q5

March 12, 2018

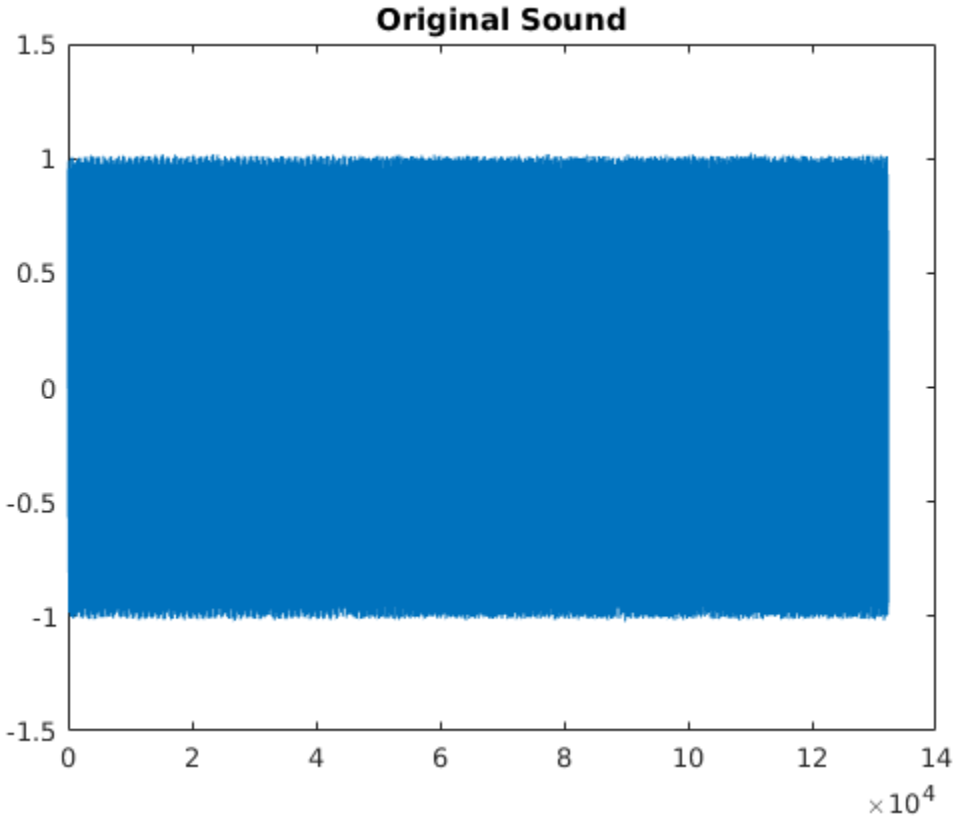
1 Detect number using dialtone

1.0.1 Function to Eavesdrop

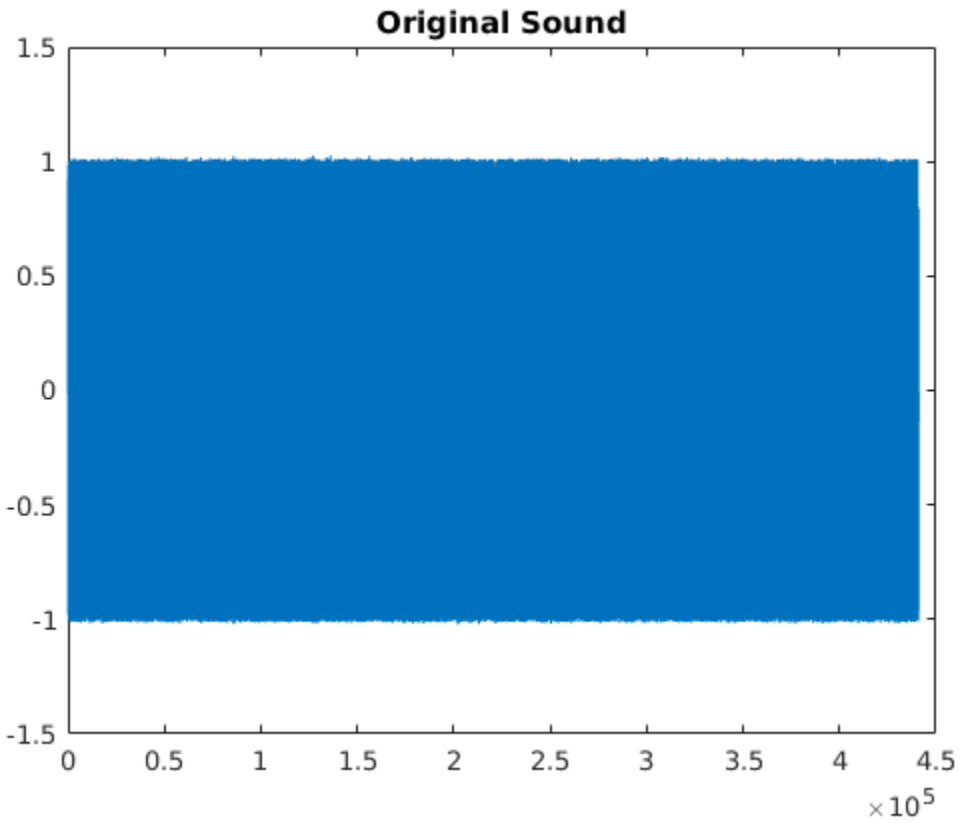
```
function [result] = Eavesdrop(audio_file)

    info = audioinfo(audio_file);

%   Each number is assumed to be pressed for 1 sec hence num=length of number
    num =  info.Duration;


    X = audioread(audio_file);
    plot(X);
    title('Original Sound');
    step_length = info.SampleRate;

%     Get the audio files of each number and create a vector of their signal

    s_num = zeros(10,step_length);
    for i = [1:10]
    s = strcat('./',num2str(mod(i,10) ,'%2d'),'.ogg');
    a = audioread(s);
    s_num(i,:) = a(1:step_length);
    end

%   For every num check the dot product with each num, then take the maximum as the output
    result = 0;
    for i = [1:num]
        x = X((i-1)*step_length +1 : i*step_length);
        [val,max_num] = max(s_num*x);
        result = 10*result + mod(max_num,10);
    end
end
```

```
In [1]: result = Eavesdrop('./Police.ogg')
```

```
result =

   100
```




```
In [2]: result = Eavesdrop('./9515733002.ogg');
        sprintf('%10d\n',result )


ans =

    '9515733002
     '
```


Original Sound
1.5
1
0.5
0
-0.5
-1
-1.5
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
×10^5