

# BEBOPNET: DEEP NEURAL MODELS FOR PERSONALIZED JAZZ IMPROVISATIONS - SUPPLEMENTARY MATERIAL

## 1. SUPPLEMENTARY MUSIC SAMPLES

We provide a variety of MP3 files of generated solos in:  
<https://shunithaviv.github.io/bebopnet>

Each sample starts with the melody of the jazz standard, followed by an improvisation whose duration is one chorus. Sections `BebopNet in sample` and `BebopNet out of sample` contain solos of BebopNet without beam search over chord progressions in and out of the imitation training set, respectively. Section `Diversity` contains multiple solos over the same standard to demonstrate the diversity of the model for user-4. Section `Personalized Improvisations` contain solos following the entire personalization pipeline for the four different users. Section `Harmony Guided Improvisations` contain solos generated with a harmonic coherence score instead of the user preference score, as described in Section 3.2. Section `Pop songs` contains solos over the popular non-jazz song. Some of our favorite improvisations by BebopNet are presented in the first section, `Our Favorite Jazz Improvisations`.

## 2. METHODS

### 2.1 Dataset Details

A list of the solos included in our dataset is included in section 4.

### 2.2 Musical Preference Labeling System

A figure of our CRDI variant is presented in Figure 1<sup>1</sup>.

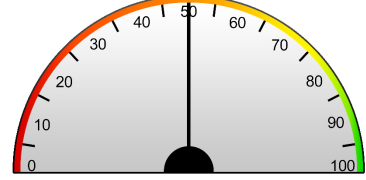
### 2.3 beam search

A pseudo code of the beam search  $\psi$  procedure is presented in Algorithm 1.

#### 2.3.1 Beam Search - Complexity Analysis

In terms of time complexity, for every time step, we forward the  $b$  sequences of length  $t$  through the two networks  $f_\theta$  and  $g_\phi$ . A naïve implementation would amount to  $\mathcal{O}(b \cdot t^2)$  time complexity and  $\mathcal{O}(b \cdot t)$  space complexity. Using simple bookkeeping, passing the entire sequences through the networks can be avoided, thus reducing time complexity to  $\mathcal{O}(b \cdot t)$  as well. We note that in modern frameworks, it is natural to efficiently implement the multiple forwards through the network in parallel as one would forward a batch.

<sup>1</sup> Image credit: <https://github.com/Andrew-Shay/python-gauge>



**Figure 1.** Digital CRDI controlled by a user to provide continuous preference feedback.

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### Algorithm 1: Score-based beam search $\psi$

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**Input:** jazz model  $f_\theta$ , score model  $g_\phi$ , batch size  $b$ , beam size  $k$ , update interval  $\delta$ , input sequence  $X_\tau^{in} = x_1 \dots x_\tau \in \mathcal{X}^\tau$

**Output:** sequence  $X_{\tau+T} = x_1 \dots x_{\tau+T} \in \mathcal{X}^{\tau+T}$   
 $V_b = [X_\tau^{in}, X_\tau^{in}, \dots, X_\tau^{in}] \in \mathcal{X}^{\tau \times b}$ ;

$scores = \underbrace{[-1, -1, \dots, -1]}_{b \text{ times}} \in \mathcal{R}^b$

**for** step  $t$  in  $\tau, \tau + 1, \dots, \tau + T$  **do**

**for** sequence  $X_t^i$  in  $V_b$  **do**

$Pr(s_{t+1}|X_t^i, c_{t+1}^i) = f_\theta(X_t^i, c_{t+1}^i)$ ;

$s_{t+1}^i \sim Pr(s_{t+1}|X_t^i, c_{t+1}^i)$ ;

$x_{t+1}^i = (s_{t+1}^i, c_{t+1}^i)$ ;

$X_{t+1}^i = x_1^i \dots x_{t+1}^i$ ;

$scores[i] = g_\phi(X_{t+1}^i)$

**end**

$V_b = [X_{t+1}^1, X_{t+1}^2, \dots, X_{t+1}^b] \in \mathcal{X}^{(t+1) \times b}$ ;

**if**  $(t - \tau) \bmod \delta = 0$  **then**

$topk\_inds = \underset{i}{\text{k-argmax}} \text{ scores}$ ;

**for**  $i$  in  $1, 2, \dots, b$  **do**

$V_b[i] = V_b[topk\_inds[i \bmod k]]$

**end**

**end**

**end**  
 $X_{\tau+T} = \underset{X}{\text{argmax}} \text{ score}(V_b)$

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### 3. EXPERIMENTS

#### 3.1 Hyper-parameter search

Hyper-parameters for both models were selected by performing a manual coarse-to-fine search. Table 1 displays considered and chosen hyper-parameters for  $f_\theta$ . For user preference metric learning, we chose hyper-parameters using five-fold cross-validation over the training set. The five models used for cross-validation were later combined as an ensemble model. We show the considered hyper-parameters in Table 2. Table 3 presents the hyper-parameters considered for the beam search.

#### 3.2 Harmonic Guided Generation

An alternate known generative approach to the one we propose in our paper is to maximize a predefined reward function based on music theory, see, e.g., [1, 2], rather than a user-specific metric. This approach, similar to “reward hacking” common in RL [3], may lead to undesired results. To examine a simple baseline using this method, we generated samples from BebopNet that are optimized to play notes within the harmony. We then used the harmony coherence metric (for scales), as discussed in Section 6 in our paper, and applied beam-search with it. The resulting optimized solos successfully maximized this harmonic coherence metric. One can listen to the generated solos that appear in the supplementary music samples. Perhaps unsurprisingly, the use of this handcrafted metric resulted in a degraded performance where the solos were biased to prefer repeating notes that match the chord.

#### 3.3 Per-User Personalization

##### 3.3.1 Elicitation Process

We applied our proposed pipeline on four users, all of whom are amateur jazz musicians. Each of the users has a few years of experience in jazz improvisation, however, music is not their main profession. For each user, the elicitation process took place in one session of 5 hours in front of a desktop. The users used the computer keyboard arrows to change the CRDI meter while they listened to the improvisations with headphones. Before playing each improvisation, the name of the standard over which the improvisation is played is shown. The user may choose to play the melody of the standard before listening to the improvisation to familiarize themselves with the standard.

##### 3.3.2 Results

Below we present the analysis for all users. Figures 2, 3, 4, 5, present the histograms of predictions over sequences from the validation set for all users. Table 4 presents the thresholds selected for selective prediction for each user. Different users indeed exhibit different taste. One such contrast is the first-order statistics of users 1 and 2. While user-1 labeled a large proportion of the data as negative, user-2 labeled most of it as positive. In contrast to the two above, user-3 has a high level of neutral sequences, which may indicate uncertainty in his preference. In Figure 6 we

can see a similar behavior in all the users’ models  $g_\phi$ : the beam size increases the score obtains grows up to an optimal point. A noticeable improvement of the user preference score is achieved for all the users, as we compare the initial score for BebopNet (when  $beam\_width = 1_1$ ) to the top score achieved with beam search and the preference model.

#### 3.4 Plagiarism Analysis

As described in Plagiarism section, we present here the plagiarism analysis results. Table 3.4 presents the average longest sub-sequence between any two artists. The diagonal of this table represents “self-plagiarism”. Figure 7 displays the percent of identical sequences in length  $n$  per artist.

Hyper-parameter	Lowest considered	Top considered	Chosen
Number of layers	2	4	3
Learning rate	$1e^{-3}$	5	$5e^{-1}$
Weight decay	$1e^{-7}$	$1e^{-2}$	$1e^{-6}$
Dropout	0	0.8	0
Number of epochs	100	600	500
Batch size	32	512	256
Sequence Length	8	150	100

**Table 1.** Hyper-parameter search: considered range and chosen values for note prediction

Hyper-parameter	Lowest considered	Top considered	Chosen
Pitch embedding size	64	1024	256
Duration embedding size	64	1024	256
Hidden size	128	2048	512
Number of layers	1	4	3
Learning rate	$1e^{-2}$	5	$1e^{-1}$
Weight decay	$1e^{-7}$	$1e^{-2}$	$1e^{-6}$
Dropout	0.4	0.8	0.9
Number of epochs	50	200	100
Batch size	32	64	32
Sequence Length	8	32	16

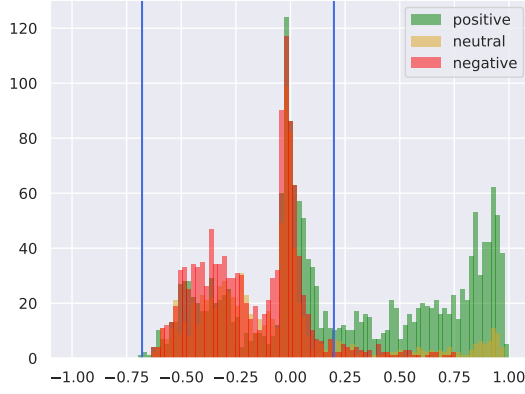
**Table 2.** Hyper-parameter search: considered range and chosen values for user preference metric learning

Hyper-parameter	Lowest considered	Top considered	Chosen
Beam width	2	500	32
$k$	2	100	8
Beam depth	1 note	4 measures	2 measures

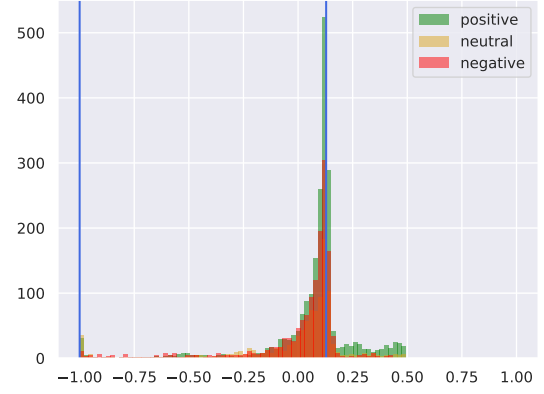
**Table 3.** Hyper-parameter search: considered range and chosen values for the beam search

User	$\beta_1$	$\beta_2$
1	-0.679	0.198
2	-0.999	0.128
3	-0.515	0.086
4	-0.865	0.158

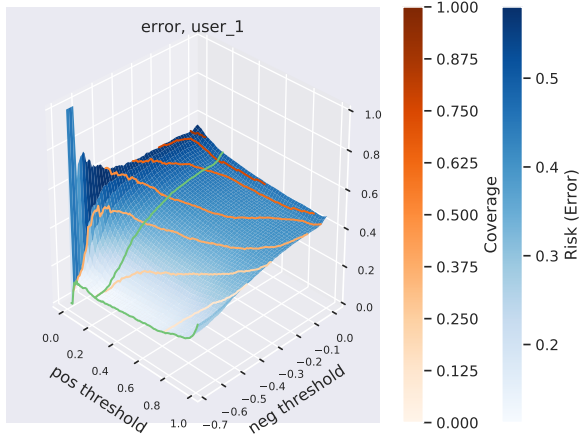
**Table 4.**  $\beta_1, \beta_2$  for every user.  $\beta_1, \beta_2$  are defined to be the thresholds that yield minimum error on the contour of 25% coverage.



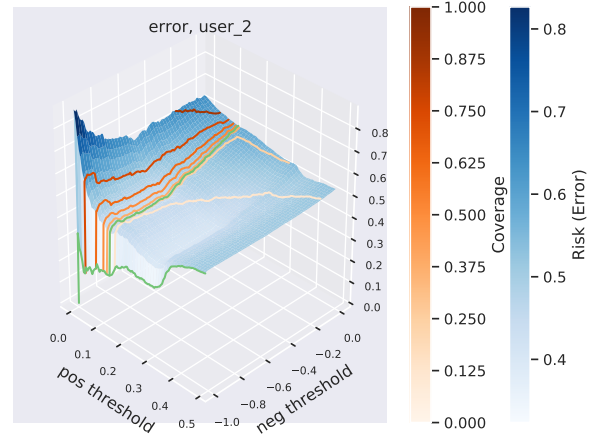
i Histogram of predictions - user 1



i Histogram of predictions - user 2



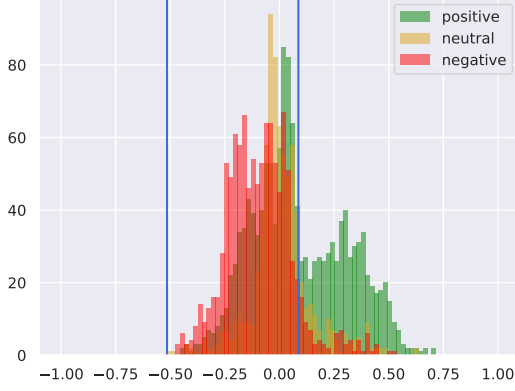
ii Risk-coverage plot - user 1



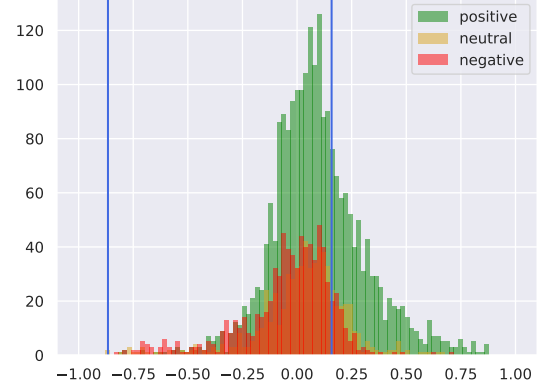
ii Risk-coverage plot - user 2

**Figure 2.** User 1: 2i Predictions of the preference model on sequences from a validation set. Green: sequences labeled with a positive score ( $y_\tau > 0$ ); yellow: neutral ( $y_\tau = 0$ ); red: negative ( $y_\tau < 0$ ). Blue vertical line indicates thresholds  $\beta_1, \beta_2$  used for selective prediction. 2ii Risk-coverage plot for the predictions of the preference model.  $\beta_1, \beta_2$  (green lines) are defined to be the thresholds that yield minimum error on the contour of 25% coverage.

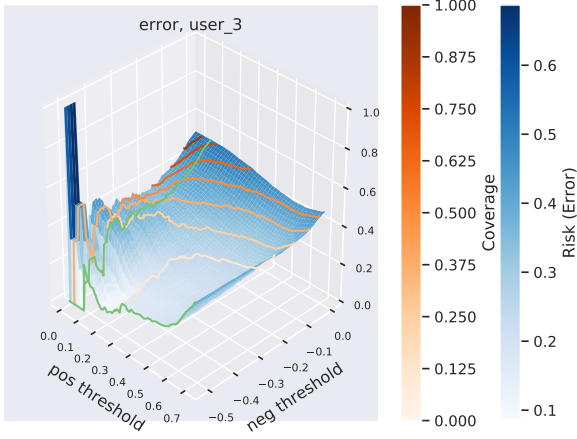
**Figure 3.** User 2: 3i Predictions of the preference model on sequences from a validation set. Green: sequences labeled with a positive score ( $y_\tau > 0$ ); yellow: neutral ( $y_\tau = 0$ ); red: negative ( $y_\tau < 0$ ). Blue vertical line indicates thresholds  $\beta_1, \beta_2$  used for selective prediction. 3ii Risk-coverage plot for the predictions of the preference model.  $\beta_1, \beta_2$  (green lines) are defined to be the thresholds that yield minimum error on the contour of 25% coverage.



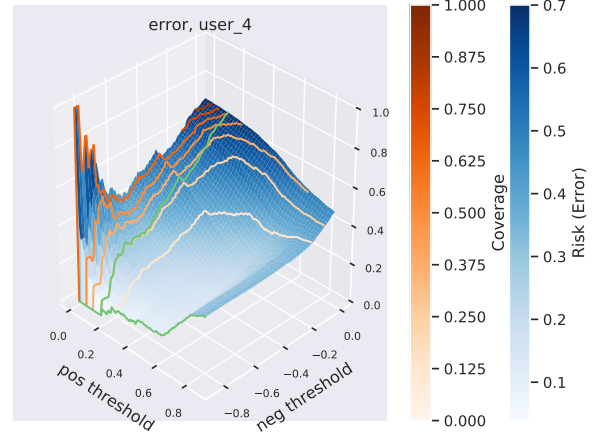
i Histogram of predictions - user 3



i Histogram of predictions - user 4



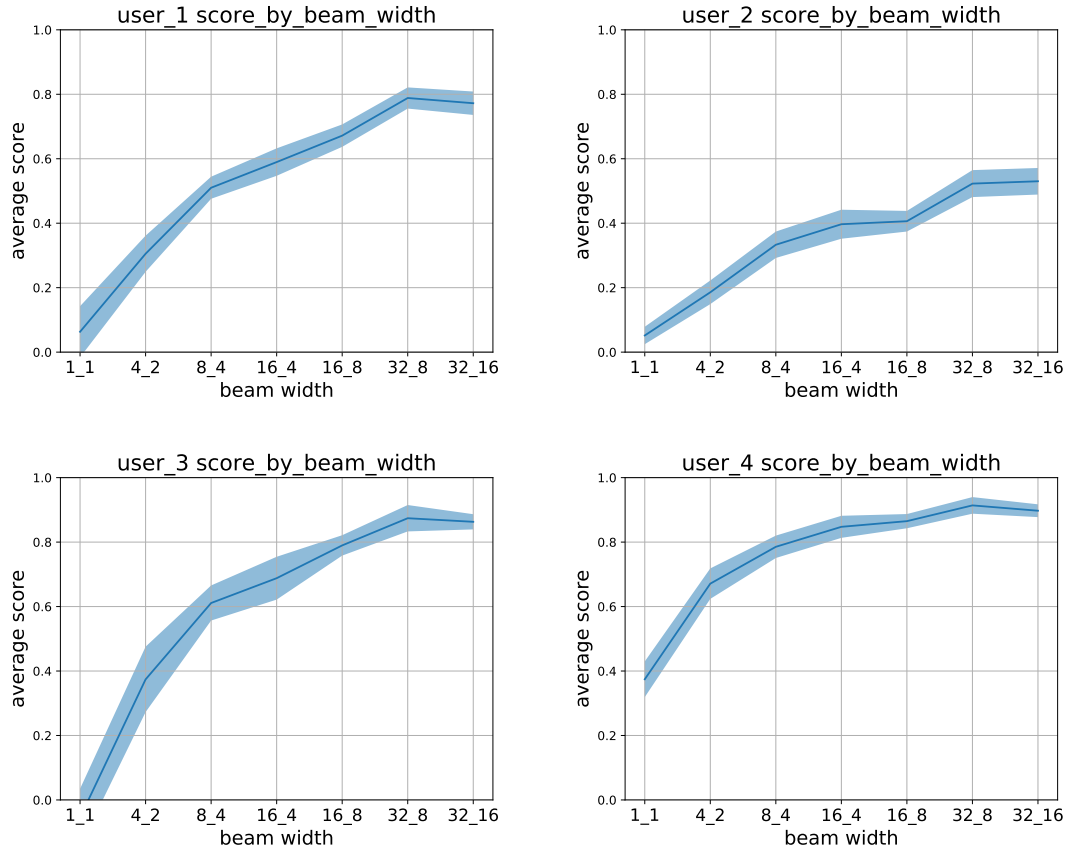
ii Risk-coverage plot - user 3



ii Risk-coverage plot - user 4

**Figure 4.** User 3: 4i Predictions of the preference model on sequences from a validation set. Green: sequences labeled with a positive score ( $y_\tau > 0$ ); yellow: neutral ( $y_\tau = 0$ ); red: negative ( $y_\tau < 0$ ). Blue vertical line indicates thresholds  $\beta_1, \beta_2$  used for selective prediction. 4ii Risk-coverage plot for the predictions of the preference model.  $\beta_1, \beta_2$  (green lines) are defined to be the thresholds that yield minimum error on the contour of 25% coverage.

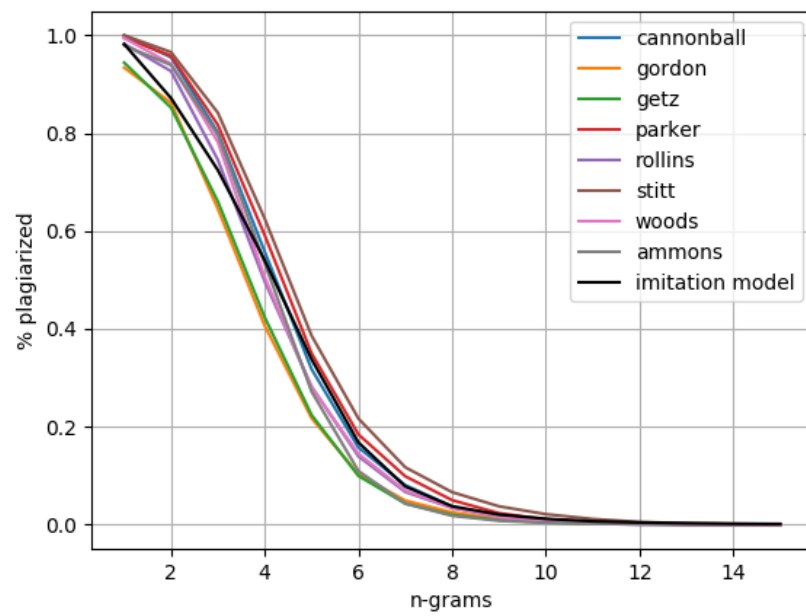
**Figure 5.** User 4: 5i Predictions of the preference model on sequences from a validation set. Green: sequences labeled with a positive score ( $y_\tau > 0$ ); yellow: neutral ( $y_\tau = 0$ ); red: negative ( $y_\tau < 0$ ). Blue vertical line indicates thresholds  $\beta_1, \beta_2$  used for selective prediction. 5ii Risk-coverage plot for the predictions of the preference model.  $\beta_1, \beta_2$  (green lines) are defined to be the thresholds that yield minimum error on the contour of 25% coverage.



**Figure 6.** User Score vs. Beam Width: As we increase the width of the beam, we get a higher score for generated solos using the user preference model.  $x$ -axis -  $b_k$  combinations of beam width  $b$  and parameter  $k$  used. Shaded area represents the 95% percentile of the confidence interval. Notice the initial point of beam width 1\_1 representing the score for improvisations generated by BebopNet without personalization.

Name	Adderley	Gordon	Getz	Parker	Rollins	Stitt	Woods	Ammons	Mean	Ours
Adderley	4	6	6	4.7	5.7	4.5	5	4.5	5	6.2
Gordon	3.4	6.4	5.1	4.2	4.6	3.8	3.5	4.2	4.4	4.6
Getz	3.3	4.6	5.7	4.4	4.2	3.8	3.5	4.2	4.2	4
Parker	3.7	5	5.1	6	5.1	4.1	3.6	5	4.7	4.3
Rollins	3.6	4.9	4.6	4.4	4.7	3.8	3.5	4.2	4.2	4.1
Stitt	4	7	7.2	5.6	5	10.3	4.1	5.6	6.1	4.7
Woods	4.1	5	5.8	4.8	5.4	4.4	5.4	5.1	5	3.8
Ammons	3.3	4.8	4.8	3.9	4.3	4	3.6	5.3	4.2	3.9
Mean	3.7	5.5	5.5	4.7	4.9	4.8	4	4.8	-	4.4
Ours	2.7	3.9	3.8	3	3.4	2.8	2.8	3.6	3.3	3.8

**Table 5.** Plagiarism among 8 jazz saxophone giants. Element  $x_{a,b}$  in the table is the average largest sub-sequence in a solo of artist  $a$  (row names) found in any solo of artist  $b$  (column names).



**Figure 7.** Percent of common phrases of length  $n$ -gram length. Our jazz model is in black (imitation model).

#### 4. JAZZ DATASET (XML FILES)

2 Autumn Leaves Sonny Stitt Good Life  
003 Tenor Madness Coltrane Rollins Prestige  
004 Serpents Tooth Take 1 Rollins and Bird  
5 Serpents Tooth Rollins Bird Take 2  
9 Autumn Leaves Stitt Ammons Boss Tenors  
12 Scrapple from the Apple Dexter Gordon Our Man in Paris  
15 Just Friends Bird with Strings  
38 Summertime Stitt A Jazz Message  
40 Ive Got Rhythm Stitt Tune up  
073 P208-209 GIRL FROM IMPANEMA GETZ  
85 My Man Benny Woods  
115 Blue Seven Sonny Rollins  
126 I Remember You Charlie Parker Verve  
134 God Bless The Child Rollins  
150 Four Rollins Live  
156 Cheese Cake Dexter Gordon Go  
162 I Want More Dexter Gordon  
163 For Regulars Only Alt Dexter Gordon  
164 Airegin Sonny Rollins  
173 I Cant Give You Anything But Love Stitt  
174 Soon Cannonball  
212 Webb City Sonny Stitt Constellation  
218 Embraceable You Phil Woods Cool Woods  
219 Yesterdays Phil Woods Just Friends  
224 Out of Nowhere Stan Getz Roost  
228 Jumpin the Blues Charlie Parker J McShann  
239 Pennies From Heaven Stan Getz Roost  
242 St Thomas Sonny Rollins  
255 Ornithology Charlie Parker Roost Live  
267 Im Forever Blowing Bubbles Charlie Parker J McShann  
285 Cherokee Charlie Parker Trio  
288 My Heart Tells Me Charlie Parker  
295 Walkin Phil Woods This is How I Feel About Jazz  
299 Indian Summer Phil Woods The NY Scene  
300 Groovin High Charlie Parker  
311 Things Are Getting Better Cannonball Adderley  
348 Im A Fool To Want You Dexter Gordon Blue Note  
361 Moritat Sonny Rollins Saxophone Collossus  
381 Heres That Rainy Day Stan Getz for Lovers  
382 Cry Me A River Dexter Gordon Blows Hot and Cool  
391 On a Slow Boat To China Stan Getz Soul Eyes  
394 Line For Lyons Stan Getz Chet Baker Live in Sweden part1  
394 Line For Lyons Stan Getz Chet Baker Live in Sweden part2  
395 Ernies Tune Dexter Gordon Blue Note  
404 Daddy Plays The Horn Dexter Gordon  
408 Everybodys Somebodys Fool Dexter Gordon Blue Note  
424 Dont Explain Dexter Gordon A Swingin Affair  
428 This Cant Be Love Stan Getz in HiFi  
429 There Will Never Be Another You Sonny Sitt Roost  
430 Ratio Sonny Stitt In The Beginning  
453 Ornithology Sonny Stitt Stitt play Bird  
458 As Time Goes By Dexter Gordon Round Midnight  
469 Our Love is Here to Stay Phil Woods Jazz For The Carraige Trade  
480 April in Paris Charlie Parker with Strings  
529 Sunshower Stan Getz Ballads n Bossas The Lost Sessions  
534 E Luxo So Stan Getz Jazz Samba  
536 Hush a Bye Stan Getz Soul Eyes



551 O Grande Amor Stan Getz Sweet Rain  
557 Manha de Carnaval Getz Big Band Bossa Nova  
560 Stans Blues Getz Gilberto 2  
594 Billies Bounce Charlie Parker Take 5  
622 Nows The Time Take 3 Bird Savoy  
625 Tanya Dexter Gordon 1 Flight Up  
627 Nows The Time Take 4 Bird Savoy  
638 So Danco Samba Stan Getz w Gilberto  
643 Clear Cut Boogie Rollins Global Warming  
644 I remember You Gentle Jug Gene Ammons  
659 Star Eyes Dexter Art of the Ballad  
670 Vivo Sohando Stan Getz Gilberto  
679 Im Just Waiting on A Friend Sonny Rollins Stones Tattoo You  
690 WNEW Stan Getz and Bill Evans  
712 Laura Charlie Parker With Strings  
722 Nobody Else But Me Stan Getz Plays  
738 Hanky Panky Dexter Gordon Blue Note  
741 Doralice Stan Getz Gilberto  
763 Corcovado Cannonball Adderleys Bossa Nova  
766 Moonlight In Vermont Stan Getz for Lovers  
787 I Know That You Know Rollins Sonny Side Up  
793 Salvador Sonny Rollins This is What I Do  
797 Blue Room Sonny Rollins Rogers Hart Songbook  
819 Walkin Bass Phil Woods plays Henry Mancini  
820 On The Sunny Side of the Street Sonny Stitt Sunny Side Up  
826 Three Oclock on the Morning Dexter Gordon Go  
836 Voce e Eu Stan Getz Gilberto 2  
840 Corcovado Stan Getz w Guest Laurindo Almeida  
852 Everything Happens to Me Charlie Parker with Strings  
861 Exactly Like You Stan Getz Ballads  
867 Have Yourself a Merry Christmas Dexter Gordon  
871 Counter Clockwise Gene Ammons Boss Tenors  
871 Counter Clockwise Stitt Jug Boss Tenors  
914 Love Jumped Out Stan Getz Recorded Fall 61 - Tenor Sax  
935 Summertime Stan Getz The Definitive  
953 Moose The Mooch Charlie Parker  
982 Anthropology Charlie Parker  
988 Dewey Square Charlie Parker  
1006 Boston Bernie Dexter Gordon Long Tall Dexter  
1019 Meditation Dexter Gordon The Art of the Ballad  
1039 Girl from Ipanema Getz Live TV Show  
1052 You Talk the Talk Gene Ammons Greatest Hits of 70s  
1054 Outra Vez Stan Getz 1984 w guest artist Laurindo Almeida  
1059 Of Thee I Sing Stan Getz West Coast Jazz 1955  
1065 Blues For Alice Charlie Parker  
1070 KC Blues Charlie Parker  
1078 On a Slow Boat to China Getz Last Recording  
1129 Manha De Carneval Dexter Gordon Gettin Around  
1132 Summertime Charlie Parker With Strings  
1137 Satin Doll Gene Ammons Organ Combos  
1144 Jordu Stan Getz Jazz Masters 8  
1152 The Christmas Song Dexter Gordon The Panther  
1164 Our Love is Here to Stay Dexter Gordon Blue Note  
1167 Red Top Gene Ammon Johnny Coles Savoy  
1171 Dr Wu Phil Woods Katy Lied  
1182 Flick of a Trick Dexter Gordon Gettin Around  
1184 I Want to be Happy Stan Getz w Oscar Peterson  
1186 Kateas Dance Gene Ammons Legends of Acid Jazz

1193 But Not For Me Stan Getz Quintessence V1  
 1194 One Note Samba Stan Getz au Go Go  
 1197 Samba Triste Stan Getz Rio For Lovers  
 1202 Fuzzy Gene Ammons Savoy Sessions  
 1212 As Time Goes By Dexter Gordon Manhattan Symphony  
 1260 Para Machucar meu Coracao Stan Getz Gilberto  
 1279 Wave Stan Getz YouTube  
 1322 Winter Moon Stan Getz Girl From Ipanema 89  
 1324 Love for Sale Dexter Gordon Go  
 1336 2nd Balcony Jump Dexter Gordon Go  
 1351 Broadway Dexter Gordon Our Man in Paris  
 1396 Soy Califa Dexter Gordon Swinin Affair  
 1405 You Stepped Out Of A Dream Dexter Swingin Affair  
 1419 The Backbone Dexter Gordon A Swinin Affair  
 1429 Until The Real Thing Comes Along Dexter Gordon A Swingin Affair  
 1433 McSplivens Dexter Gordon A Swingin Affair  
 1437 Who Can I Turn To Dexter Gordon Gettin Around  
 1441 Heartaches Dexter Gordon Gettin Around  
 1446 Shiny Stockings Dexter Gordon Gettin Around  
 1451 Le Coiffeur Dexter Gordon Gettin Around  
 1454 Very Saxily Yours Dexter Gordon Gettin Around  
 1488 With a Song in My Heart Sonny Rollins Young Rollins  
 1495 Menina Moca Stan Getz Bossa Nova Years  
 1516 Early Autumn Stan Victor W Herman 56 - Tenor Sax  
 1542 Love For Sale Charlie Parker Plays Standards  
 1548 Stanley The Steamer Dexter Gordon Tower of Power  
 1553 East of the Sun Stan Getz with European Friends  
 1555 Tinys Tempo Charlie Parker Take 3  
 1558 Tinys Tempo Charlie Parker Take 1  
 1562 Tinys Tempo Charlie Parker Take 2  
 1573 Lady Bird Stan Getz with European Friends  
 1581 Stans Blues Stan Getz Anniversary  
 1605 Doxy Sonny Rolins Bags Groove  
 1623 In Your Own Sweet Way Phil Woods Warm Woods  
 1637 Hershey Bar Stan Getz When the World Was Young  
 1649 Youd Be So Nice to Come Home To Stan Getz Yours and Mine  
 1673 O Grand Amor Stan Getz For Lovers  
 1687 How Insensitive Stan Getz Compact Jazz  
 1837 Society Red Dexter Gordon Doin Allright  
 1949 Four Sonny Stitt No Greater Love  
 2269 Ineta Gene Ammons Red Top  
 2553 Wee Dot Gene Ammons Leo Parker LP 1947-1950 Gene  
 A Night In Tunisa MCA Bird  
 A Nightingale Sang in Berkeley SQ Dexter Gordon Gotham City  
 After Hours Sonny Rollins Sonny Stitt Sonny Side Up - Rollins  
 All The Things You Are Bird Massey Hall  
 Anna Gene Ammons Bossa Nova  
 Anything Goes Stan Getz Mulligan Meets in HiFi Getz  
 As I Live and Bop Stan Getz Complete Studio Sessions  
 Autumn In NY Dexter Gordon Daddy Plays the Horn  
 Autumn Leaves Stan Getz Best of the Roost Years  
 Autumn Leaves Stan Getz & Kenny Barron  
 Bikini Dexter Gordon 1943-1947  
 Blow Mr Dexter Dexter Gordon 1943-1947  
 Blowin in the Wind Stan Getz  
 Blowing Reds Top Gene Ammons 1947-1949  
 Blue Bossa Dexter Gordon Biting the Apple  
 Blue Monk Dexter Gordon Live at Montreaux

Blue n Boogie Bird Benedetti dlt1  
Blues for Bags Sonny Stitt Only the Blues  
Bluing Sonny Rollins Complete Prestige  
But Not For Me Gene Ammons Soul Summit  
Bye Bye Blackbird Gene Ammons God Bless Jug & Sonny  
Bye Bye Blackbird Sonny Stitt Gene Ammons God Bless Jug Sonny  
Canadian Sunset Gene Ammons Boss Tenor  
Chromatic Aberration Dexter Gordon 43-47  
Close Enough For Love Stan Getz The Dolphin  
Compulsion Charlie Parker Collectors Item  
Compulsion Charlie Parker Sonny Rollins Collectors Item  
Concentration Gene Ammons 1947-49  
Conception Sonny Rollins Dig  
Confirmation Dexter Gordon Daddy Plays the Horn  
Cool Cool Daddy Gene Ammons Etta Jones Lonely and Blue  
Corcovado Stan Getz Compact Jazz  
Crazeology Charlie Parker Take 4 12.17.1947  
Crazy Chords Stan Getz 2-fer  
Crazy Mary Gene Ammons Free Again  
Dancing in the Dark Charlie Parker with Strings  
Denial Sonny Rollins Dig  
Detour Ahead Stan Getz for Lovers  
Dexters Minor Mad Dexter Gordon 1943-1947  
Diaper Pin Stan Getz Complete Studio Sessions  
Dig Sonny Rollins Jackie McClean Dig - Tenor Sax.  
Do What You Do, Do Stan Getz Bossa Nova Years  
EAAK Blues Gene Ammons 47-49  
Early Autumn Stan Getz 3 Herds 1948  
Feijoada Stan Getz Stuttgart 1989  
Fools Rush In Stan Getz 1952-1953  
For You Sonny Stitt Night Letter  
Ginza Samba Stan Getz with Cal Tjader  
Going for the Okey Doak Gene Ammons 47-49  
Groovin High Charlie Parker Radio 3.23.53 Milt Buckner Trio  
Groovy Sambas Cannonball Adderley Bossa Nova  
Hairy Sonny Stitt Night Letters  
How Deep is the Ocean Stan Getz 1952-1953  
I Was Doing Alright Dexter Gordon Doin Alright  
Idaho Gene Ammons 47-49  
In a Sentimental Mood Sonny Rollins with the MJQ  
Indian Summer Stan Getz Quartets  
Interlude in Bebop Stan Getz Complete Studio Sessions  
It's Only a Paper Moon Sonny Rollins Complete Prestige Sessions  
Its Allright With Me Sonny Rollins Workout  
Ive Got You Under My Skin Stan Getz Quartets  
Ive Grown Accustomed to her Face Brookmeyer Getz B and Friends - Tenor Sax  
Ive Told Evry Little Star Sonny Rollins & the Contemporary Leaders  
Joy Spring Stan Getz The Dolphin  
Jungle Strut Gene Ammons Brother Jug  
Just Friends Charlie Parker Cafe Society 1950  
Kong Neptune Dexter Gordon One Flight Up  
Lady Bird Dexter Gordon Youtube  
Landslide Dexter Gordon Dexter Calling  
Leaping Leo Gene Ammons Leo Parker LP 1947-1950 Gene Ammons  
Lets Fall in Love Stan Getz Gerry Mulligan Meets in HiFi part1  
Lets Fall in Love Stan Getz Gerry Mulligan Meets in HiFi part2  
Like Someone In Love Stan Getz The Steamer  
Lion Roars Gene Ammons L. Parker 1947-1950

Lullaby of Birdland Stan Getz 1952-1953  
Man With a Horn Stan Getz Best of Anita O'day  
McDougals Sprout Gene Ammons 1947-1949  
Misty Dexter Gordon Montmartre Jazzhus 1965  
Moonglow Gene Ammons Up Tight  
Moose The Mooch Charlie Parker at Storyville 031053  
Motens Swing Sonny Stitt Sits in w Oscar Peterson Trio  
My Little Suede Shoes Charlie Parker Verve  
My Old Flame Sonny Rollins Complete Prestige Sessions  
My Romance Gene Ammons Boss Tenor  
O Morro Nao Tem Vez Stan Getz Jazz Samba Encore  
O Pato Stan Getz  
On Rainy Afternoons Stan Getz Children of the World  
On a Slow Boat to China Sonny Rollins Prestige Profiles  
Our Love is Here to Stay Stan Getz & his Cool Sounds  
Out of the Blue Sonny Rollins Dig  
Pagan Love Song Gene Ammons Bossa Nova  
Pennies From Heaven Stan Getz Complete Studio Session w Jimmy Rainey  
Prezervation Stan Getz 2-fer  
Rainbow People Dexter Gordon Tower of Power  
Red Top Gene Ammons 47-49  
Scrapple From the Apple Gerry Mulligan Meets Getz in HiFi  
Smile Dexter Gordon Dexter Calling  
Soul Shack Sonny Stitt Night Letter  
Split Kick Stan Getz Roost Quartets  
St Thomas Sonny Rollins You Tube  
St Thomas Sonny Stitt Brothers 4  
Street Tattoo Stan Getz Cade del Mar  
Sugar Coated Gene Ammons 47-49  
Tangerine Gene Ammons Jug  
Tenderly Dexter Gordon  
Tenor Eleven Gene Ammons 1949-1950  
That Old Feeling Stan Getz Getz Meets Mulligan in HiFi  
The Breeze and I Gene Ammons Up Tight  
The Chase Dexter Gordon The Chase Dexter Gordon & Gene Ammons  
The Lady in Red Stan Getz Quartets  
The Rubaiyat Dexter Gordon Citizen Bop  
The Shadow of Your Smile Dexter Gordon A Day in Copenhagen  
The Way You Look Tonight Stan Getz Complete Studio Sessions  
There is No Greater Love Stitt Gene Ammons Boss Tenors 61  
Theres a Small Hotel Stan Getz Quartets  
Time On My Hands Stan Getz Plays  
Too Close For Comfort Stan Getz Gerry Mulligan Meets in HiFi part1  
Too Close For Comfort Stan Getz Gerry Mulligan Meets in HiFi part2  
Too Marvelous For Words Stan Getz Quartets  
Watermelon Man Dexter Gordon Freddie Hubbard Takin Off - Dexter  
Watermelon Man Dexter Gordon Original Hits  
Wave Dexter Gordon Quartet  
Whats New Dexter Gordon 1963 YT  
Whats New Stan Getz Quartets  
Why Don't I Sonny Rollins Blue Note  
Windows of the World Stan Getz What the World Needs Now  
You Can Depend on Me Dexter Gordon Daddy Plays the Horn

## 5. REFERENCES

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