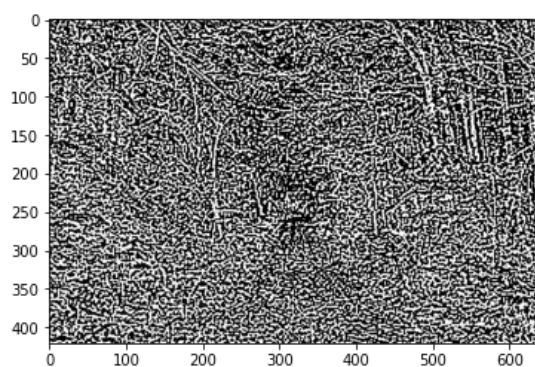
DoG for Image 17

DoG for Image 18
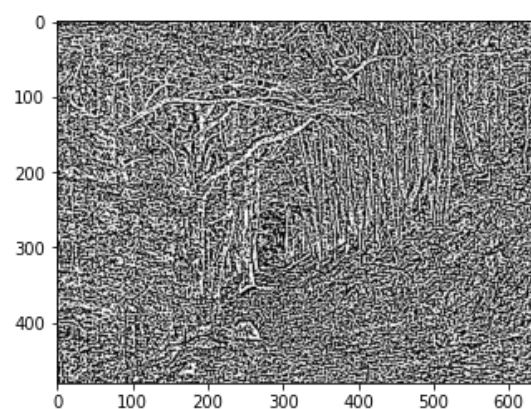
DoG for Image 19

DoG for Image 20
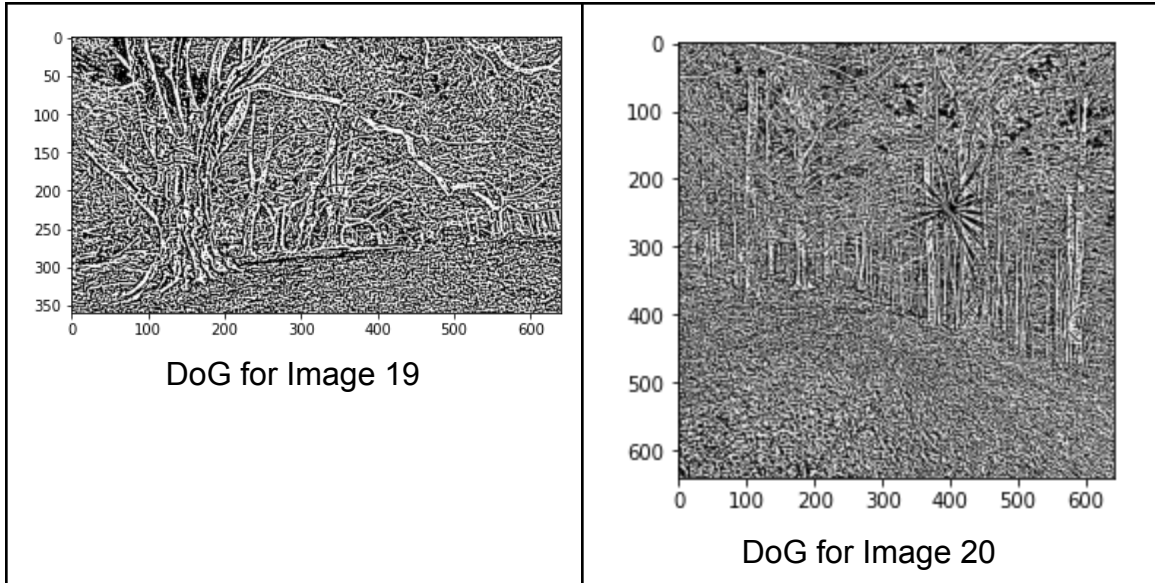
- **Spatial Envelope Representation:**
  - The obtained Spatial Envelope representation is given below (The order is the same as the images shown in the previous sections):

```
[[ 92374.   62960.   52762.   42920.   22264.]
 [ 97466.   71656.   61977.   51624.   24477.]
 [ 84974.   62665.   57745.   46817.   20439.]
 [ 75795.   52740.   46168.   36595.   19102.]
 [ 94065.   63687.   54082.   44161.   23045.]
 [ 78176.   55269.   48624.   39280.   19931.]
 [ 86251.   59475.   57438.   42133.   22223.]
 [191615.  132870.  133693.   94018.   62204.]
 [ 73415.   51113.   52028.   35592.   18252.]
 [ 85697.   58839.   58736.   41331.   24837.]
 [158788.  112279.  115462.   80556.   78835.]
 [ 83899.   58486.   64018.   40304.   26573.]
 [ 68229.   42898.   41255.   28057.   25001.]
 [198519.  128638.  124859.   85945.   76439.]
 [ 90925.   63310.   66363.   44562.   42040.]
 [ 66008.   49270.   60833.   36212.   18077.]
 [ 89206.   62263.   53233.   45729.   19009.]
 [100124.   70743.   61094.   51369.   23870.]
 [ 75905.   53162.   44788.   38372.   18173.]
 [132624.   95590.   82012.   67615.   31759.]]
```

○ The obtained Spatial Envelope representation(Normalized) is given below (The order is the same as the images shown in the previous sections):

```
[[0.33801961 0.23038642 0.19306938 0.15705504 0.08146956]
 [0.31727214 0.23325521 0.20174805 0.16804688 0.07967773]
 [0.31167107 0.22984522 0.21179944 0.17171728 0.07496699]
 [0.32897135 0.22890625 0.20038194 0.15883247 0.08290799]
 [0.33710221 0.2282361  0.19381451 0.15826046 0.08258673]
 [0.32400531 0.22906582 0.2015252  0.16279841 0.08260527]
 [0.32240954 0.22231983 0.21470544 0.15749477 0.08307042]
 [0.31187337 0.21625977 0.21759928 0.15302409 0.10124349]
 [0.31864149 0.22184462 0.22581597 0.15447917 0.07921875]
 [0.31805597 0.21837515 0.21799287 0.15339593 0.09218008]
 [0.29086313 0.20566933 0.21149985 0.14756008 0.14440761]
 [0.30700746 0.21401493 0.2342579  0.14748244 0.09723727]
 [0.33211157 0.20881036 0.20081289 0.13657029 0.1216949 ]
 [0.32311035 0.20937174 0.20322103 0.13988444 0.12441243]
 [0.29597982 0.20608724 0.21602539 0.14505859 0.13684896]
 [0.28649306 0.21384549 0.26403212 0.15717014 0.0784592 ]
 [0.33107928 0.23108299 0.19756903 0.16971868 0.07055003]
 [0.32592448 0.2302832  0.1988737  0.1672168  0.07770182]
 [0.32944878 0.23073785 0.19439236 0.16654514 0.07887587]
 [0.32378906 0.23337402 0.20022461 0.16507568 0.07753662]]
```

● **Cluster Wise Images:**

○ **Cluster 0:**

Image 1

Image 2

Image 3

Image 4

Image 5

Image 6

Image 7

Image 9

Image 10

Image 17

Image 18

Image 19

Image 20

○ **Cluster 1:**

Image 8

Image 11

Image 12

Image 13

Image 14

Image 15

Image 16

- **Observations:**

  - The obtained two clusters are such that the first cluster contains forest images in the majority and the second cluster contains the city images in the majority.

  - The distribution of Cluster 0 is as follows:
    - Forest images: 10
    - City images: 3

- The distribution of cluster 1 is as follows:
  - Forest images: 0
  - City images: 7

- The k-mean algorithm is sensitive to the initialization therefore the cluster distribution changes if the initial order of images is changed.

- **Google Colab Link:**

https://colab.research.google.com/drive/1t5t5m8gfPe4vJ_sd1GoakrkJ6v4WepsA#scrollTo=WFU9wqD4fIJU