

A Supervised Learning Approach to the Behavior of “Soul Dominants” in the McGill Billboard Corpus

Table 1: Bass note transitions in the McGill Billboard Corpus from an eleventh chord (the antecedent, “Ant.”) to the ensuing chord (the consequent, “Cons.”).

Ant. ↓ \ Cons. →	$\hat{1}$	$\flat\hat{2}$	$\hat{2}$	$\flat\hat{3}$	$\hat{3}$	$\hat{4}$	$\#\hat{4}$	$\hat{5}$	$\flat\hat{6}$	$\hat{6}$	$\flat\hat{7}$	$\hat{7}$
$\hat{1}$	405	8	4	2	0	47	0	1	63	4	3	0
$\flat\hat{2}$	0	3	0	0	0	0	0	0	0	0	0	0
$\hat{2}$	1	0	3	0	0	0	0	47	0	0	0	0
$\flat\hat{3}$	0	0	0	0	0	0	0	0	0	0	0	0
$\hat{3}$	0	0	0	0	6	0	0	0	0	0	0	0
$\hat{4}$	30	0	0	12	0	28	0	13	1	3	0	0
$\#\hat{4}$	1	0	0	0	8	0	8	0	0	0	0	5
$\hat{5}$	464	17	11	0	40	94	9	129	26	55	9	0
$\flat\hat{6}$	0	4	0	0	0	0	0	0	0	0	2	0
$\hat{6}$	3	0	1	0	8	0	0	3	0	43	0	1
$\flat\hat{7}$	68	0	0	11	0	3	0	2	0	0	14	5
$\hat{7}$	0	0	0	0	0	0	0	0	0	0	0	0

Table 2: Error matrix for an algorithm wherein an eleventh chord approached by P4 or P5 in the bass voice predicts resolution by descending P5. Accuracy denotes the percent correctly classified overall; sensitivity denotes the percent of soul dominants correctly classified; specificity denotes the percent of non-soul dominants correctly classified.

	Predicted Resolution \neq \downarrow P5		Predicted Resolution = \downarrow P5		
	Observed	Expected	Observed	Expected	
Resolution \neq \downarrow P5	936	809.60	226	352.40	1162
Resolution = \downarrow P5	277	403.40	302	175.60	579
	1213		528		1741

Accuracy = $(936+302)/1741 = 71\%$
 Sensitivity = $302/579 = 52\%$
 Specificity = $936/1162 = 81\%$

Table 3: Error matrix for an algorithm wherein an eleventh chord with $\hat{5}$ in the bass and a chord offset **not** on a weak beat predicts resolution by descending P5.

	Predicted Resolution \neq \downarrow P5		Predicted Resolution = \downarrow P5		
	Observed	Expected	Observed	Expected	
Resolution \neq \downarrow P5	857	648.74	305	513.26	1162
Resolution = \downarrow P5	115	323.26	464	255.74	579
	972		769		1741

Accuracy = $(857+464)/1741 = 76\%$
 Sensitivity = $464/579 = 80\%$
 Specificity = $857/1162 = 74\%$

Example 1: The first four measures of the first verse of Earth, Wind & Fire’s “After the Love Has Gone.” All chord symbols are taken from the McGill Billboard Corpus transcription; staff notation has been supplied by the author. Both algorithms decline to predict bass resolution by descending P5 (bass of “B♭maj/9” not approached by P4 or P5; weak-beat chord offset).

0:14

For a-while, to love was all we could do. We were young and we knew, and our eyes were a-live, deep in-side we knew our love was true. For a

Fmaj(9) Faug(9) Fmaj(9) Amin7 Dmin B♭maj7 E♭maj7 B♭maj/9 C7

Example 2: The last four measures of the first chorus of the Commodores’ “Easy.” Both algorithms incorrectly predict a leap of a descending P5 in the bass across mm. 2–3. Algorithm B correctly predicts the resolution of the second “D♭maj/9” (mm. 3–4).

1:02

eas - y I'm eas - y like Sun-day morn - ing

Abmaj Cmin7 B♭min7 D♭maj/9 G♭maj D♭maj/3 D♭maj/9 Abmaj

P4 5

Example 3: The first eight measures of Tina Turner’s “What’s Love Got to Do With It.” Both algorithms decline to predict bass resolution by descending P5 (bass of “F♯maj/9” is $\hat{1}$ of G-sharp minor, approached by common tone from the previous chord).

0:00

G♯min7 G♯min7 F♯maj/9 F♯maj/9 G♯min7 G♯min7 F♯maj/9 F♯maj/9

Electric Guitar

Electric Bass

$\hat{1}$ $\hat{1}$ $\hat{1}$