Discovering the potential applications of photonic chip

--Noise Cancellation

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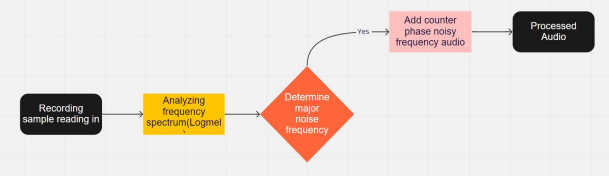
Backgrounds

- Photonic chips have massive bandwidth compare to the chips designed and manufactured in traditional semiconductor process
- As a kind of most demanded audio process methods, noise cancellation requires relative high sampling rate and low time delay can be a Typical function to test out the potential of processor, especially for the processing speed



Code

```
import librosa
import librosa.display
import pandas as pd
import numpy as np
import scipy.signal
import matplotlib.pyplot as plt
%matplotlib inline
from PIL import Image
from pathlib import Path
from pylab import rcParams
rcParams['figure.figsize'] = 14, 6

from scipy import signal
import random

import csv
# Preprocessing
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import LabelEncoder, StandardScaler
#Reports
from sklearn.metrics import classification_report, confusion_matrix

sr = 16000
e_file1 = "C:\\Users\cesdi\Desktop\ec601\audio processing\recording1.wav"

import warnings
warnings.filterwarnings('ignore')

#logmel spectrum
S1 = librosa.feature.melspectrogram(y=y1, sr=sr, n_mels=64)
D1 = librosa.power_to_db(S1, ref=np.max)
librosa.display.specshow(D1, x_axis='time', y_axis='mel');

S2 = librosa.feature.melspectrogram(y=y2, sr=sr, n_mels=64)
D2 = librosa.power_to_db(S2, ref=np.max)
librosa.display.specshow(D2, x_axis='time', y_axis='mel');

def f_high(y,sr):
    b,a = signal.butter(10, 2000/(sr/2), btype='highpass')
    yf = signal.lfilter(b,a,y)
    return yf
yf1 = f_high(y1, sr)
yf2 = f_high(y2, sr)
```

Conclusions

- The higher sample rate have largely improve the noise recognition accuracy
- Plausible to design a better noise cancellation device while keep the same battery life on hardware side

Future Work

- Looking for other method to improve a better applicability with the processor