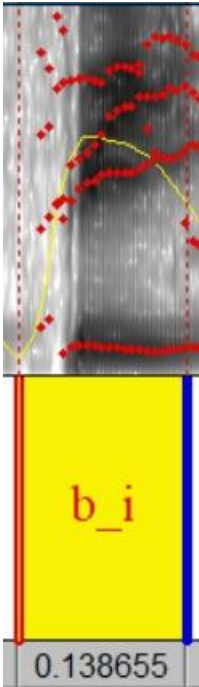
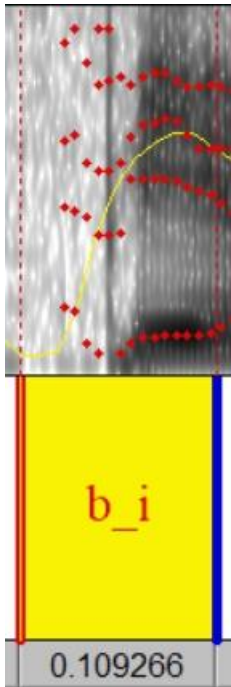
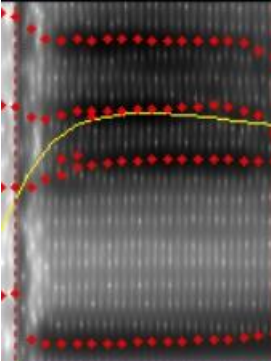
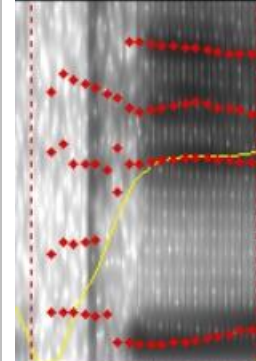
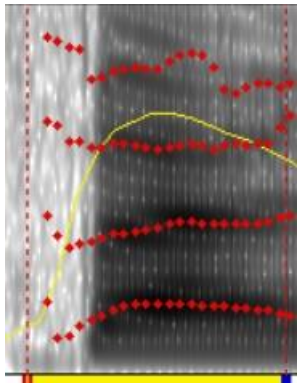
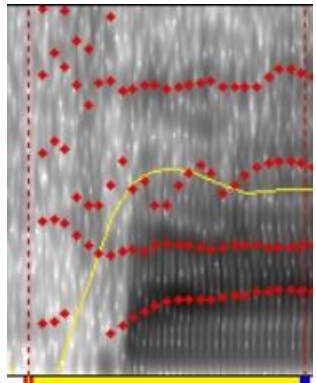
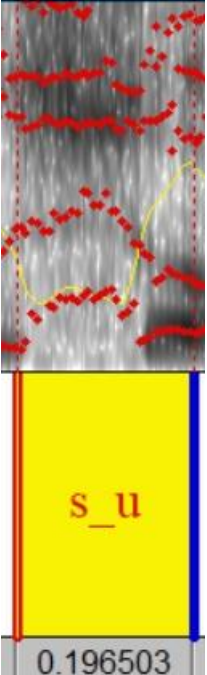
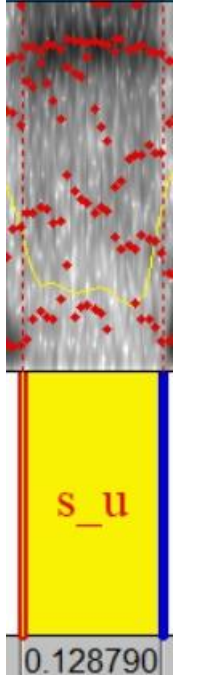
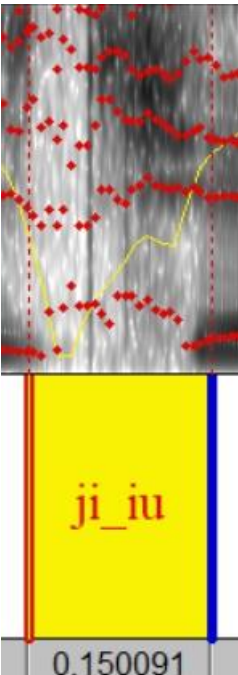
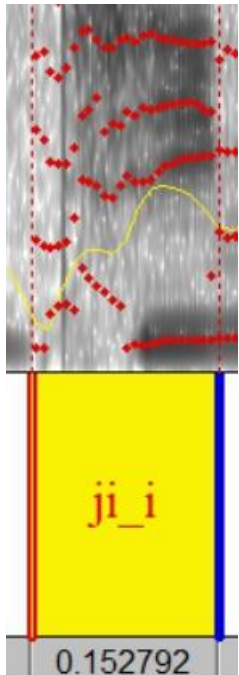


1. ㄅㄠ ㄅㄟㄝ ㄅ ㄌㄧㄠㄝ ㄅㄟㄣ ㄅㄠ
2. ㄅㄠ ㄇㄩ ㄘㄠ ㄅㄟㄣ ㄇㄟ ㄌ ㄈㄣ ㄟㄇㄣ
3. ㄅㄠ ㄅ ㄘㄧㄝ ㄘㄩ ㄅㄟㄠ ㄟㄣ ㄟㄠ ㄇㄠㄟ
4. ㄈㄠ ㄟㄟ ㄌㄟㄣ ㄅㄟㄣ ㄈㄠ ㄇㄩ
5. ㄅㄠ ㄟㄠ ㄅㄠㄟ ㄅㄠㄟ ㄇㄠㄟ ㄇㄠㄟ ㄅㄠ
6. 目前純種土黃牛大約剩下九百頭(太長省略注音)

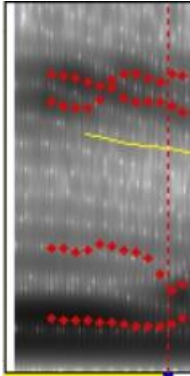
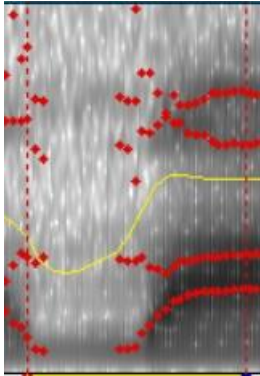
◆ Part2

Plosive	b[ㄅ]		
---------	------	--	--

<p>Plosive</p>	<p>d[ㄉ]</p>	 <p>d_i</p> <p>0.106451</p>	 <p>d_i</p> <p>0.128032</p>
<p>Fricative</p>	<p>f[ㄈ]</p>	 <p>f_a</p> <p>0.144851</p>	 <p>f_a</p> <p>0.154037</p>

Fricative	s[ㄴ]		
Affricate	ji[ㅈ]		

Affricate	ch[𐌸]	<p>A spectrogram showing the frequency spectrum of the affricate 'ch_u'. The x-axis represents time, and the y-axis represents frequency. A yellow line indicates the first formant (F1), which starts at a low frequency and rises sharply. Red dots represent the second formant (F2), which remains relatively stable. The spectrogram is overlaid on a yellow rectangular region labeled 'ch_u'.</p> <p>ch_u</p> <p>0.171058</p>	<p>A spectrogram showing the frequency spectrum of the affricate 'ch_a'. The x-axis represents time, and the y-axis represents frequency. A yellow line indicates the first formant (F1), which starts at a low frequency and rises sharply. Red dots represent the second formant (F2), which remains relatively stable. The spectrogram is overlaid on a yellow rectangular region labeled 'ch_a'.</p> <p>ch_a</p> <p>0.172033</p>
Nasal	n[𐌹]	<p>A spectrogram showing the frequency spectrum of the nasal 'n_i'. The x-axis represents time, and the y-axis represents frequency. A yellow line indicates the first formant (F1), which starts at a low frequency and rises sharply. Red dots represent the second formant (F2), which remains relatively stable. The spectrogram is overlaid on a yellow rectangular region labeled 'n_i'.</p> <p>n_i</p> <p>0.132745</p>	<p>A spectrogram showing the frequency spectrum of the nasal 'n_i'. The x-axis represents time, and the y-axis represents frequency. A yellow line indicates the first formant (F1), which starts at a low frequency and rises sharply. Red dots represent the second formant (F2), which remains relatively stable. The spectrogram is overlaid on a yellow rectangular region labeled 'n_i'.</p> <p>n_i</p> <p>0.109482</p>

Nasal	m[ㄇ]	 m_u 0.086251	 m_a 0.178109
-------	--------	--	--

◆ Part3 Q1

✚ Plosive

1. Intensity 都會從低到高
2. Formant 最下面的與下面數來第二條的差距會很大
3. Formant 從上面數來三條都比較密集
4. 發音的時間相較其他發音時間較短一點

✚ Fricative

1. Intensity 的改變幅度大
2. 同樣的發音 Intensity 相似度大
3. 同樣的發音 Formant 有的會比較發散，有的會比較集中


✚ Affricate


1. 發音的時間相較其他發音時間較長一點
2. Intensity 的改變變化是下~上~下~上
3. Formant 前面的紅點比較發散一點

Nasal

1. 當 Intensity 往下的時候會沒有 Formant
2. 當 Intensity 平滑時 Formant 很規律以及密集
3. 同樣的發音 Intensity & Formant 可能差異很大

◆ Part3 Q2

 Boundary 算一點點 clear，由上面的 ji_iu & ji_i 和 ch_u & ch_a 和 m_u & m_a 的 Intensity & Formant 還看得出一些端倪不同

 RCD 的優點是：

右邊對左邊的影響力比較大，所以可以更精準的辨識正確的 Syllable

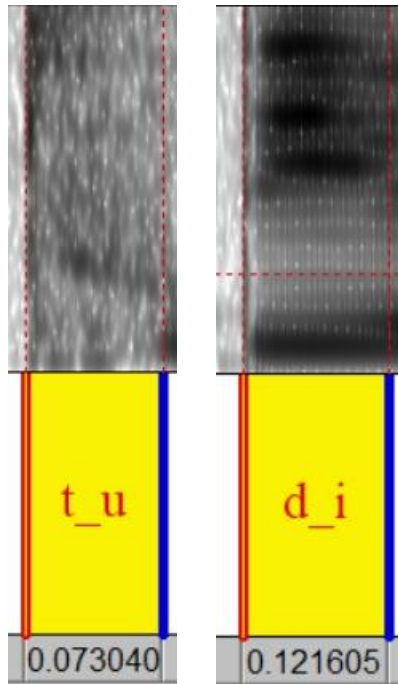
◆ Part3 Q3

Compare ㄉ & ㄊ：

ㄉ的 spectrogram 會比較深且是橫向發展的

ㄊ的 spectrogram 會比較淺且是直向發展的

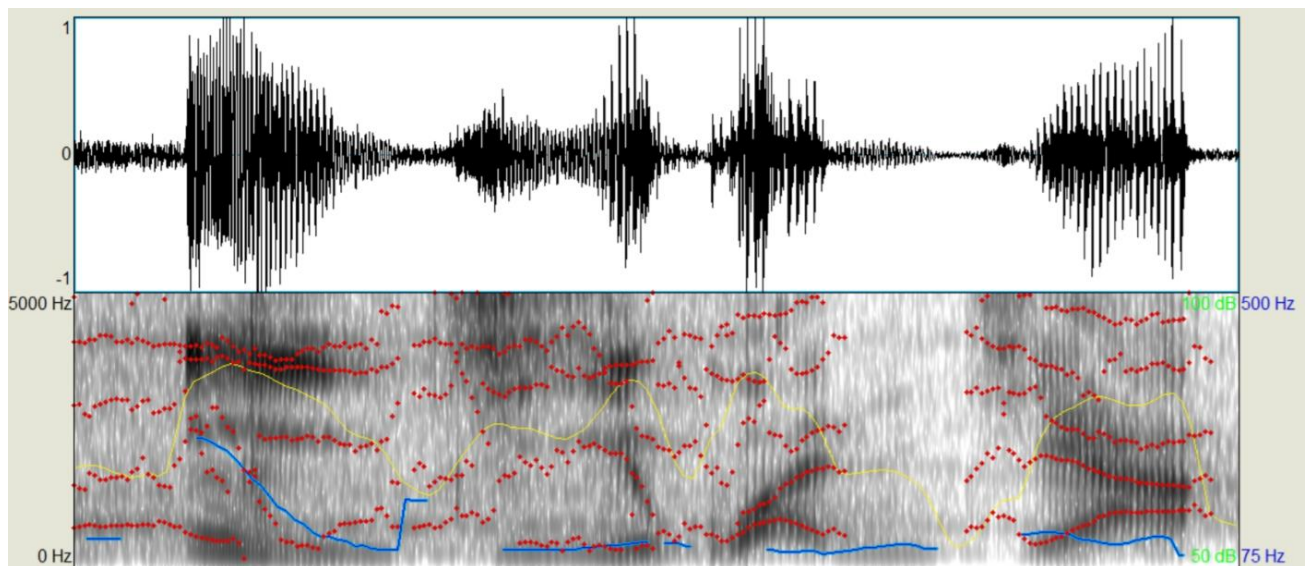
下面有範例圖



◆ Part3 Q4

有些 spectrogram 有明顯的深淺、紋路、深淺區塊的變化
就容易分辨 initials from finals

◆ Bonus



Plosive (ㄊ) – Fricative(ㄘ) – Affricate (ㄊ) – Nasal (ㄋ)

1. Plosive (ㄊ)前段的 Intensity 從低到高幅度成長明顯，以及

spectrogram 明顯淺深變化因此判定為 Plosive

2. 因為第二段的 Intensity 有上下起伏所以判斷為 Fricative
3. 因為第三段的 Intensity 從下上波盪所以判斷為 Affricate
4. 最後一段的 Intensity 比較平滑沒有起伏故判斷為 Nasal