Program Listing

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**Program developed for various operations in signal processing **
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**************************************************************************
 MATLAB PROGRAM FOR MALE, FEMALE,CHILDREN VOICE RECOGNITION
 **************************************************************************
s1= wavread('c:\windows\media\the microsoft sound');
s2 = wavread('c:\windows\media\logoff');
ct =1;
 while(ct =1)
close all;
a=menu( 'INTRODUCTION', 'MALE, FEMALE & SOUND
                                        DIFFERENTION',   'QUIT');
switch(a);
  case 1
clc;

sound(s1,22100);
im=imread('c:\my documents\sujit\slide','jpeg');
image(im);
  axis('off');
 pause(1);
im= imread('c:\my documents\ycis\slide1','jpeg');
  image(im);
  axis('off');
  pause(1);
im= imread('c:\my documents\title\slide1','jpeg');
  image(im);
  axis('off');
  pause(1);
case 2
 clc;

y1= wavread('c:\2ndcopy\a111');
% Spectral power  calculation;
sound(y1,44100);
y1= y1(:);
p7= psd(y1,65536,44100,65536,'linear');
```

```
c7=0;
for i=1:32769
  c7 = c7+p7(i);
end
c9 = c7*c7
inten = 0;
if(c9>1.0e+005)
  inten =1;
elseif(c9<1.0e+000)
  inten=2;
else
 inten = 3;
end
switch(inten)
  case 1 % speak gently
    disp('speak gently');
    xa1=imread('c:\my documents\lll\slide2\slide1','jpeg');
  image(xa1);
  axis('off');
  axis('equal');
pause(5);



  case 2 %speak loudly
  disp('speak loudly');
  xa = imread('c:\my documents\lll\slide1','jpeg');
  image(xa);
  axis('off');
  axis('equal');
pause(5);



  case 3
    disp('ADJUSTING POWER TO NORMAL LEVAL,PLEASE WAIT');
```

```
    if (c9>8.6000e+003)

  if(c9>5.0000e+006)
    de=.35;
  elseif(c9>5.0000e+005)
    de=0.6;
  elseif(c9>5.0000e+0004)
    de=0.7;
  else(c9>8.6000e+003)
    de=0.99;

    end
    c9;
  m1=y1;
  while((c9>8.6000e+003))
    y1=m1.*de;
    de=de-0.05;
    p7=psd(y1,65536,44100,65536,'linear');
c7=0;
  c7=sum(p7);
c9=c7*c7;
end

else
  if(c9<9.000e-001)
  de=8.8;
elseif(c9<9.000e+000)
  de=5;
elseif(c9<9.000e+0001)
  de=3;
elseif(c9<9.000e+002)
  de =1.5;
else(c9<7.6000e+003)
  de=1.2;
  end

  c9;
  m1=y1;
```

```
  while((c9<7.6000e+003))
    y1=m1.*de;
    de = de+0.25;
    p7= psd(y1,65536,44100,65536,'linear');
c7=0;

  c7=sum(p7);
c9=c7*c7;
end
end
disp('SPEECH INTENSITY OK');

disp('FINDING CHILD OR ADULT,PLEASE WAIT');
b1= fir1(4000,[0.002721088435 0.012698412],'dc-0');%60 to 280 HZ band
b2= fir1(4000,[0.002721088435 0.007709750567],'dc-0');%60 to 170 HZ band
b3= fir1(4000,[0.010430839 0.012698412127],'dc-0');%220 to 280 HZ band
b4= fir1(4000,[0.036281179 0.102040816],'dc-0');%800 to 2250 HZ band
b5= fir1(4000,[0.036281179 0.1020408163],'dc-0');%200 to 225 Hz band
b6= fir1(4000,[0.002721088435 0.01020408163],'dc-0');%60 to 225 Hz band

va = 65536;
va1=512;
fs = 44100;
x1=fftfilt(b1,y1,va);
x2=fftfilt(b2,y1,va);
x3=fftfilt(b3,y1,va);
x4=fftfilt(b4,y1,va);
x5=fftfilt(b5,y1,va);

x6=fftfilt(b6,y1,va);

[p1,f1] = spectrum(x1,va,va1,va,fs);
[p2,f2] = spectrum(x2,va,va1,va,fs);
[p3,f3] = spectrum(x3,va,va1,va,fs);
[p4,f4] = spectrum(x4,va,va1,va,fs);
[p5,f5] = spectrum(x5,va,va1,va,fs);
[p6,f6] = spectrum(x6,va,va1,va,fs);
```

```
p1=p1(:);
p2=p2(:);
p3=p3(:);
p4=p4(:);
p5=p5(:);
p6=p6(:);

p1111= sum(p1)
p2222= sum(p2)
p3333= sum(p3)
p4444= sum(p4)
p5555= sum(p5)
p6666= sum(p6)
zoom on;

child = 0;
  adult = 0;
  global male;

  if(p1111<1.0000e+000)
  child =1;
  xa2= imread ('c:\my documents\child\slide1','jpeg');
   image(xa2);
 disp( 'IT  IS A CHILD VOICE');
    axis('off');
      axis('equal');
      pause(4);

else
  adult=1;

  end %if else loop



    switch(adult)
        case 1    %  adult case
```

```
 disp('FINDING MALE OR FEMALE');
 band60_170=0;
 male=0;
 d= imread('c:\my documents\abk1\slide1','jpeg');
 d1= imread('c:\my documents\abk\slide1','jpeg');
 if(p2222>1.50000e+000)
  male=1;
 disp( 'IT  IS A MALE VOICE');
  image(d);
  axis ('off');
   pause(4);
 band 60-170=1;
elseif(p6666<=4.0e+000)
 disp( 'IT  IS A FEMALE VOICE');
 image(d1);
 axis('off');
 pause(4);
elseif(p3333>=7.0e+000)
 disp(' IT  IS A FEMALE VOICE');
 image(d1);
 axis('off');
 pause(4);
elseif(p4444>=5.0e+001)

 disp(' IT  IS A FEMALE VOICE');
 image(d1);
 axis('off');
 pause(4);

 elseif(p4444<1.2000e+000)
 male=1;
 disp(' IT  IS A MALE VOICE');
 image(d);
axis('off');
 pause(4);
elseif(band60-170==0 & p3333<1.000e+000)
 male=1;
 disp(' IT  IS A MALE VOICE');
```

```
        image(d);
        axis('off');
        pause(4);
      else

        disp(' IT IS A FEMALE VOICE');
        image(d1);
        axis('off');
        pause(4);

      end
      end % switch adult end
      pause(4);
end %switch inten end
```

MATLAB PROGRAM FOR DISPLAY OF FREQUENY SPECTRUM (TOTAL BAND)

```
y1=wavread('c:\a3sound\naru1');
sound(y1,44100)
Va= 65536;
%FFT length
Va1=32768;
% overlaping length
Fs=44100;
%sampling rate
b2= fir1(2700,0.999999);
%all pass filter operation
f3= fftfilt(b2,y,va);
% fft operation
[p,f]= spectrum(f3,Va,Va1,Va,fs);
plot (f,p(:1);
zoom on;
clf
```

MATLAB PROGRAM FOR DISPLAY OF FREQUENY SPECTRUM

(FOR DESIRED PASS BAND)

```
y1=wavread('c:\a3sound\naru1');
sound(y1,44100)
 Va= 65536;
%fft length
Va1=32768;
% overlaping length
 fs= 44100;
%sampling rate
b2= fir1(2700,0.999999);
%all pass filter operation
b1= fir1(2700,[0.00090702 0.113378],'dc-0,);
%band pass filter (2Hz-2500Hz)
f2= fftfilt(b1,y1,va);
% fft operation
[p1,f1]= spectrum(f2,Va,Va1,Va,fs);
 plot (f1,p1(:1);
zoom on;
```

MATLAB PROGRAM FOR DISPLAY OF FREQUENY SPECTRUM

(FOR DESIRED STOP BAND)

```
y1=wavread('c:\a3sound\naru1');
sound(y1,44100)
 Va= 65536;
%fft length
Va1=32768;
% overlaping length
 Fs= 44100;
%sampling rate
b2=fir1(2700,0.999999);
%all pass filter operation
b1= fir1(2700,[0.00090702 0.113378],'dc-1,);
%band stop filter (2Hz-2500Hz)
f2= fftfilt(b1,y1,va);
% fft operation
```

```
[p1,f1]= spectrum(f2,Va,Va1,Va,fs);
 plot (f1,p1(:1);
zoom on;
```

MATLAB PROGRAM FOR DISPLAY OF TIME DOMAIN RESPONSE

```
y= wavread('c:\a3sound\naru1')

X11=length(y);

X12=1:x11;
Plot(x12,y);

Pause;clf;

**********************************************************************
SPECTRAL POWER CALCULATION IN DIFFERENT FREQUENCY BANDS
**********************************************************************
y3= wavread('c:\a3sound\naru1')

b1= fir1(2700,[0.108843537 0.3628117914],'dc-0'); %600 HZ 2000 HZ band
f1=  fftfilt(b1,y3,va);
f1= f1(:);
[p1,f1]= spectrum(f1,va,va1,va,fs);
p1= p1(:);
sp=  sum(p1);% sp contains spectral power
b2= fir1(2700,[0.007256235828 0.0126984127 0.07256235828 0.163265306],'dc-0');
%  40 HZ to 70 HZ & 400 to 900 Hz band
f11= fftfilt(b2,y3,va);
f11= f11(:);
[p2,f2]= spectrum(f11,va,va1,va,fs);
p2= p2(:);
sp1= sum(p2);% sp1 contains spectral power of band 40-70 & 400-900 Hz
```

```
b3= fir1(2700,[0.013605442 0.045351473],'dc-0'); %75 HZ to 250 HZ  band
fl2= fftfilt(b3,y1,va);
fl2= fl2(:);
[p3,f3]= spectrum(fl2,va,va1,va,fs);
p3= p3(:);
sp2= sum(p3);% sp2 contains spectral power of band 40-70 & 400-900 Hz
b4= fir1(2700,[0.007256235828 0.032653061 0.09070294785 0.1814058957],'dc-0');
% 40 HZ to 180 HZ & 500 to 1000 HZ band
fl3= fftfilt(b4,y3,va);
fl3= fl3(:);
[p4,f4]= spectrum(fl3,va,va1,va,fs);
p4= p4(:);

sp3= sum(p4);% sp3 contains spectral power of band 40-180 & 500_1000 Hz
b5= fir1(2700,[0.09977324263 0.1179138322],'dc-0'); %550 HZ to 650 HZ  band
fl4= fftfilt(b5,y1,va);
fl4= fl4(:);
[p5,f5]=spectrum(fl4,va,va1,va,fs);
p5=p5(:);
sp4=sum(p5);% sp4 contains spectral power of band 550-650 Hz band

b6=fir1(2700,[0.018140589 0.04353741497],'dc-0'); %100 HZ to 240 HZ  band
fl5=fftfilt(b6,y3,va);
fl5=fl5(:);
[p6,f6]=spectrum(fl5,va,va1,va,fs);
p6=p6(:);
sp5=sum(p6);% sp5 contains spectral power of 100 HZ to 240 HZ  band
```

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MATLAB PROGRAME FOR STUDY RELATIVE ENERGY AND ARTICULATION.

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```
y1=wavread('c:\a3sound\naru1');
% naru1, the wave file of recorded male voice
sound(y1,44100)
%  listen the original sound
 Va=65536;
%fft length
Va1=32768;
%  overlaping length
 Fs=44100;
%sampling rate
b2= fir1(2700,0.999999);
%  all pass filter operation
f3 =fftfilt (b2,y1,va,);
[p,f] =spectrum (f3,Va,Va1,Va,fs);
b1=fir1(2700,[0.00090702 0.113378],'dc-0,);
% band pass filter (2Hz-2500Hz)
f2= fftfilt(b1,y1,va);
%  FFT operation
[p1,f1]=spectrum(f2,Va,Va1,Va,fs);
 plot (f1,p1(:1);
zoom on;
sound(f2 ,44100)
% to study articulation in band 2-2500 Hz by listening sound
f2=f2(:)

p1=p1(:);
sp=sum(p1);% sp contains spectral power of  band 2 HZ to 2500 HZ  band
p=p(:);
s= sum(p); % s contains spectral power in total band
% Relative energy in band 2-2500 Hz is (sp/s)*100
pause;
clf;
```