General description of the project:

First, we collected 40 audio recordings, all of which contained the word zero. We collected these recordings from different categories of people (males, females) and of different ages.

After we collected these recordings, we divided them into four groups: an exercise specifically for the male category, an exercise specifically for the female category, a test for the male category, and a test for the female category.

Then we created four different systems correlation, energy, and zero-crossing count. power spectral density and trained them on the data, and then we checked the accuracy rate of each system.

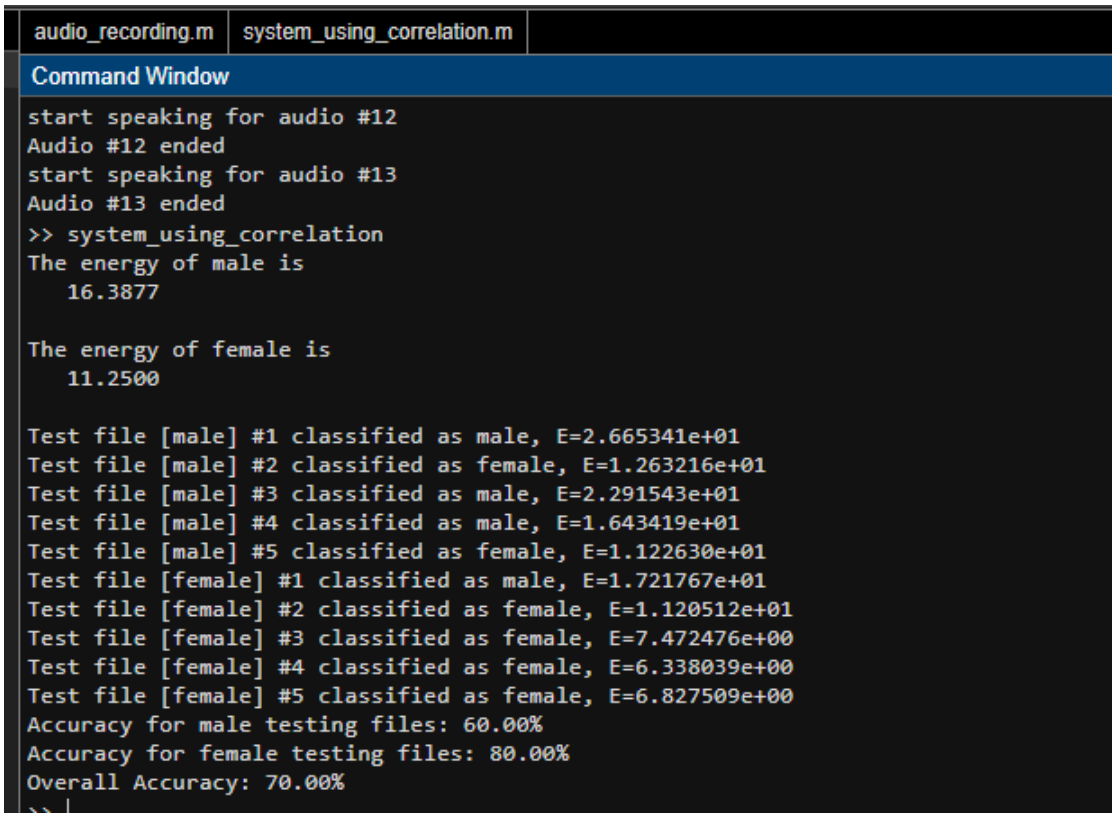
System Improvement and Extension:

A more diverse data set: To further improve the system, it is possible to take audio recordings of speakers of different ages and different environments. This helps the system to identify more points of difference and helps it produce better results.

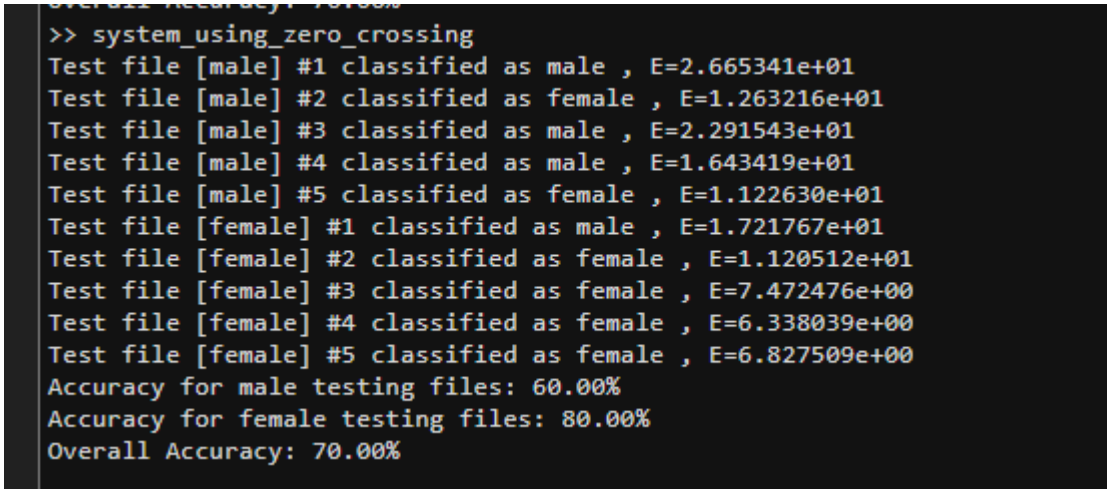
Extend to Different Words:Collect recordings for additional words to create a more versatile system that can recognize gender based on a broader range of speech patterns

The result :

For system using correlation



For system using zero corssing



For system using PSD

```
Overall Accuracy: 30.00%
>> system_using_PSD
The energy of male is
   1.5537e-04

The energy of female is
   1.0537e-04

Test file [female] #1 classified as male , E=1.668407e-04
Test file [female] #2 classified as female , E=9.741820e-05
Test file [female] #3 classified as female , E=6.421696e-05
Test file [female] #4 classified as female , E=5.646108e-05
Test file [female] #5 classified as female , E=6.627041e-05
Test file [male] #1 classified as male , E=2.748199e-04
Test file [male] #2 classified as female , E=1.119294e-04
Test file [male] #3 classified as male , E=1.998062e-04
Test file [male] #4 classified as male , E=1.426885e-04
Test file [male] #5 classified as female , E=1.179988e-04
Accuracy for male testing files: 60.00%
Accuracy for female testing files: 80.00%
Overall Accuracy: 70.00%
>>
```

For system using energy

```
>> system_using_energy
The energy of male is
   16.3877

The energy of female is
   11.2500

Test file [male] #1 classified as male, E=2.665341e+01
Test file [male] #2 classified as female, E=1.263216e+01
Test file [male] #3 classified as male, E=2.291543e+01
Test file [male] #4 classified as male, E=1.643419e+01
Test file [male] #5 classified as female, E=1.122630e+01
Test file [female] #1 classified as male, E=1.721767e+01
Test file [female] #2 classified as female, E=1.120512e+01
Test file [female] #3 classified as female, E=7.472476e+00
Test file [female] #4 classified as female, E=6.338039e+00
Test file [female] #5 classified as female, E=6.827509e+00
Accuracy for male testing files: 60.00%
Accuracy for female testing files: 80.00%
Overall Accuracy: 70.00%
```