HW2

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- **Q1**

  Fourier tempogram

ChaCha	P-score 0.04	ALOTC-score 0.09
Jive	P-score 0.02	ALOTC-score 0.05
Quickstep	P-score 0.0	ALOTC-score 0.0
Rumba	P-score 0.05	ALOTC-score 0.11
Samba	P-score 0.01	ALOTC-score 0.01
Tango	P-score 0.35	ALOTC-score 0.64
Viennese waltz	P-score 0.01	ALOTC-score 0.02
Waltz	P-score 0.04	ALOTC-score 0.07

  autocorrelation tempogram

ChaCha	P-score 0.53	ALOTC-score 0.81
Jive	P-score 0.39	ALOTC-score 0.55
Quickstep	P-score 0.39	ALOTC-score 0.5
Rumba	P-score 0.42	ALOTC-score 0.78
Samba	P-score 0.3	ALOTC-score 0.55
Tango	P-score 0.5	ALOTC-score 0.67
Viennese waltz	P-score 0.5	ALOTC-score 0.6
Waltz	P-score 0.37	ALOTC-score 0.56

  autocorrelation tempogram 的結果明顯比 Fourier tempogram 的高出非常多，因為 Fourier tempogram 比較容易抓到幾倍大的 bpm。然後 ALOTC-score 又比 P-score 高。

  參數的部分是設定忽略 freq 大於 300 跟小於 30 的，下面幾題也都是一樣的參數設定。

- **Q2**

Fourier tempogram

```
* use [T1/2, T2/2]
ChaCha          | P-score 0.06
Jive            | P-score 0.05
Quickstep       | P-score 0.0
Rumba           | P-score 0.08
Samba           | P-score 0.06
Tango           | P-score 0.28
Viennese waltz  | P-score 0.0
Waltz           | P-score 0.0
```

```
* use [T1*2, T2*2]
ChaCha          | P-score 0.01
Jive            | P-score 0.02
Quickstep       | P-score 0.01
Rumba           | P-score 0.01
Samba           | P-score 0.0
Tango           | P-score 0.04
Viennese waltz  | P-score 0.16
Waltz           | P-score 0.04
```

```
* use [T1/3, T2/3]
ChaCha          | P-score 0.01
Jive            | P-score 0.0
Quickstep       | P-score 0.0
Rumba           | P-score 0.08
Samba           | P-score 0.01
Tango           | P-score 0.0
Viennese waltz  | P-score 0.0
Waltz           | P-score 0.0
```

```
* use [T1*3, T2*3]
ChaCha          | P-score 0.0
Jive            | P-score 0.0
Quickstep       | P-score 0.0
Rumba           | P-score 0.0
Samba           | P-score 0.0
Tango           | P-score 0.0
Viennese waltz  | P-score 0.0
Waltz           | P-score 0.0
```

autocorrelation tempogram

```
* use [T1/2, T2/2]
ChaCha          | P-score 0.09
Jive            | P-score 0.0
Quickstep       | P-score 0.0
Rumba           | P-score 0.29
Samba           | P-score 0.32
Tango           | P-score 0.12
Viennese waltz  | P-score 0.0
Waltz           | P-score 0.43
```

```
* use [T1*2, T2*2]
ChaCha          | P-score 0.27
Jive            | P-score 0.42
Quickstep       | P-score 0.37
Rumba           | P-score 0.13
Samba           | P-score 0.22
Tango           | P-score 0.2
Viennese waltz  | P-score 0.03
Waltz           | P-score 0.03
```

```
* use [T1/3, T2/3]
ChaCha          | P-score 0.0
Jive            | P-score 0.0
Quickstep       | P-score 0.0
Rumba           | P-score 0.0
Samba           | P-score 0.0
Tango           | P-score 0.0
Viennese waltz  | P-score 0.0
Waltz           | P-score 0.02
```

```
* use [T1*3, T2*3]
ChaCha          | P-score 0.01
Jive            | P-score 0.02
Quickstep       | P-score 0.07
Rumba           | P-score 0.01
Samba           | P-score 0.01
Tango           | P-score 0.01
Viennese waltz  | P-score 0.44
Waltz           | P-score 0.0
```

不同 genre 在不同參數下的結果都不同，但 Fourier tempogram 和 autocorrelation tempogram 在使用 1/3 倍和 3 倍的參數時，各 genre 的結果幾乎都表現不太好，除了 Viennese waltz 在 autocorrelation tempogram 有出現 3 倍較高的結果。

- **Q3**

  Fourier tempogram

```
4s | ChaCha           | ALOTC-score 0.0
4s | Jive             | ALOTC-score 0.0
4s | Quickstep        | ALOTC-score 0.91
4s | Rumba            | ALOTC-score 0.0
4s | Samba            | ALOTC-score 0.03
4s | Tango            | ALOTC-score 0.0
4s | Viennese waltz   | ALOTC-score 0.0
4s | Waltz            | ALOTC-score 0.05
```

```
6s | ChaCha           | ALOTC-score 0.05
6s | Jive             | ALOTC-score 0.45
6s | Quickstep        | ALOTC-score 0.0
6s | Rumba            | ALOTC-score 0.01
6s | Samba            | ALOTC-score 0.02
6s | Tango            | ALOTC-score 0.02
6s | Viennese waltz   | ALOTC-score 0.05
6s | Waltz            | ALOTC-score 0.02
```

```
10s | ChaCha          | ALOTC-score 0.76
10s | Jive            | ALOTC-score 0.62
10s | Quickstep       | ALOTC-score 0.02
10s | Rumba           | ALOTC-score 0.1
10s | Samba           | ALOTC-score 0.02
10s | Tango           | ALOTC-score 0.58
10s | Viennese waltz  | ALOTC-score 0.09
10s | Waltz           | ALOTC-score 0.49
```

```
8s | ChaCha           | ALOTC-score 0.03
8s | Jive             | ALOTC-score 0.07
8s | Quickstep        | ALOTC-score 0.49
8s | Rumba            | ALOTC-score 0.34
8s | Samba            | ALOTC-score 0.51
8s | Tango            | ALOTC-score 0.0
8s | Viennese waltz   | ALOTC-score 0.03
8s | Waltz            | ALOTC-score 0.02
```

```
12s | ChaCha          | ALOTC-score 0.07
12s | Jive            | ALOTC-score 0.2
12s | Quickstep       | ALOTC-score 0.09
12s | Rumba           | ALOTC-score 0.04
12s | Samba           | ALOTC-score 0.12
12s | Tango           | ALOTC-score 0.05
12s | Viennese waltz  | ALOTC-score 0.0
12s | Waltz           | ALOTC-score 0.21
```

4s，Quickstep 有很好的結果 0.91

6s，Jive 的 0.45 較為突出，但也沒有到很好

8s，Quickstep、Rumba、Samba 是相對於其它 genre 較好的

10s，ChaCha、Jive、Tango 有不錯的結果，Waltz 的也還可以

12s，Jive 和 Waltz 相較其他較高，但結果幾乎都偏低

autocorrelation tempogram

```
4s | ChaCha           | ALOTC-score 0.81
4s | Jive             | ALOTC-score 0.55
4s | Quickstep        | ALOTC-score 0.5
4s | Rumba            | ALOTC-score 0.78
4s | Samba            | ALOTC-score 0.55
4s | Tango            | ALOTC-score 0.67
4s | Viennese waltz   | ALOTC-score 0.6
4s | Waltz            | ALOTC-score 0.56
```

```
6s | ChaCha           | ALOTC-score 0.81
6s | Jive             | ALOTC-score 0.55
6s | Quickstep        | ALOTC-score 0.5
6s | Rumba            | ALOTC-score 0.78
6s | Samba            | ALOTC-score 0.55
6s | Tango            | ALOTC-score 0.67
6s | Viennese waltz   | ALOTC-score 0.6
6s | Waltz            | ALOTC-score 0.56
```

```
10s | ChaCha           | ALOTC-score 0.81
10s | Jive             | ALOTC-score 0.55
10s | Quickstep        | ALOTC-score 0.5
10s | Rumba            | ALOTC-score 0.78
10s | Samba            | ALOTC-score 0.55
10s | Tango            | ALOTC-score 0.67
10s | Viennese waltz   | ALOTC-score 0.6
10s | Waltz            | ALOTC-score 0.56
```

```
8s | ChaCha           | ALOTC-score 0.81
8s | Jive             | ALOTC-score 0.55
8s | Quickstep        | ALOTC-score 0.5
8s | Rumba            | ALOTC-score 0.78
8s | Samba            | ALOTC-score 0.55
8s | Tango            | ALOTC-score 0.67
8s | Viennese waltz   | ALOTC-score 0.6
8s | Waltz            | ALOTC-score 0.56
```

```
12s | ChaCha           | ALOTC-score 0.81
12s | Jive             | ALOTC-score 0.55
12s | Quickstep        | ALOTC-score 0.5
12s | Rumba            | ALOTC-score 0.78
12s | Samba            | ALOTC-score 0.55
12s | Tango            | ALOTC-score 0.67
12s | Viennese waltz   | ALOTC-score 0.6
12s | Waltz            | ALOTC-score 0.56
```

我發現改變 window length 之後，autocorrelation tempogram 的結果都沒有改變，不知道是不是哪裡出問題了 QQ

我用的方法是先算出 window length，如下

```
wl = int(round(s * sr / 512, 0))
```

再將它傳入 feature.tempogram 和 tempo_frequencies 中的參數，如下

```
tempogram = librosa.feature.tempogram(onset_envelope=oenv, sr=sr, win_length=wl)
freq = librosa.tempo_frequencies(n_bins=wl, sr=sr)
```

- **Q4**

```
ChaCha           | F-score 0.9
Jive             | F-score 0.67
Quickstep        | F-score 0.62
Rumba            | F-score 0.8
Samba            | F-score 0.57
Tango            | F-score 0.8
Viennese waltz   | F-score 0.74
Waltz            | F-score 0.65
```

基本上八個 genre 的結果都不算很低，ChaCha 有最好的結果 0.9

- **Q5**

```
SMC | F-score 0.34

JCS | F-score 0.65
```

這兩個 dataset 的 F-score 都比 Ballroom 的大部分低。
SMC 中的音樂多半是古典音樂、抒情歌等，不像 Ballroom 的舞曲具有強烈的節奏性，所以很容易被旋律拉著跑。雖然 JCS 中也有節奏性強烈的歌曲，不過因為結合了一些節奏變換，所以我猜這可能是它相較 Ballroom 中某些 genre 略低的理由。