

In [1]:

```
import os
path="C:\\Users\\Apurba Sarkar\\signature big data file\\signature data"
dir_list=os.listdir(path)
print(dir_list)
```

```
['16604931777563111130229813871107 - Jogamaya sarkar.jpg', '16604988828647095319442588303225 - Narayan Bhandari.jpg', '16606136092118713933151467753769 - susanta nayek.jpg', '16607112242422816944698539425876 - Ananya Das.jpg', '20211030_092315 - Priyanka Mait y.jpg', '20220817_100630~2 - Saheli Mondal.jpg', '2022_06_06 9_22 pm Office Lens - Rajat Poddar.jpg', 'BA4411C4-47AD-4777-A669-0C9FB3E51595 - Zeeshan Masood khan.jpeg', 'Chaitali signature new - Chaitali Majumder.jpeg', 'Document 114_2 - Kushal Kayal.jpg', 'Goutam Mondal signature_1 - GOUTAM MONDAL.jpg', 'IMG20220812115616_01 - Avijit Sani.jpg', 'IMG20220816232150~2 - ARNAB NANDI.jpg', 'img4 - git tech.jpg', 'IMG_20210517_173957 - Pritom.jpg', 'IMG_20220106_192324 (1) - Subhadip Samanta.jpg', 'IMG_20220812_115307_01 - Faizal khan.jpg', 'IMG_20220812_115546 - Arijit Chakraborty.jpg', 'IMG_20220812_115630 - Snehasish Karmakar.png', 'IMG_20220814_215002 - Subhankar karmakar.jpg', 'IMG_20220814_215907 - Pritam Bera.jpg', 'IMG_20220814_231308 - Alapan Ganguly.jpg', 'IMG_20220816_063941 - Jeet Bhattacharya.jpg', 'IMG_20220816_201906 - SABIKUN NAHAR.jpg', 'IMG_20220817_083317 - Aryan Biswas.jpg', 'IMG_20220817_103640 - Sayantan Choudhuri.jpg', 'Screenshot_2022-08-15-00-18-25-00 - Suvasish Jana.jpg', 'Screenshot_2022-08-16-14-54-42-97_965bbf4d18d205f782c6b8409c5773a4 - SUMAN PALAI.jpg', 'Screenshot_20220814-210411_Gallery - Nayan Bose.jpg', 'Screenshot_20220814-213155-795 - Arka Provo Naskar.png', 'SIG - Apurba Sarkar.jpeg', 'signature - Pritam Gharami.jpg', 'SIGNATURE - Sneha Debnath.jpg', 'Signature_1 - suvayu Chattopadhyay.jpg']
```

In [2]:

```
len(dir_list)
```

Out[2]: 34

In [3]:

```
import os
import cv2
import numpy as np
path="C:\\Users\\Apurba Sarkar\\signature big data file\\signature data"
dir_l=os.listdir(path)
a=len(dir_l)
mean=np.empty(a)
for i in range(0,a):
    j=dir_l[i]
    new1=os.path.join(path,j)
    print(new1)
    img1=cv2.imread(new1)
    img2=cv2.cvtColor(img1,cv2.COLOR_BGR2GRAY)
    mean[i]=np.mean(img2)

mean
```

C:\Users\Apurba Sarkar\signature big data file\signature data\16604931777563111130229813871107 - Jogamaya sarkar.jpg
 C:\Users\Apurba Sarkar\signature big data file\signature data\16604988828647095319442588303225 - Narayan Bhandari.jpg
 C:\Users\Apurba Sarkar\signature big data file\signature data\16606136092118713933151467753769 - susanta nayek.jpg
 C:\Users\Apurba Sarkar\signature big data file\signature data\16607112242422816944698539425876 - Ananya Das.jpg
 C:\Users\Apurba Sarkar\signature big data file\signature data\20211030_092315 - Priyanka Maity.jpg
 C:\Users\Apurba Sarkar\signature big data file\signature data\20220817_100630~2 - Saheli Mondal.jpg
 C:\Users\Apurba Sarkar\signature big data file\signature data\2022_06_06_9_22 pm Office Lens - Rajat Poddar.jpg
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 C:\Users\Apurba Sarkar\signature big data file\signature data\Chaitali signature new - Chaitali Majumder.jpeg
 C:\Users\Apurba Sarkar\signature big data file\signature data\Document 114_2 - Kushal Kayal.jpg
 C:\Users\Apurba Sarkar\signature big data file\signature data\Goutam Mondal signature_1 - GOUTAM MONDAL.jpg
 C:\Users\Apurba Sarkar\signature big data file\signature data\IMG20220812115616_01 - Avijit Sani.jpg
 C:\Users\Apurba Sarkar\signature big data file\signature data\IMG20220816232150~2 - ARNAB NANDI.jpg
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 C:\Users\Apurba Sarkar\signature big data file\signature data\IMG_20220106_192324 (1) - Subhadip Samanta.jpg
 C:\Users\Apurba Sarkar\signature big data file\signature data\IMG_20220812_115307__01 - Faizal khan.jpg
 C:\Users\Apurba Sarkar\signature big data file\signature data\IMG_20220812_115546 - Arijit Chakraborty.jpg
 C:\Users\Apurba Sarkar\signature big data file\signature data\IMG_20220812_115630 - Snehasish Karmakar.png
 C:\Users\Apurba Sarkar\signature big data file\signature data\IMG_20220814_215002 - Subhankar karmakar.jpg
 C:\Users\Apurba Sarkar\signature big data file\signature data\IMG_20220814_215907 - Pritam Bera.jpg
 C:\Users\Apurba Sarkar\signature big data file\signature data\IMG_20220814_231308 - Alapan Ganguly.jpg
 C:\Users\Apurba Sarkar\signature big data file\signature data\IMG_20220816_063941 - Jeet Bhattacharya.jpg
 C:\Users\Apurba Sarkar\signature big data file\signature data\IMG_20220816_201906 - SABIKUN NAHAR.jpg
 C:\Users\Apurba Sarkar\signature big data file\signature data\IMG_20220817_083317 - Aryan Biswas.jpg
 C:\Users\Apurba Sarkar\signature big data file\signature data\IMG_20220817_103640 - Sayantan Choudhuri.jpg
 C:\Users\Apurba Sarkar\signature big data file\signature data\Screenshot_2022-08-15-00-18-25-00 - Suvasish Jana.jpg
 C:\Users\Apurba Sarkar\signature big data file\signature data\Screenshot_2022-08-16-14-54-42-97_965bbf4d18d205f782c6b8409c5773a4 - SUMAN PALAI.jpg
 C:\Users\Apurba Sarkar\signature big data file\signature data\Screenshot_20220814-210411_Gallery - Nayan Bose.jpg
 C:\Users\Apurba Sarkar\signature big data file\signature data\Screenshot_20220814-213155-795 - Arka Provo Naskar.png
 C:\Users\Apurba Sarkar\signature big data file\signature data\SIG - Apurba Sarkar.jpeg
 C:\Users\Apurba Sarkar\signature big data file\signature data\signature - Pritam Gharami.jpg
 C:\Users\Apurba Sarkar\signature big data file\signature data\SIGNATURE - Sneha Debnath.jpg
 C:\Users\Apurba Sarkar\signature big data file\signature data\Signature_1 - suvayu Chattopadhyay.jpg

Out[3]: array([154.43209721, 163.37311852, 184.85329411, 166.21309848,
 191.22872548, 165.92715012, 229.69165773, 152.31139057,
 111.29104282, 247.43460691, 233.18661046, 170.26516864,
 150.81511182, 130.48150072, 163.87707808, 183.83213462,
 175.67703094, 174.79064401, 128.28026466, 196.5021427 ,
 132.26976136, 190.10960065, 194.17500049, 142.92788875,
 143.41215597, 170.24463974, 148.27291667, 126.65245226,
 108.45908524, 136.96356363, 166.78368152, 228.55845614,
 242.12051266, 246.89467356])

In [4]:

```

import os
import cv2
import numpy as np
path="C:\\Users\\Apurba Sarkar\\signature big data file\\signature data"
dir_l=os.listdir(path)
a=len(dir_l)
std=np.empty(a)
for i in range(0,a):
    j=dir_l[i]
    new1=os.path.join(path,j)
    print(new1)
    img1=cv2.imread(new1)
    img2=cv2.cvtColor(img1,cv2.COLOR_BGR2GRAY)
    std[i]=np.std(img2)

```

std

```

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C:\Users\Apurba Sarkar\signature big data file\signature data\BA4411C4-47AD-4777-A669-0C9FB3E51595 - Zeeshan Masood khan.jpeg
C:\Users\Apurba Sarkar\signature big data file\signature data\Chaitali signature new - Chaitali Majumder.jpeg
C:\Users\Apurba Sarkar\signature big data file\signature data\Document 114_2 - Kushal Kayal.jpg
C:\Users\Apurba Sarkar\signature big data file\signature data\Goutam Mondal signature_1 - GOUTAM MONDAL.jpg
C:\Users\Apurba Sarkar\signature big data file\signature data\IMG20220812115616_01 - Avijit Sani.jpg
C:\Users\Apurba Sarkar\signature big data file\signature data\IMG20220816232150~2 - ARNAB NANDI.jpg
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C:\Users\Apurba Sarkar\signature big data file\signature data\IMG_20220814_215002 - Subhankar karmakar.jpg
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C:\Users\Apurba Sarkar\signature big data file\signature data\IMG_20220817_083317 - Aryan Biswas.jpg

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C:\Users\Apurba Sarkar\signature big data file\signature data\IMG_20220817_103640 - Sayantan Choudhuri.jpg
C:\Users\Apurba Sarkar\signature big data file\signature data\Screenshot_2022-08-15-00-18-25-00 - Suvasish Jana.jpg
C:\Users\Apurba Sarkar\signature big data file\signature data\Screenshot_2022-08-16-14-54-42-97_965bbf4d18d205f782c6b8409c5773a4 - SUMAN PALAI.jpg
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C:\Users\Apurba Sarkar\signature big data file\signature data\signature - Pritam Gharami.jpg
C:\Users\Apurba Sarkar\signature big data file\signature data\SIGNATURE - Sneha Debnath.jpg
C:\Users\Apurba Sarkar\signature big data file\signature data\Signature_1 - suvayu Chattopadhyay.jpg
```

```
Out[4]: array([33.00482228, 17.41333139, 14.07877477, 25.95726879,  9.63302937,
        12.87263125, 73.32474043, 14.22953931, 18.02814088, 31.86976934,
        27.25764627, 11.94141681, 23.41785054, 15.00495122, 17.37578898,
        17.29046867, 23.3288129 , 22.34005313, 25.78977117, 49.82378901,
        79.96787488, 17.60368687, 18.90407149, 19.38100498, 61.3240238 ,
        36.81318876, 22.15764539, 15.86248384, 20.47583701, 64.65189488,
        24.26329651, 41.48676482, 40.58499984, 38.60006636])
```

```
In [5]: import os
import cv2
import numpy as np
from scipy.stats import skew
path="C:\\Users\\Apurba Sarkar\\signature big data file\\signature data"
dir_l=os.listdir(path)
a=len(dir_l)
skew_val=np.empty(a)
for i in range(0,a):
    j=dir_l[i]
    new1=os.path.join(path,j)
    print(new1)
    img1=cv2.imread(new1)
    img2=cv2.cvtColor(img1,cv2.COLOR_BGR2GRAY)
    val=skew(img2,axis=0,bias=True)
    skew_val[i]=np.mean(val)
skew_val
```

```
C:\Users\Apurba Sarkar\signature big data file\signature data\16604931777563111130229813871107 - Jogamaya sarkar.jpg
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C:\Users\Apurba Sarkar\signature big data file\signature data\2022_06_06 9_22 pm Office Lens - Rajat Poddar.jpg
```

```

C:\Users\Apurba Sarkar\signature big data file\signature data\BA4411C4-47AD-4777-A669-0C9FB3E51595 - Zeeshan Masood khan.jpeg
C:\Users\Apurba Sarkar\signature big data file\signature data\Chaitali signature new - Chaitali Majumder.jpeg
C:\Users\Apurba Sarkar\signature big data file\signature data\Document 114_2 - Kushal Kayal.jpg
C:\Users\Apurba Sarkar\signature big data file\signature data\Goutam Mondal signature_1 - GOUTAM MONDAL.jpg
C:\Users\Apurba Sarkar\signature big data file\signature data\IMG20220812115616_01 - Avijit Sani.jpg
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```

```

Out[5]: array([-1.13435791, -0.8844089 , -3.61599536,  0.32800698, -2.83267706,
        -3.89317472, -3.59496094, -0.9982801 , -2.64919218, -3.57674732,
        -2.92073579, -2.78217934, -3.16558672, -2.59599817, -1.69923168,
        -1.0628851 , -3.20082472, -3.67419716, -2.41111737, -3.31404795,
         0.87015443, -2.51553083, -3.6066041 , -3.45852615, -0.62158862,
        -2.20730614, -6.13580541, -0.38779184, -2.58692923, -1.62344152,
        -2.78110859, -3.20286595, -3.67474022, -4.49986749])

```

```

In [6]: import os
import cv2
import numpy as np
from scipy.stats import kurtosis
path="C:\\Users\\Apurba Sarkar\\signature big data file\\signature data"
dir_l=os.listdir(path)
a=len(dir_l)

```

```

kurt_val=np.empty(a)
for i in range(0,a):
    j=dir_l[i]
    new1=os.path.join(path,j)
    print(new1)
    img1=cv2.imread(new1)
    img2=cv2.cvtColor(img1,cv2.COLOR_BGR2GRAY)
    val=kurtosis(img2,axis=0,bias=True)
    kurt_val[i]=np.mean(val)
kurt_val

```

```

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C:\Users\Apurba Sarkar\signature big data file\signature data\IMG_20220814_215002 - Subhankar karmakar.jpg
C:\Users\Apurba Sarkar\signature big data file\signature data\IMG_20220814_215907 - Pritam Bera.jpg
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C:\Users\Apurba Sarkar\signature big data file\signature data\IMG_20220816_063941 - Jeet Bhattacharya.jpg
C:\Users\Apurba Sarkar\signature big data file\signature data\IMG_20220816_201906 - SABIKUN NAHAR.jpg
C:\Users\Apurba Sarkar\signature big data file\signature data\IMG_20220817_083317 - Aryan Biswas.jpg
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C:\Users\Apurba Sarkar\signature big data file\signature data\signature - Pritam Gharami.jpg

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C:\Users\Apurba Sarkar\signature big data file\signature data\SIGNATURE - Sneha Debnath.jpg
 C:\Users\Apurba Sarkar\signature big data file\signature data\Signature_1 - suvayu Chattopadhyay.jpg

Out[6]: array([1.27661153, 3.22763951, 15.32023191, 1.45990414, 15.52493235,
 31.04101623, 18.47959136, 4.22241784, 7.1692309 , 17.19839975,
 19.00201292, 16.00864662, 13.34681898, 9.34311638, 5.29538832,
 1.19631375, 24.30151162, 18.17756805, 10.84302619, 13.69296883,
 -1.22348231, 14.29220085, 23.95834234, 19.4171697 , -1.24413465,
 10.58031047, 40.99051322, 1.67775373, 29.87909661, 0.7173785 ,
 16.80435959, 12.6792039 , 18.0808296 , 28.56492548])

In [7]:

```
import pandas as pd
ser1=pd.Series(mean,name='mean')
ser2=pd.Series(std,name='std')
ser3=pd.Series(skew_val,name='skew_val')
ser4=pd.Series(kurt_val,name='kurt_val')
a_n=pd.concat([ser1,ser2,ser3,ser4],axis=1)
df5=pd.DataFrame(a_n)
print(df5)
```

| | mean | std | skew_val | kurt_val |
|----|------------|-----------|-----------|-----------|
| 0 | 154.432097 | 33.004822 | -1.134358 | 1.276612 |
| 1 | 163.373119 | 17.413331 | -0.884409 | 3.227640 |
| 2 | 184.853294 | 14.078775 | -3.615995 | 15.320232 |
| 3 | 166.213098 | 25.957269 | 0.328007 | 1.459904 |
| 4 | 191.228725 | 9.633029 | -2.832677 | 15.524932 |
| 5 | 165.927150 | 12.872631 | -3.893175 | 31.041016 |
| 6 | 229.691658 | 73.324740 | -3.594961 | 18.479591 |
| 7 | 152.311391 | 14.229539 | -0.998280 | 4.222418 |
| 8 | 111.291043 | 18.028141 | -2.649192 | 7.169231 |
| 9 | 247.434607 | 31.869769 | -3.576747 | 17.198400 |
| 10 | 233.186610 | 27.257646 | -2.920736 | 19.002013 |
| 11 | 170.265169 | 11.941417 | -2.782179 | 16.008647 |
| 12 | 150.815112 | 23.417851 | -3.165587 | 13.346819 |
| 13 | 130.481501 | 15.004951 | -2.595998 | 9.343116 |
| 14 | 163.877078 | 17.375789 | -1.699232 | 5.295388 |
| 15 | 183.832135 | 17.290469 | -1.062885 | 1.196314 |
| 16 | 175.677031 | 23.328813 | -3.200825 | 24.301512 |
| 17 | 174.790644 | 22.340053 | -3.674197 | 18.177568 |
| 18 | 128.280265 | 25.789771 | -2.411117 | 10.843026 |
| 19 | 196.502143 | 49.823789 | -3.314048 | 13.692969 |
| 20 | 132.269761 | 79.967875 | 0.870154 | -1.223482 |
| 21 | 190.109601 | 17.603687 | -2.515531 | 14.292201 |
| 22 | 194.175000 | 18.904071 | -3.606604 | 23.958342 |


```

23 142.927889 19.381005 -3.458526 19.417170
24 143.412156 61.324024 -0.621589 -1.244135
25 170.244640 36.813189 -2.207306 10.580310
26 148.272917 22.157645 -6.135805 40.990513
27 126.652452 15.862484 -0.387792 1.677754
28 108.459085 20.475837 -2.586929 29.879097
29 136.963564 64.651895 -1.623442 0.717379
30 166.783682 24.263297 -2.781109 16.804360
31 228.558456 41.486765 -3.202866 12.679204
32 242.120513 40.585000 -3.674740 18.080830
33 246.894674 38.600066 -4.499867 28.564925

```

In [8]:

```

import pandas as pd
df=pd.read_csv("information.csv")
df

```

Out[8]:

| | Timestamp | Username | NAME | AGE | GENDER | SIGNATURE |
|---|-----------------------------------|--------------------------------|----------------------|-----|--------|---|
| 0 | 2022/08/14 8:53:16 pm GMT+5:30 | pritom2001.saha@gmail.com | Pritom saha | 21 | Male | https://drive.google.com/u/0/open?usp=forms_we... |
| 1 | 2022/08/14 8:54:44 pm GMT+5:30 | apurbasarkar17072002@gmail.com | Apurba Sarkar | 20 | Male | https://drive.google.com/u/0/open?usp=forms_we... |
| 2 | 2022/08/14 8:55:53 pm GMT+5:30 | zeeshanmasoodkhan@icloud.com | Zeeshan masood khan | 21 | Male | https://drive.google.com/u/0/open?usp=forms_we... |
| 3 | 2022/08/14 9:00:33 pm GMT+5:30 | pritamgharami1200@gmail.com | Pritam Gharami | 23 | Male | https://drive.google.com/u/0/open?usp=forms_we... |
| 4 | 2022/08/14 9:05:03 pm GMT+5:30 | bosenayan82@gmail.com | Nayan Bose | 21 | Male | https://drive.google.com/u/0/open?usp=forms_we... |
| 5 | 2022/08/14 9:32:34 pm GMT+5:30 | arkaraj2001@gmail.com | Arka provo Naskar | 21 | Male | https://drive.google.com/u/0/open?usp=forms_we... |
| 6 | 2022/08/14 9:37:06 pm GMT+5:30 | jogamaya@gmail.com | Jogamaya Sarkar | 35 | Female | https://drive.google.com/u/0/open?usp=forms_we... |
| 7 | 2022/08/14 9:45:49 pm GMT+5:30 | susanta@gmail.com | Susanta Kumar Sarkar | 50 | Male | https://drive.google.com/u/0/open?usp=forms_we... |
| 8 | 2022/08/14 9:52:23 pm GMT+5:30 | rajupilot2000@gmail.com | Subhankar Karmakar | 22 | Male | https://drive.google.com/u/0/open?usp=forms_we... |

| | Timestamp | Username | NAME | AGE | GENDER | SIGNATURE |
|----|------------------------------------|--------------------------------|---------------------------|-----|--------|--|
| 9 | 2022/08/14 9:59:39 pm GMT+5:30 | pritambera90031@gmail.com | PRITAM BERA | 19 | Male | https://drive.google.com/u/0/open? usp=forms_we... |
| 10 | 2022/08/14 11:10:53 pm GMT+5:30 | chaitali.majumder12@gmail.com | Chaitali Majumder | 22 | Female | https://drive.google.com/u/0/open? usp=forms_we... |
| 11 | 2022/08/14 11:13:33 pm GMT+5:30 | narayanbhandari556@gmail.com | Narayan Kumar bhandari | 20 | Male | https://drive.google.com/u/0/open? usp=forms_we... |
| 12 | 2022/08/14 11:15:11 pm GMT+5:30 | gangulyalapan1999@gmail.com | ALAPAN GANGULY | 23 | Male | https://drive.google.com/u/0/open? usp=forms_we... |
| 13 | 2022/08/14 11:20:26 pm GMT+5:30 | goutammondal30091999@gmail.com | GOUTAM MONDAL | 23 | Male | https://drive.google.com/u/0/open? usp=forms_we... |
| 14 | 2022/08/15 12:19:00 am GMT+5:30 | suvasishjana06@gmail.com | Suvasish Jana | 20 | Male | https://drive.google.com/u/0/open? usp=forms_we... |
| 15 | 2022/08/15 12:20:38 am GMT+5:30 | kushalkayal982@gmail.com | Kushal Kayal | 20 | Male | https://drive.google.com/u/0/open? usp=forms_we... |
| 16 | 2022/08/15 6:41:51 am GMT+5:30 | avijitsani25@gmail.com | Avijit Sani | 20 | Male | https://drive.google.com/u/0/open? usp=forms_we... |
| 17 | 2022/08/16 5:36:55 am GMT+5:30 | samantasubhadip158@gmail.com | Subhadip Samanta | 20 | Male | https://drive.google.com/u/0/open? usp=forms_we... |
| 18 | 2022/08/16 6:40:17 am GMT+5:30 | jbhattacharya2000@gmail.com | Jeet Bhattacharjee | 22 | Male | https://drive.google.com/u/0/open? usp=forms_we... |
| 19 | 2022/08/16 6:48:50 am GMT+5:30 | rajat.rtp@gmail.com | Rajat Poddar | 24 | Male | https://drive.google.com/u/0/open? usp=forms_we... |
| 20 | 2022/08/16 7:04:11 am GMT+5:30 | nayeksusanta410@gmail.com | Susanta nayek | 24 | Male | https://drive.google.com/u/0/open? usp=forms_we... |
| 21 | 2022/08/16 7:39:02 am GMT+5:30 | suvayusuvayu@gmail.com | Suvayu chattopadhyay | 21 | Male | https://drive.google.com/u/0/open? usp=forms_we... |
| 22 | 2022/08/16 2:56:26 pm GMT+5:30 | sumanpalai39@gmail.com | Suman Palai | 20 | Male | https://drive.google.com/u/0/open? usp=forms_we... |
| 23 | 2022/08/16 8:19:32 pm GMT+5:30 | amisabikun1@gmail.com | Sabikun Nahar | 21 | Female | https://drive.google.com/u/0/open? usp=forms_we... |

| | Timestamp | Username | NAME | AGE | GENDER | SIGNATURE |
|----|------------------------------------|------------------------------------|--------------------|-----|--------|---|
| 24 | 2022/08/16 11:08:25 pm GMT+5:30 | priyankamaity918@gmail.com | Priyanka Maity | 22 | Female | https://drive.google.com/u/0/open?usp=forms_we... |
| 25 | 2022/08/16 11:25:15 pm GMT+5:30 | arnabnandi27@gmail.com | ARNAB Nandi | 23 | Male | https://drive.google.com/u/0/open?usp=forms_we... |
| 26 | 2022/08/17 12:06:57 am GMT+5:30 | aribittu315@gmail.com | Arijit Chakraborty | 22 | Male | https://drive.google.com/u/0/open?usp=forms_we... |
| 27 | 2022/08/17 3:02:12 am GMT+5:30 | ayush2003asn@gmail.com | Snehasish Karmakar | 21 | Male | https://drive.google.com/u/0/open?usp=forms_we... |
| 28 | 2022/08/17 8:35:29 am GMT+5:30 | benzaryan@gmail.com | Aryan Biswas | 21 | Male | https://drive.google.com/u/0/open?usp=forms_we... |
| 29 | 2022/08/17 9:09:08 am GMT+5:30 | snehadebnath1998@gmail.com | SNEHA DEBNATH | 24 | Female | https://drive.google.com/u/0/open?usp=forms_we... |
| 30 | 2022/08/17 9:49:04 am GMT+5:30 | khankhanfaizal786@gmail.com | Faizal khan | 20 | Male | https://drive.google.com/u/0/open?usp=forms_we... |
| 31 | 2022/08/17 10:08:43 am GMT+5:30 | sahelimondaldpt451@gmail.com | Saheli mondal | 31 | Female | https://drive.google.com/u/0/open?usp=forms_we... |
| 32 | 2022/08/17 10:11:40 am GMT+5:30 | ananyag1566@gmail.com | Ananya Das | 20 | Female | https://drive.google.com/u/0/open?usp=forms_we... |
| 33 | 2022/08/17 10:40:52 am GMT+5:30 | mr.sayantan2003choudhuri@gmail.com | Sayantan Choudhuri | 19 | Male | https://drive.google.com/u/0/open?usp=forms_we... |

In [9]: `df['GENDER'].value_counts()`

Out[9]: Male 27
Female 7
Name: GENDER, dtype: int64

In [10]: `df.keys()`

Out[10]: Index(['Timestamp', 'Username', 'NAME', 'AGE', 'GENDER', 'SIGNATURE'], dtype='object')

In [11]: `df.head`

```

Out[11]: <bound method NDFrame.head of                                Timestamp                                Username \
0      2022/08/14 8:53:16 pm GMT+5:30      pritom2001.saha@gmail.com
1      2022/08/14 8:54:44 pm GMT+5:30      apurbasarkar17072002@gmail.com
2      2022/08/14 8:55:53 pm GMT+5:30      zeeshanmasoodkhan@icloud.com
3      2022/08/14 9:00:33 pm GMT+5:30      pritamgharami1200@gmail.com
4      2022/08/14 9:05:03 pm GMT+5:30      bosenayan82@gmail.com
5      2022/08/14 9:32:34 pm GMT+5:30      arkaraj2001@gmail.com
6      2022/08/14 9:37:06 pm GMT+5:30      jogamaya@gmail.com
7      2022/08/14 9:45:49 pm GMT+5:30      susanta@gmail.com
8      2022/08/14 9:52:23 pm GMT+5:30      rajupilot2000@gmail.com
9      2022/08/14 9:59:39 pm GMT+5:30      pritambera90031@gmail.com
10     2022/08/14 11:10:53 pm GMT+5:30      chaitali.majumder12@gmail.com
11     2022/08/14 11:13:33 pm GMT+5:30      narayanbhandari556@gmail.com
12     2022/08/14 11:15:11 pm GMT+5:30      gangulyalapan1999@gmail.com
13     2022/08/14 11:20:26 pm GMT+5:30      goutammondal30091999@gmail.com
14     2022/08/15 12:19:00 am GMT+5:30      suvasishjana06@gmail.com
15     2022/08/15 12:20:38 am GMT+5:30      kushalkaya1982@gmail.com
16     2022/08/15 6:41:51 am GMT+5:30      avijitsani25@gmail.com
17     2022/08/16 5:36:55 am GMT+5:30      samantasubhadip158@gmail.com
18     2022/08/16 6:40:17 am GMT+5:30      jbhattacharya2000@gmail.com
19     2022/08/16 6:48:50 am GMT+5:30      rajat.rtpr@gmail.com
20     2022/08/16 7:04:11 am GMT+5:30      nayeksusanta410@gmail.com
21     2022/08/16 7:39:02 am GMT+5:30      suvayusuvayu@gmail.com
22     2022/08/16 2:56:26 pm GMT+5:30      sumanpalai39@gmail.com
23     2022/08/16 8:19:32 pm GMT+5:30      amisabikun1@gmail.com
24     2022/08/16 11:08:25 pm GMT+5:30      priyankamaity918@gmail.com
25     2022/08/16 11:25:15 pm GMT+5:30      arnabnandi27@gmail.com
26     2022/08/17 12:06:57 am GMT+5:30      aribittu315@gmail.com
27     2022/08/17 3:02:12 am GMT+5:30      ayush2003asn@gmail.com
28     2022/08/17 8:35:29 am GMT+5:30      benzaryan@gmail.com
29     2022/08/17 9:09:08 am GMT+5:30      snehadebnath1998@gmail.com
30     2022/08/17 9:49:04 am GMT+5:30      khankhanfaizal786@gmail.com
31     2022/08/17 10:08:43 am GMT+5:30      sahelimondaldpt451@gmail.com
32     2022/08/17 10:11:40 am GMT+5:30      ananyag1566@gmail.com
33     2022/08/17 10:40:52 am GMT+5:30      mr.sayantan2003choudhuri@gmail.com

```

| | NAME | AGE | GENDER | \ |
|---|---------------------|-----|--------|---|
| 0 | Pritom saha | 21 | Male | |
| 1 | Apurba Sarkar | 20 | Male | |
| 2 | Zeeshan masood khan | 21 | Male | |
| 3 | Pritam Gharami | 23 | Male | |
| 4 | Nayan Bose | 21 | Male | |
| 5 | Arka provo Naskar | 21 | Male | |

| | | | |
|----|------------------------|----|--------|
| 6 | Jogamaya Sarkar | 35 | Female |
| 7 | Susanta Kumar Sarkar | 50 | Male |
| 8 | Subhankar Karmakar | 22 | Male |
| 9 | PRITAM BERA | 19 | Male |
| 10 | Chaitali Majumder | 22 | Female |
| 11 | Narayan Kumar bhandari | 20 | Male |
| 12 | ALAPAN GANGULY | 23 | Male |
| 13 | GOUTAM MONDAL | 23 | Male |
| 14 | Suvasish Jana | 20 | Male |
| 15 | Kushal Kayal | 20 | Male |
| 16 | Avijit Sani | 20 | Male |
| 17 | Subhadip Samanta | 20 | Male |
| 18 | Jeet Bhattacharjee | 22 | Male |
| 19 | Rajat Poddar | 24 | Male |
| 20 | Susanta nayek | 24 | Male |
| 21 | Suvayu chattopadhyay | 21 | Male |
| 22 | Suman Palai | 20 | Male |
| 23 | Sabikun Nahar | 21 | Female |
| 24 | Priyanka Maity | 22 | Female |
| 25 | ARNAB Nandi | 23 | Male |
| 26 | Arijit Chakraborty | 22 | Male |
| 27 | Snehasish Karmakar | 21 | Male |
| 28 | Aryan Biswas | 21 | Male |
| 29 | SNEHA DEBNATH | 24 | Female |
| 30 | Faizal khan | 20 | Male |
| 31 | Saheli mondal | 31 | Female |
| 32 | Ananya Das | 20 | Female |
| 33 | Sayantan Choudhuri | 19 | Male |

SIGNATURE

| | |
|----|---|
| 0 | https://drive.google.com/u/0/open?usp=forms_we... |
| 1 | https://drive.google.com/u/0/open?usp=forms_we... |
| 2 | https://drive.google.com/u/0/open?usp=forms_we... |
| 3 | https://drive.google.com/u/0/open?usp=forms_we... |
| 4 | https://drive.google.com/u/0/open?usp=forms_we... |
| 5 | https://drive.google.com/u/0/open?usp=forms_we... |
| 6 | https://drive.google.com/u/0/open?usp=forms_we... |
| 7 | https://drive.google.com/u/0/open?usp=forms_we... |
| 8 | https://drive.google.com/u/0/open?usp=forms_we... |
| 9 | https://drive.google.com/u/0/open?usp=forms_we... |
| 10 | https://drive.google.com/u/0/open?usp=forms_we... |
| 11 | https://drive.google.com/u/0/open?usp=forms_we... |
| 12 | https://drive.google.com/u/0/open?usp=forms_we... |
| 13 | https://drive.google.com/u/0/open?usp=forms_we... |

```

14 https://drive.google.com/u/0/open?usp=forms_we...
15 https://drive.google.com/u/0/open?usp=forms_we...
16 https://drive.google.com/u/0/open?usp=forms_we...
17 https://drive.google.com/u/0/open?usp=forms_we...
18 https://drive.google.com/u/0/open?usp=forms_we...
19 https://drive.google.com/u/0/open?usp=forms_we...
20 https://drive.google.com/u/0/open?usp=forms_we...
21 https://drive.google.com/u/0/open?usp=forms_we...
22 https://drive.google.com/u/0/open?usp=forms_we...
23 https://drive.google.com/u/0/open?usp=forms_we...
24 https://drive.google.com/u/0/open?usp=forms_we...
25 https://drive.google.com/u/0/open?usp=forms_we...
26 https://drive.google.com/u/0/open?usp=forms_we...
27 https://drive.google.com/u/0/open?usp=forms_we...
28 https://drive.google.com/u/0/open?usp=forms_we...
29 https://drive.google.com/u/0/open?usp=forms_we...
30 https://drive.google.com/u/0/open?usp=forms_we...
31 https://drive.google.com/u/0/open?usp=forms_we...
32 https://drive.google.com/u/0/open?usp=forms_we...
33 https://drive.google.com/u/0/open?usp=forms_we... >

```

In [12]:

```
df.head()
```

Out[12]:

| | Timestamp | Username | NAME | AGE | GENDER | SIGNATURE |
|---|-----------------------------------|--------------------------------|------------------------|-----|--------|---|
| 0 | 2022/08/14 8:53:16 pm GMT+5:30 | pritom2001.saha@gmail.com | Pritom saha | 21 | Male | https://drive.google.com/u/0/open?usp=forms_we... |
| 1 | 2022/08/14 8:54:44 pm GMT+5:30 | apurbasarkar17072002@gmail.com | Apurba Sarkar | 20 | Male | https://drive.google.com/u/0/open?usp=forms_we... |
| 2 | 2022/08/14 8:55:53 pm GMT+5:30 | zeeshanmasoodkhan@icloud.com | Zeeshan masood khan | 21 | Male | https://drive.google.com/u/0/open?usp=forms_we... |
| 3 | 2022/08/14 9:00:33 pm GMT+5:30 | pritamgharami1200@gmail.com | Pritam Gharami | 23 | Male | https://drive.google.com/u/0/open?usp=forms_we... |
| 4 | 2022/08/14 9:05:03 pm GMT+5:30 | bosenayan82@gmail.com | Nayan Bose | 21 | Male | https://drive.google.com/u/0/open?usp=forms_we... |

In [13]:

```
df.sample(10)
```

Out[13]:

| | Timestamp | Username | NAME | AGE | GENDER | SIGNATURE |
|----|------------------------------------|-------------------------------|---------------------------|-----|--------|---|
| 10 | 2022/08/14 11:10:53 pm GMT+5:30 | chaitali.majumder12@gmail.com | Chaitali Majumder | 22 | Female | https://drive.google.com/u/0/open?usp=forms_we... |
| 11 | 2022/08/14 11:13:33 pm GMT+5:30 | narayanbhandari556@gmail.com | Narayan Kumar bhandari | 20 | Male | https://drive.google.com/u/0/open?usp=forms_we... |
| 29 | 2022/08/17 9:09:08 am GMT+5:30 | snehadebnath1998@gmail.com | SNEHA DEBNATH | 24 | Female | https://drive.google.com/u/0/open?usp=forms_we... |
| 17 | 2022/08/16 5:36:55 am GMT+5:30 | samantasubhadip158@gmail.com | Subhadip Samanta | 20 | Male | https://drive.google.com/u/0/open?usp=forms_we... |
| 20 | 2022/08/16 7:04:11 am GMT+5:30 | nayeksusanta410@gmail.com | Susanta nayek | 24 | Male | https://drive.google.com/u/0/open?usp=forms_we... |
| 18 | 2022/08/16 6:40:17 am GMT+5:30 | jbhattacharya2000@gmail.com | Jeet Bhattacharjee | 22 | Male | https://drive.google.com/u/0/open?usp=forms_we... |
| 8 | 2022/08/14 9:52:23 pm GMT+5:30 | rajupilot2000@gmail.com | Subhankar Karmakar | 22 | Male | https://drive.google.com/u/0/open?usp=forms_we... |
| 31 | 2022/08/17 10:08:43 am GMT+5:30 | sahelimondaldpt451@gmail.com | Saheli mondal | 31 | Female | https://drive.google.com/u/0/open?usp=forms_we... |
| 15 | 2022/08/15 12:20:38 am GMT+5:30 | kushalkayal982@gmail.com | Kushal Kayal | 20 | Male | https://drive.google.com/u/0/open?usp=forms_we... |
| 25 | 2022/08/16 11:25:15 pm GMT+5:30 | arnabnandi27@gmail.com | ARNAB Nandi | 23 | Male | https://drive.google.com/u/0/open?usp=forms_we... |

In [14]:

df.describe()

Out[14]:

| | AGE |
|-------|-----------|
| count | 34.000000 |
| mean | 22.823529 |
| std | 5.744407 |
| min | 19.000000 |
| 25% | 20.000000 |

| | AGE |
|-----|-----------|
| 50% | 21.000000 |
| 75% | 23.000000 |
| max | 50.000000 |

In [15]: `df.shape`

Out[15]: (34, 6)

In [16]: `df.values`

Out[16]: array([['2022/08/14 8:53:16 pm GMT+5:30', 'pritom2001.saha@gmail.com',
'Pritom saha', 21, 'Male',
'https://drive.google.com/u/0/open?usp=forms_web&id=1_7fWnfSIm2woi2x3JiRVsMpY1kYrbIyX'],
['2022/08/14 8:54:44 pm GMT+5:30',
'apurbasarkar17072002@gmail.com', 'Apurba Sarkar', 20, 'Male',
'https://drive.google.com/u/0/open?usp=forms_web&id=1IK_S9qoc37sq7rSxmFKUWrHmTvyVXBeH'],
['2022/08/14 8:55:53 pm GMT+5:30', 'zeeshanmasoodkhan@icloud.com',
'Zeeshan masood khan', 21, 'Male',
'https://drive.google.com/u/0/open?usp=forms_web&id=1bLBRrGJE3MvCF1kn0Va5W7beaNBEjwqB'],
['2022/08/14 9:00:33 pm GMT+5:30', 'pritamgharami1200@gmail.com',
'Pritam Gharami', 23, 'Male',
'https://drive.google.com/u/0/open?usp=forms_web&id=1NbxiK0YFqYPLiEf0UfSvqn3rx3j5q977'],
['2022/08/14 9:05:03 pm GMT+5:30', 'bosenayan82@gmail.com',
'Nayan Bose ', 21, 'Male',
'https://drive.google.com/u/0/open?usp=forms_web&id=1JidXhbdq4NyFcE9oAbJXxCTksXcEz7lN'],
['2022/08/14 9:32:34 pm GMT+5:30', 'arkaraj2001@gmail.com',
'Arka provo Naskar ', 21, 'Male',
'https://drive.google.com/u/0/open?usp=forms_web&id=1ji5JDioEim4Wpe2XY-V9UQFmr3q87Iwv'],
['2022/08/14 9:37:06 pm GMT+5:30', 'jogamaya@gmail.com',
'Jogamaya Sarkar', 35, 'Female',
'https://drive.google.com/u/0/open?usp=forms_web&id=1cFl0sT-710uQKHwk5B0W9Kc04Me25frV'],
['2022/08/14 9:45:49 pm GMT+5:30', 'susanta@gmail.com',
'Susanta Kumar Sarkar', 50, 'Male',
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dtype=object)
```

```
In [17]: print(df['AGE'].mean())
```

```
22.823529411764707
```

```
In [18]: print(df['AGE'].min())
```

19

```
In [19]: print(df['AGE'].max())
```

50

```
In [20]: print(df['AGE'].std())
```

5.744407495016844

```
In [21]: print(df['AGE'].median())
```

21.0

```
In [22]: import pandas as pd
df1 = pd.DataFrame(df)
df2=df1.drop(['Timestamp','Username','NAME','AGE','SIGNATURE'],axis=1)
df2
```

Out[22]:

GENDER

| | |
|----|--------|
| 0 | Male |
| 1 | Male |
| 2 | Male |
| 3 | Male |
| 4 | Male |
| 5 | Male |
| 6 | Female |
| 7 | Male |
| 8 | Male |
| 9 | Male |
| 10 | Female |
| 11 | Male |

| GENDER | |
|--------|--------|
| 12 | Male |
| 13 | Male |
| 14 | Male |
| 15 | Male |
| 16 | Male |
| 17 | Male |
| 18 | Male |
| 19 | Male |
| 20 | Male |
| 21 | Male |
| 22 | Male |
| 23 | Female |
| 24 | Female |
| 25 | Male |
| 26 | Male |
| 27 | Male |
| 28 | Male |
| 29 | Female |
| 30 | Male |
| 31 | Female |
| 32 | Female |
| 33 | Male |

```
In [23]: df2=df2.replace(to_replace='Male',value=1)
df2=df2.replace(to_replace='Female',value=2)
```

```
print(df2)
```

```
      GENDER
0          1
1          1
2          1
3          1
4          1
5          1
6          2
7          1
8          1
9          1
10         2
11         1
12         1
13         1
14         1
15         1
16         1
17         1
18         1
19         1
20         1
21         1
22         1
23         2
24         2
25         1
26         1
27         1
28         1
29         2
30         1
31         2
32         2
33         1
```

In [24]:

```
x=df5
y=df2
```

```
In [25]: import warnings
warnings.filterwarnings('ignore')
```

```
In [38]: #DecisionTreeClassifier
import sklearn
from sklearn.model_selection import train_test_split
from sklearn.metrics import accuracy_score
x_train,x_test,y_train,y_test=train_test_split(x,y,test_size=0.4,random_state=42)
from sklearn.tree import DecisionTreeClassifier
clr=DecisionTreeClassifier()
clr.fit(x_train,y_train)
pred=clr.predict(x_test)
score=sklearn.metrics.accuracy_score(y_test,pred)
print(score)
```

0.9285714285714286

```
In [39]: #confusion_matrix
from sklearn.metrics import confusion_matrix
conf_mat=confusion_matrix(y_test,pred)
print(conf_mat)
```

```
[[12  0]
 [ 1  1]]
```

```
In [28]: #KNeighborsClassifier
import sklearn
from sklearn.model_selection import train_test_split
from sklearn.metrics import accuracy_score
x_train,x_test,y_train,y_test=train_test_split(x,y,test_size=0.4,random_state=42)
#from sklearn.tree import DecisionTreeClassifier
from sklearn.neighbors import KNeighborsClassifier
clr=KNeighborsClassifier()
clr.fit(x_train,y_train)
pred=clr.predict(x_test)
score=sklearn.metrics.accuracy_score(y_test,pred)
print(score)
```

0.8571428571428571

```
In [29]: #confusion_matrix
from sklearn.metrics import confusion_matrix
conf_mat=confusion_matrix(y_test,pred)
print(conf_mat)
```

```
[[11  1]
 [ 1 11]]
```

```
In [40]: #KNeighborsClassifier
import sklearn
from sklearn.model_selection import train_test_split
from sklearn.metrics import accuracy_score
x_train,x_test,y_train,y_test=train_test_split(x,y,test_size=0.2)
#from sklearn.tree import DecisionTreeClassifier
from sklearn.neighbors import KNeighborsClassifier
clr=KNeighborsClassifier(n_neighbors=5)
clr.fit(x_train,y_train)
pred=clr.predict(x_test)
score=sklearn.metrics.accuracy_score(y_test,pred)
print(score)
```

```
0.7142857142857143
```

```
In [31]: #confusion_matrix
from sklearn.metrics import confusion_matrix
conf_mat=confusion_matrix(y_test,pred)
print(conf_mat)
```

```
[[5 0]
 [2 0]]
```

```
In [32]: #svm
from sklearn import svm
clr=svm.SVC()
clr.fit(x_train,y_train)
pred=clr.predict(x_test)
score=sklearn.metrics.accuracy_score(y_test,pred)
print(score)
```

```
0.7142857142857143
```



```
In [33]: #confusion_matrix  
from sklearn.metrics import confusion_matrix  
conf_mat=confusion_matrix(y_test,pred)  
print(conf_mat)
```

```
[[5 0]  
 [2 0]]
```

```
In [41]: from sklearn.linear_model import LogisticRegression  
from sklearn.model_selection import train_test_split  
from sklearn.metrics import accuracy_score  
from sklearn.datasets import load_iris  
x_train,x_test,y_train,y_test=train_test_split(x,y,test_size=0.1)  
clf=LogisticRegression()  
clf.fit(x_train,y_train)  
pred=clf.predict(x_test)  
score=sklearn.metrics.accuracy_score(y_test,pred)  
print(score)
```

```
0.75
```

```
In [47]: from sklearn.neural_network import MLPClassifier  
from sklearn.model_selection import train_test_split  
from sklearn.metrics import accuracy_score  
from sklearn.datasets import load_iris  
x_train,x_test,y_train,y_test=train_test_split(x,y,test_size=0.1)  
clf=MLPClassifier(solver='lbfgs',hidden_layer_sizes=(10),alpha=0.001)  
clf.fit(x_train,y_train)  
pred=clf.predict(x_test)  
score=sklearn.metrics.accuracy_score(y_test,pred)  
print(score)
```

```
0.75
```