Multilingual Speech Recognition using Python and Google Speech API (en)

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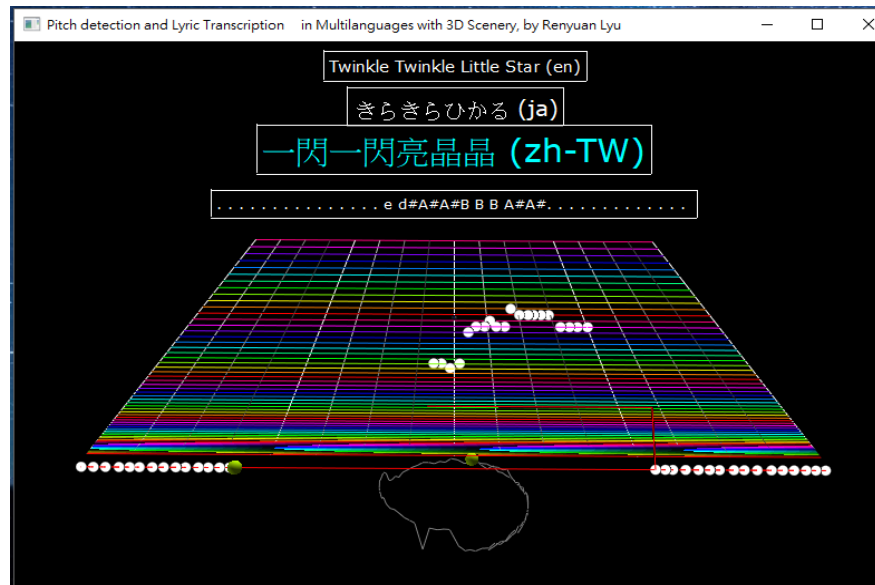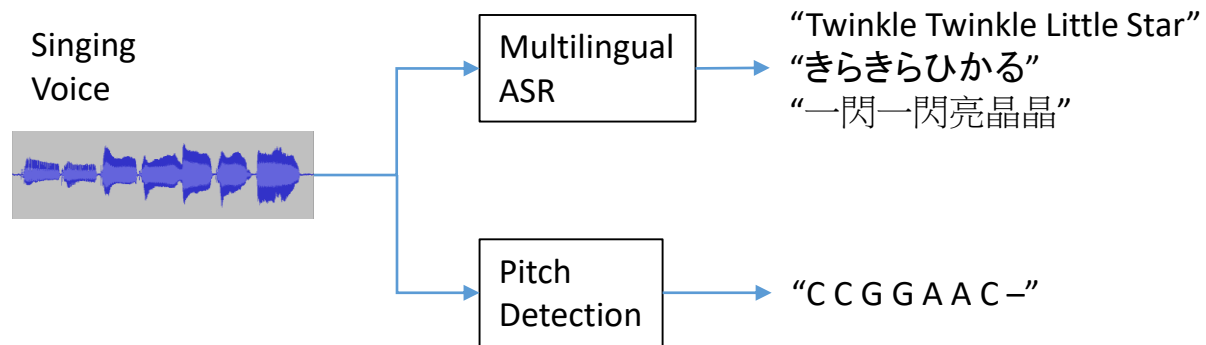
The Source Code on Github

https://github.com/renyuanL/multilingualASR

A demo on Youtube

https://youtu.be/DmwsR7rVonE

Abstract

- Speech Recognition has been more popular during the past decade since the appearance of Apple Siri, Google Translate

- Using Python SpeechRecognition module, which includes multiple speech recognition engines for online applications in games, linguistic tutoring and the other applications, such as bilingual translation and so on.

- A real-time system in multiple languages, such as English, Japanese and Mandarin Chinese.

Concept Block

Singing Voice

Multilingual ASR

"Twinkle Twinkle Little Star"
"きらきらひかる"
"一閃一閃亮晶晶"

Pitch Detection

"C C G G A A C –"

Using Modules

```python
import speech_recognition
import visual
import pyaudio

import numpy
import threading

import ryF0Estimate
```

https://pypi.python.org/pypi/SpeechRecognition/
http://vpython.org/
https://people.csail.mit.edu/hubert/pyaudio/

The AudioClass

```python
class Ry音類: # the AudioClass
    def __init__(self):

        self.音= pyaudio.PyAudio()

        self.樣本格式= pyaudio.paInt16
        self.樣本寬=   self.音.get_sample_size(self.樣本格式)

        self.通道數= 1       # 道
        self.取樣率= 16000  # 點/秒

        self.框長=    256     # 點/框
        self.總秒數= 16      # 秒

        self.流= self.音.open(
                format=   self.樣本格式,
                channels= self.通道數,
                rate=     self.取樣率,
                frames_per_buffer= self.框長,
                input=    True,
                output=   True)

        self.框數=  int(self.取樣率*self.總秒數/self.框長)

        self.錄音框們=  [[] for i in range(self.框數)]
```

Using Threading

```python
def init(self):

    self.錄音線= threading.Thread(target= self.錄音線程)
    self.能量線= threading.Thread(target= self.f1_能量)
    self.基頻線= threading.Thread(target= self.f4_基頻)
    self.語音辨認線= threading.Thread(target= self.f6_語音辨認)


def start(self):

    self.錄音線.start()
    self.能量線.start()
    self.基頻線.start()
    self.語音辨認線.start()
```

The Recording Thread

```
def 錄音線程(self):

    while (self.錄音中==True):
        框= self.流.read(self.框長)
        self.錄音框們[self.i現框%self.框數]= 框
        self.i現框 += 1
```
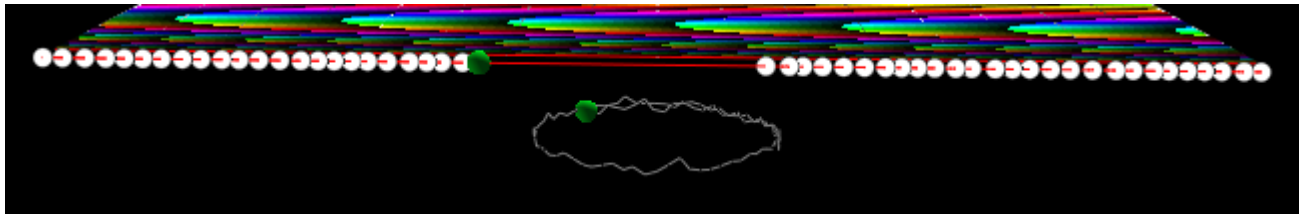
The ASR Thread

```python
def 語音辨認(self):

    辨= sr.Recognizer()
    while self.語音辨認中==True:
        #
        # Get x as "singingVoice" to be 音
        #
        音= sr.AudioData(x, self.取樣率, self.樣本寬)

        #
        # Do ASR to get recognition Result as 文
        #
        try:
            if   lang=='ja':
                文= 辨.recognize_google(音, language='ja')
            elif lang=='en':
                文= 辨.recognize_google(音, language='en')
            elif lang= 'zh-TW'
                文= 辨.recognize_google(音, language='zh-TW')
            else:
                self.文= '{} ({})'.format(文, lang)
        except:
            self.文= 'exceptionOccurs!!'
            pass
    return
```

Singing
Voice

Pitch
Detection

Multilingual
ASR

"C C G G A A C –"

"Twinkle Twinkle Little Star"
"きらきらひかる"
"一閃一閃亮晶晶"

A Test

https://youtu.be/DmwsR7rVonE

Recording #151 PyConJP2017
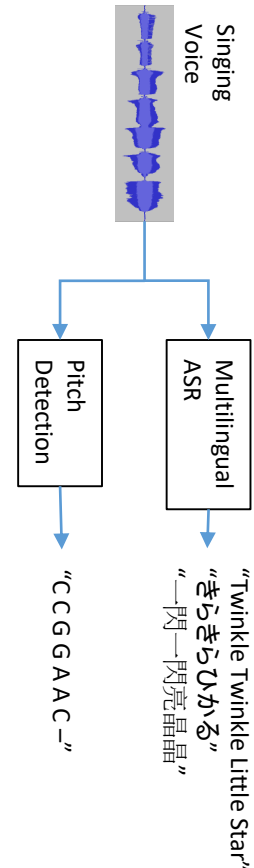
きらきら光る　　お空の星よ
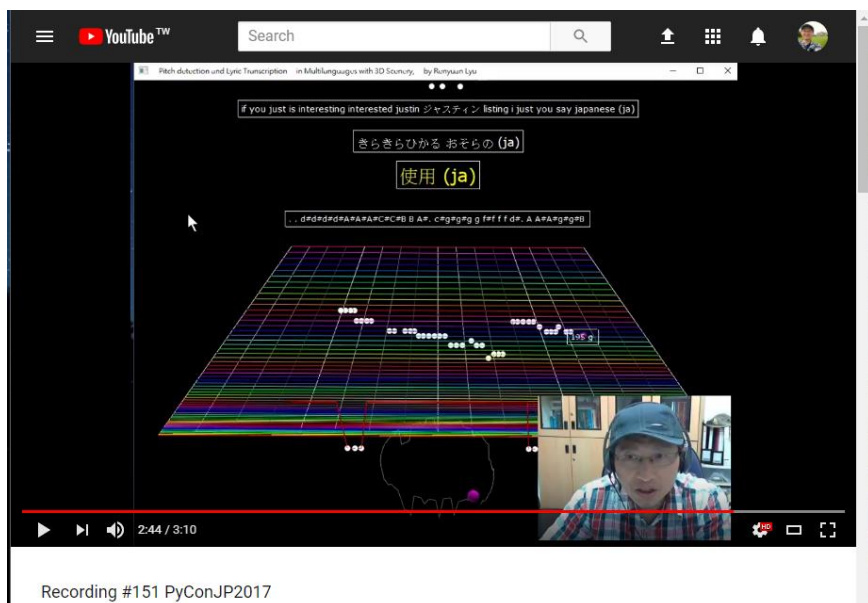瞬きしては　　　皆を見てる
きらきら光る　　お空の星よ

きらきらひかる　おそらのほしよ
まばたきしては　みんなをみてる
きらきらひかる　おそらのほしよ

一閃一閃亮晶晶，滿天都是小星星
掛在天上放光明，好像許多小眼睛
一閃一閃亮晶晶，滿天都是小星星

Twinkle, twinkle, little star,
How I wonder what you are.

Up above the world so high,
Like a diamond in the sky.

Twinkle, twinkle, little star,
How I wonder what you are!