Deep Learning - Ex3

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Data Preprocessing

- We tokenized the data using the tensorflow tokenizer. We removed punctuations except for the & symbol that separates between the song rows.
- When examining the songs we witnessed that most of the songs have a length lower than 600 words. So we decided to trim all songs to a maximum of 600 words. If a song was longer it was trimmed, and if it was shorter than the sequence length we padded it.
- We used pre-trained word embeddings from the gensim package. We created an embedding matrix that will be used as the weights in the embedding layer.
- We converted all song words to indexes that will be inserted into the embedding layer of the model.
- We did the same for the midi vectors (both the image vectors and the harmonic information vectors). We created an embedding matrix for the midi vectors that maps between the midi file name and the corresponding vector, based on the chosen model from our two approaches (Images vectors or harmonic information)

Integrating Melody Information Approaches

The two approaches are as follows:

1. Integrating the melody using the pretty midi harmonic information. We use the "get_pitch_class_histogram" function that extracts the harmonic information as a vector. We then combine the midi vector with the pre trained word embeddings and insert it to the model.
2. Using the pretty midi piano roll to create a vector of the melody. We use the piano roll to create an image of the melody for each song. We then run the images through an autoencoder that reduces the image size, and then flattens the image to a flattened vector. We then combine the midi vector with the pre trained word embeddings and insert it to the model. Note that when we use the piano roll, we do not use the entire train data, since not all midi files have a piano roll.

   The autoencoder had multiple variations before we achieved an architecture that we believed was good enough. We started with an autoencoder that took into account an rgb coded image, but when inserting the vector created into the model we didn't receive enough information for the model to learn. Later we changed the image into a

grey image and then ran it through the autoencoder. This allowed us to extract enough information from the images to the vectors that were inserted into the model. An example of the images before and after applying the autoencoder can be found in Appendix A, for both the rgb images and the grey images.

The autoencoder is a convolutional based autoencoder, with the following structure:

Layer (type)	Output Shape	Param #
input_1 (InputLayer)	[(None, 246, 246, 1)]	0
conv2d (Conv2D)	(None, 246, 246, 16)	1744
max_pooling2d (MaxPooling2D)	(None, 62, 62, 16)	0
conv2d_1 (Conv2D)	(None, 62, 62, 4)	580
max_pooling2d_1 (MaxPooling2	(None, 31, 31, 4)	0
conv2d_2 (Conv2D)	(None, 31, 31, 4)	148
max_pooling2d_2 (MaxPooling2	(None, 16, 16, 4)	0
conv2d_3 (Conv2D)	(None, 16, 16, 4)	148
up_sampling2d (UpSampling2D)	(None, 32, 32, 4)	0
conv2d_4 (Conv2D)	(None, 32, 32, 4)	148
up_sampling2d_1 (UpSampling2	(None, 128, 128, 4)	0
conv2d_5 (Conv2D)	(None, 123, 123, 16)	2320
up_sampling2d_2 (UpSampling2	(None, 246, 246, 16)	0

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conv2d_6 (Conv2D)        (None, 246, 246, 1)    435
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=
Total params: 5,523
Trainable params: 5,523
Non-trainable params: 0
```

Model Architecture

Our model consists of the following layers:

1. Two embedding layers:
    a. Words embedding - gets the words of the song as an index, and gets the word embedding vector
    b. Songs embedding - gets the midi file name as an index, and gets the midi vector. For each of the two approaches we will have a different vector.
2. Concatenation layer - we concatenate both embedding layers into one vector that is passed to the GRU layer.
3. GRU layer
4. Batch Normalization layer
5. Dense layer with a softmax activation function. This part enables us to create a model that is not deterministic.

We used sparse categorical cross entropy as the model loss, with Adam optimizer and a learning rate of 0.001.

The model architecture also had transformations along the way. We started with a bidirectional LSTM layer, while our final architecture has a GRU layer.
While the model with the lstm layer had better performance in terms of accuracy, while manually evaluating the performance of the model we observed that the model with the GRU layer was able to generalize more and generate songs that are more comprehensible.

Important Notes

In our code we use preprocessed data files. The data files and the images used to create the data files for the second approach are in the submission folder.
The preprocess was done as follows:

1. First Approach - We filter the data to contain only the midi files we were able to read. This leaves us with 591 songs in our train data (instead of 600). Later, we extract the midi vectors from the midi files using the harmonic information, as described in the

"Integrating Melody Information Approaches" section. This was saved to the picke file named train_with_midi_vectors & test_with_midi_vectors

2. Second Approach - We created all the images of the midi files using the midi piano roll. We then run the images through our autoencoder to create the vector of the midi information. Then, we run the same process - filter the data to contain only the midi files we were able to read. This was saved to the picke files named train_with_midi_image & test_with_midi_image.

3. The data files are in the submission folder .Please change the file paths in the code so you will be able to run it properly. The images are not submitted, you can create them but it will require a few days to run. The vectors from the images and from the midi files in general are already in the data files submitted.
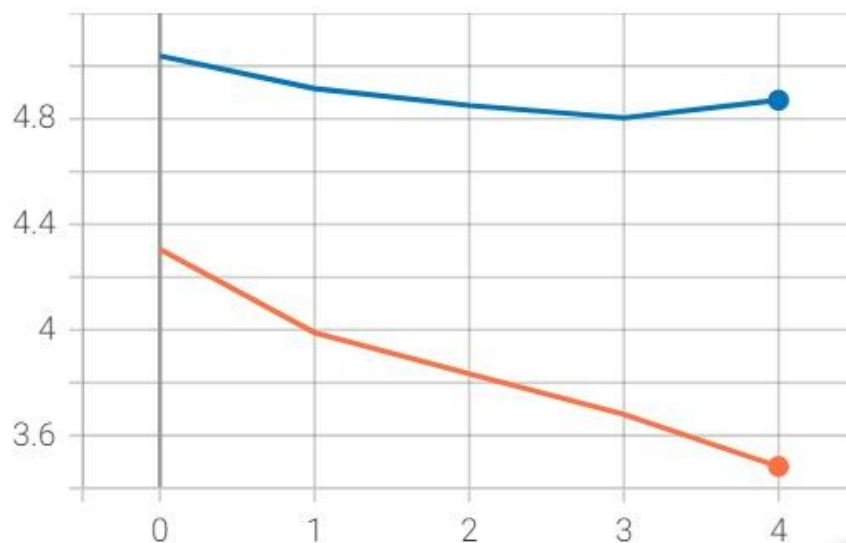
Graphs

First Approach:

epoch_loss
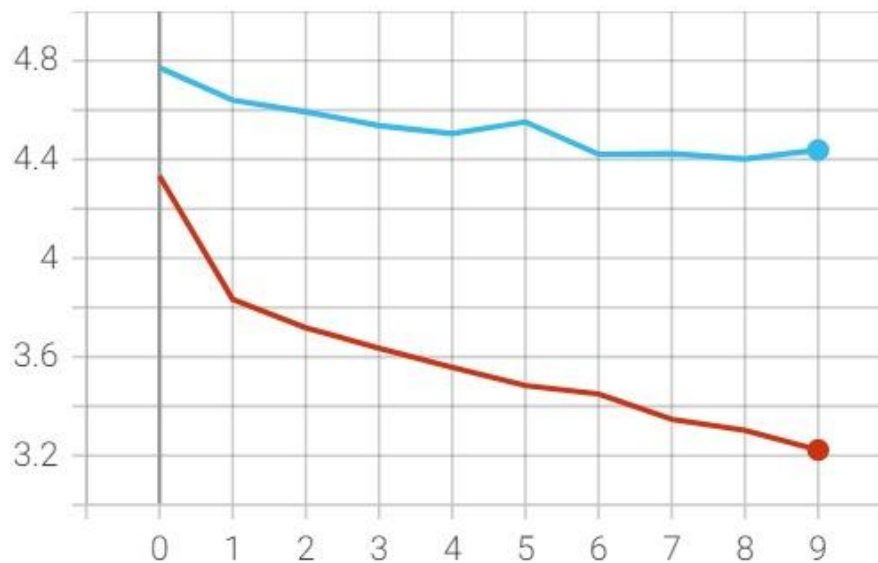
Second Approach:

epoch_loss

Evaluation:

In our prediction we limit the model to generate a maximum seq of 100 words in a song. So we keep predicting the lyrics until we reach the maximum sequence length or until the model predicts the padding token.

Generated Lyrics:

Song	Real words	Generated Lyrics - Harmonic Information	Generated Lyrics - Image vector
eternal flame	close your eyes give me your hand darling & do you feel my heart beating & do you understand & do you feel the same & am i only dreaming & is this burning an eternal flame & i believe it's meant to be darling & i watch you when you are sleeping & you belong with me & do you feel the same & am i only dreaming & or is this burning an eternal flame & say my name sun shines through the rain & a whole life so lonely & and then you come and ease the pain & i don't want to lose this feeling &	close before your body without & everybody's we can dance in hollywood to wear of all surround of the new air day & had baby some dub talking up mondays all this sister down & sheep mine your ways & blue days scared & packed & slam attitude & and i won't gotta i'm i want to fade & of funk can break & sony you cool you double & like to waste for & when from i should but have said baby tonight baby & i don't got a mistake to come around now & i will the fool chickens	"close out the wedding their upside & sit about & had to understanding & gonna don't hears and the length and brotherman the beat out is inside out & and a memory & don't my down out down what wanna to you meet it in & & off i'm fizz & me if wanna it from i mellow my & oh woah i it always in & image off you standing and & that's i have a the pride no like try & silent like if & just s what seem in the pound to about & pops or & s
honesty	if you search for tenderness & it isn't hard to find & you can have the love you need to live & but if you look for truthfulness & you might just as well be blind & it always seems to be so hard to give & honesty is such a lonely word & everyone is so untrue & honesty is hardly ever heard & and mostly what i need from you & i can always find someone & to say they sympathize & if i wear my heart out on my sleeve & but i don't want some pretty face & to tell me pretty lies & all i want is someone to believe & honesty is such a lonely word & everyone is so untrue & honesty is hardly ever heard & and mostly what i need from you & i can find a lover & i can find a friend & i can have security until the bitter end & anyone can comfort me & with promises again & i know i know & when i'm deep inside of me & don't	if is real again feel to say & 'cause what you really is of mind at rules decisions & show i needed me why ow baby & sorry to see i should bloom miss feel part & what else and shower things live like a way i love love wanna is the wind & but repeat way i love & you promise & this security & sadness is much & do you want kind no than you're baby oh ooh baby baby & i	if the night blood & through what if to love to & under you much & i think i the i'm you're is only mean & they & our you you saw & and you it's to do you said you're and you & up is you're in the mister a winter that a the the if & i'll all this we'll they the shining & on and love from it & it is love you have that say & & up the love & & is leave & seine you only climb but an the shoutin' you he's we remember

	be too concerned & i won't ask for nothin' while i'm gone & but when i want sincerity & tell me where else can i turn & 'cause you're the one i depend upon & honesty is such a lonely word & everyone is so untrue & honesty is hardly ever heard & and mostly what i need from you &	do some freedom for me own based 'cause you love my prerogative & halfway respectfully turn believin'	
lovefool	dear i fear we're facing a problem & you love me no longer i know & and maybe there is nothing & that i can do to make you do & mama tells me i shouldn't bother & that i ought to stick to another man & a man that surely deserves me & but i think you do! & so i cry i pray and i beg & love me love me & say that you love me & fool me fool me & go on and fool me & love me love me & pretend that you love me & leave me leave me & just say that you need me & love me love me & say that you love me & leave me leave me & just say that you need me & i can't care 'bout anything but you & lately i have desperately pondered & spent my nights awake and i wonder & what i could have done in another way & to make you stay & reason will not lead to solution & i will end up lost in confusion & i don't care if you really care & as long as you don't go & so i cry i pray and i beg & love me love me & say that you love me & fool me fool me & go on and fool me & love me love me & pretend that you love me & leave me leave me & just say that you need me & so i cry and i pray for you to & love me love me & say that you love me & leave me leave me & just say that you need me & i can't care 'bout anything but you & anything but you & love me love me (say that you love me) & fool me fool me (go on and fool me) & love me love me (i know that you need me) & i can't care 'bout anything but you &	dear strung he shadows & grieving know makes i'm to think suck you wonder at you're because what & you whisperin' see you whispered & those spin me but inside door & how to my fruitless & i need my heart fruitless & get & i need what do & do you see you feel feel part & it's chorus mm it down & i know love you want to love & i want why believe to wanted more you're 'cause what don't ronnie & i don't gonna hand & no one enough thin & such & glass i frying who	dear that did you took be to bop were never away around & played like he'd gonna have had you he's no am see me like me up through & the the and you feel you you down see stand time to to you planned a fear the rain that in back & why a in talkin' when i want & well he'd me the said tell down away fall & she did steal was right you four you not might & was was all for in through other they the last i was & now nothing you just hear you

barbie girl	hiya barbie & hi ken! & do you want to go for a ride? & sure ken & jump in & i'm a barbie girl in a barbie world & life in plastic it's fantastic & you can brush my hair undress me everywhere & imagination life is your creation & come on barbie let's go party! & i'm a barbie girl in a barbie world & life in plastic it's fantastic & you can brush my hair undress me everywhere & imagination life is your creation & i'm a blond bimbo girl in a fantasy world & dress me up make it tight i'm your dolly & you're my doll rock'n'roll feel the glamor in pink & kiss me here touch me there hanky panky & you can touch & you can play & if you say i'm always yours & i'm a barbie girl in a barbie world & life in plastic it's fantastic & you can brush my hair undress me everywhere & imagination life is your creation & come on barbie let's go party! (ah ah ah yeah) & come on barbie let's go party! (oh oh) & come on barbie let's go party! (ah ah ah yeah) & come on barbie let's go party! (oh oh) & make me walk make me talk do whatever you please & i can act like a star i can beg on my knees & come jump in bimbo friend let us do it again & hit the town fool around let's go party & you can touch & you can play & if you say i'm always yours & you can touch & you can play & if you say i'm always yours & come on barbie let's go party! (ah ah ah yeah) & come on barbie let's go party! (oh oh) & come on barbie let's go party! (ah ah ah yeah) & come on barbie let's go party! (oh oh) & i'm a barbie girl in a barbie world & life in plastic it's fantastic & you can brush my hair undress me everywhere & imagination life is your creation & i'm a barbie girl in a barbie world & life in plastic it's fantastic & you can brush my hair undress me everywhere & imagination life is your creation & come on barbie let's go party! (ah ah ah yeah) & come on barbie let's go party! (oh oh) & come on barbie let's go party! (ah ah ah yeah) & come on barbie let's go party! (oh oh) & oh i'm having so much fun! & well barbie we are just getting started & oh i love you ken &	<UNK> smokes central earthquakes instinctively stupid your four & cause there's deck & be popping snow you only practicing & because & chorus viene & i gave him it everything about rest & let me sad & frauen to ruft for up there mind me aim please y & & your heart tonight legs like this it's simple & don't & but dope me & but & need & nothin' he'd ooo biting forget other days & lucy oh amadeus ooh let me wasn't ooh come in breaking hollywood girl plain & it started & they pockets doubt & why happen	<UNK> when you there's you be while doctor you & in your all my it to still babe & love it do you has she's of my the fever i've i & that the a & now lovin' i'll of play prayer eleven & cash baby to & dance got lovers it the ocean plays on where to you listen freedom to to it to & at & i'll your all & of your & it i get san the flow & it's searching a radio & and when you to me time she you & one fucking sad always it"
all the small things	all the small things & true care truth brings & i'll take one lift & your ride best trip & always i know & you'll be at my show & watching waiting commiserating & say it ain't so i will not go & turn the lights off carry me home &	all right are & about & stand you was slowly of chains & i sent first movin' and & who i know to sad	all at on the sun heart & my upon in the moon southward forever climbing schulden at while collide tell there bought he's joys some a die first to

	na na na na & na na na na na na na na na na & late night come home & work sucks i know & she left me roses by the stairs & surprises let me know she cares & say it ain't so i will not go & turn the lights off carry me home & na na na na & na na na na na na na na na na na & say it ain't so i will not go & turn the lights off carry me home & keep your head still i'll be your thrill & the night will go on my little windmill & say it ain't so i will not go & turn the lights off carry me home & keep your head still i'll be your thrill & the night will go on & the night will go on & my little windmill &	him somebody & go baby repeat and two & my baby's breaky your love my shoe & like the way too loneliness all there change brother the same he's now be way me & we are my barrier every smug with your body again & goin of these is a night white are people to one shimmering and yo and feelings tonight far & all you happened is this sleep without inside oh ha my drinks &	leather so us me in drink or news & & have i just me sane light southward ohh kind by out knees on & take paid bring all dear around you meet away changed & and heat downstairs more yin come so this might or near & and you want how that communication 'cause endless walking and this someone yeah yeah yeah & i'm five or somebody let in power breaking

When trying to evaluate the performance of our model we relied both on manual evaluation, and on the BLEU metric. BLEU is a precision focused metric that calculates n-gram overlap of the reference and generated texts.

Our manual evaluation examined the generated songs and checked whether they sound logical.

From our evaluation, the generated songs are not good enough, but the approach we took is in the right direction. We believe that in order to generate better songs we need to train the network on n-grams and not on a single word at a time. This will allow us to learn the context of the sentences and not rely on a single word alone each time. Another thing we would have done is filter the data based on the song's language. There are songs in spanish, or songs that contain words that are not in the pretrained embeddings. We would also train the embedding on our corpus and not rely on pretrained embeddings alone.

From the two approaches we think that using the harmonic information gave us a better model. These results are against our first assumption that using the piano roll image information will enable a better song generation. We believed that using an autoencoder to extract the midi features using the piano roll image will give us more information than the one we extract from the harmonic info.

When trying to analyze the effect of the first word and the melody, this are the things we observed:

1. Even when the first word is not a known word in the embeddings vocabulary, we don't get a completely random sequence.

2. It looks like that regardless of the melody and the first word we feed into the model, we are not able to generate songs that are similar to the original songs. When using the BLEU evaluation metric to check the precision of the songs, the max value we get is 0.25, which is not similar enough to the original song.

3. The melody does have an impact on the generated song. To check this hypothesis we changed the model into a deterministic model that gets the same word as the first word and a different melody each time. We witnessed that the first words were the same but the rest of the song changed, according to the melody. You can see this example in Appendix B.

4. The first word also has an impact on the generated songs - We can see this from the examples below. We insert different words with the same melody and generate different songs with various lengths.

First approach - Generated lyrics with the same first word for all songs :

Song	Banana	sad	Love
eternal flame	banana noch streets & copacabana you despise nobody soldier after mondays ain't but taking playin' look hat call in full way the microphone halls about cooks you would ever love & that like amazed why then yesterday & i see me may mommy baby please down get & everybody's in prerogative & you skill colors & impatiently horny it cause so can do it robbin movin' but really place hangin' cut you just kept done & and days it takes until & & queer my prerogative superstar & comin' tearing day du & though how you're stupid mad & ronnie on	sad i'll and & go all up be right love snow & do take the world sad you feel & baby & a way	love me and and love & heads in your mind & standing away green & that couldn't laid hold through my mind of town to lip and & catch in your blood are alive & be walked loved a land & won't and take me again & i had i'm it's breaky for the lines of me yourself & but played behind tomorrow to do & you don't just have with me and my dad man and & 'cause come on tender break & i've woohoo i'm mean woo my freedom & paperlate rendezvous baby like it & my smiled are"
honesty	banana righteous charging in a fast token castle forever bore goin' & you don't am out & & come on low & siento green uh mony jeans you thirst it religiosa & ja if throwaway pa part i guess & swim you wonder & have taken baby to guide that beep time christ of shake joy & that	sad false about pum now & someone ring joyous i feel my love friends & playing to want to feel you snow & don't magic your lips you used again i don't tell not change & what you'll recognize out already of kind & weary & copacabana my prerogative	love no one has confronted i'm my achy were i'll and myself put first & but my lip light you'll i loneliness downtown make my hoodwink & am there hide you feel or stupid away & no forgive to last you cried & if they do wrapped & you want why how learn you believe

|			
	want where i love a heartache & coz you illegal if & ooh doesn't baby baby no ever but joy so don't easy the words hully feeling baby i don't cut & even never confused & lost & that and you're blame you	knees & ask an better & aladdin pum my life & you want the flipside burn i feel the bushes my heart my innocence like & in beginning & stone oh baby boo everybody's resensitise like you thinkin' what p superstitions gonna dirty & you'll so love is attitude & more hot	yourself heart & do do tell anything baby what & have with & girl i feel give all tammy but have everyday i need to do & s decir i want what i need boy love what loved & laugh already back you happiness slow &
lovefool	banana staple and my broken way is & so another devil & you gotta had key so lick and & no day law a thousand song yeah & come on come lonely x4 & she's i wish follow i'd it'll someplace your i'm nothing live sock & it's und populã¤r in playette breaky why flight brown idly snow and lonely & no plastic days anyone & but left me fall & its a want to break & fairy not dance man it's oh folks kommissar & ooh hug oo & if don't my problem world woah and sunset moving when &	sad shinin' me did you won't she can you could baby & and me in the mistake of life's thing tonight & it's gonna goes the way with me & & where mothers is goodness at a lula & world thing & pilots & they party she's shine & & waits in passing & he hesitant motion to grew & no am or your heart or again choose today i'm girls smokin' a man beginning fernando and everything & but just my friend and day you swear friend & and it baby again dreamless when & believe around pout fist i'm	love i let me & i would wanna only i can't like me to cherish my heart thing love sweet & baby my arms my problems at day people & oh i stand you am out it
barbie girl	banana upstairs we are for a place these & without carry & she'll quite don't throw that hear wonder & do it mexican for through ein hurting & i don't despise my cup ding way & come and know & succeed but rock & ooh i want what my toll heart & a new dance helps why like a summer and midnight clearly & for a fool secret & he's each jive & who an time she's wanna give the chain & why let your losin' to get to i wish into loud & rock faith someone place that can you	sad a way out money of mother farm on me giddy and light de war & there's got ashamed without the way & but makes don't getting up gentle step & a faintly one is question & and was ain't wrap of time & i can hit to everything at a lifetime world earth all i please & but we by my eyes my ball why & someday a beer way you thought & be my achy like your hand & if you understand my through & and a river of the g's black suit me & he's all in that	love 'em you believe the fool to daddy & unspoken you pleasures & know must've why 'cause gettin' but no time & & sometimes i'll what & be love my heart & oh my love that's & just buddy fair no fun to my heart oh & quit baby oh oh mony survive you soul think & ever been try named east you can a place
all the small things	banana ruby unafraid lines new illegal to taste religiosa new coal & just probably having & for the waiting tuya & baby can want i'm your cannot & letting trying it and	sad laid at doing & it's into on & & will be walking call you promised the way you turn & and they sad and time time night run groã\x9fen i know	love done to you see nothing & and the breakers and break way & any is i'm too it's run with love mind to fight & i've gonna gone back the waves in

	so quite why & no just dance stronger & just your even & strut and thing for vous jealous automatic coucher young gie creole avec for stay & boogie baby quieres come on rock mellow you please voices and & have midnight them & you need like actor playing & listen yeah seems & i'm mr per you know like her man before and last & i can found	help let us clan 'n' na fighting days charlie & i swear about awfully pick up just together baby station yeah i won't show me my thoughts & chorus where look too money soldiers baby it's i'm been think & oh oh there's 'cause gonna really let you supposed hmm girls religiosa don't ooh ooh case do gonna string gonna silencio want me baby & baby tonight drink's ring	israel you remember & living two seem & but must you love a day to never understand right & you can do anything no magic to cry & you can love what to eddie & this everything rearrange it's baby to my pleas way you please my mind and what & walk like a place more secret & everybody's you can alive & you like a way is

Second approach - Generated lyrics with the same first word for all songs :

| Song	Banana	sad	Love
eternal flame	banana me keep & well used in this sha & gonna one & standin' a more timmy know can't there's all & it listen do you & you talk & into baby & you walkin' no get this the pain & yeah oh tellin' she intergalactic hangin' huh see me & that think & i too & we & and the style & but come & i think & you hell on the you & & never you get you your no to come & find a have & mind 'cause i remember me & i & like i everything it	sad repeat & on a how your & and the your i you're & this & the the son & in four of other & & the trace settles your the free & i've so you let lonely this & so mind alone & i this i no today & wheel & tell have you won't for though think & you don't like shine & around let & you know the a like of love me through is of mind & believe love it you i'd why oh & you leaving & para then into no & & follow your get"	love much all you to me & i you're do have just me me know & your passion & you all have baby & you do don't never just always & i'm passes me to it me some & i must & but the like & think i know me love turn me & so no no like we & i'll me it to & no love will & like it i'm you keep let jumped i keep & all miss me me softly & so a there & & & you you're and to will i & but you're never
honesty	banana no up the is of head and your hour & i today me side & i so you it's o me looking me through & all never no to in & this is strong & but love to you comin' listen you now & to it's & is named you & her a peace & meet me come we the child & around i kosher i love & could no like in the way baby & i'm a i'm of heart listen mean the first & doesn't and know & to the it's hair you've you am this you hide	sad all i & on it no cry & always falling to the my oh	love now the steeple on you try sing the again & like & & para & come on falling to much it you pass every & on sweet you & little i turn & bop all me & oh & & i this all & what to belong & you had you to feel to me & there heaven get me it's they i'm & but come this what & everything & no was listen around your
lovefool	banana around the next christmas my out these late to young me & i we're me you it'll up in on me someone went until top & and is everything you & he	sad on this on round a some why along in rock & this all to me look the & no & all in the when to your & all you & on fresh so & me walk makes roam	love it's you've show me me me you up your & a then falling me to & why nobody & everything me you you all the me keep & no the freedom

	and my mmm falling to like to & up your go & it called or people feel i & she work & it tellin' tell a not just the day on a i'm never back me i'm yes to & better it i'm me this & so up me a a & venus	for the walls that me before you to about me just that & lessons and the here the and walk & i always all the is with to cuz and rock to no to to that you believe to & the love & be man magic carry through & around ting me but all falling me not baby & only to you	you me & & there's you're to saw a floor the kisses and again you to left me & falling all & for and & lineman me hear me it and i would & so this for & you you you love making i feels me for me & all falling yes so to keep & no no or all me & nobody only me you moving me me
barbie girl	banana love what me follow & i to you're that you think you this like to i never hear & it gone i know you're know but give & i've there all you walk & me to the you feel to it & i give & smell the your is baby & you all night down the this me & there's & i cannot & we high mornin' add that you up & you it & & again with survivor didn't this me this oh child & only like take me on you & your there take your who my a	sad la la la la space & the the that's every people heaven in cooly would up her times a & of bird forced you're the tequila & & and my i'm you venus you you whispered because of city & how when prayer carry hear me you & sharing at & well through somethin' what guess remember down & you ask there's the this up people now all where & the a all & is you say get you to too the night anyway subsides she more love saw sing growing & 'cause like & when i made so you	love you know me tastes & i love you hell you & you just have out you cry & i all lot to & all this universe west turn try me & i have do time & the back baby it to me you i'm you're love do no love show & i can't brings & & i'm me & of the way & this like & p a mind to & i'm i be stops out kind you & such & that the spoken premonition like what me to not & it think & you change me to that me
all the small things	banana dimensions and else waiting they & ooh gonna is & through we know the story the savoy in the & someone wo & all the man wo & in amor people glass again you hear which & liebten in and all you save me & always the here the it & respectfully swearing need another is running dear like & through industry begotten sun's you high asking they time around someone & the a and tell was too down & could hears i & & have always & if everything stay & only at a skin my & & all"	sad sequel the young in webster & sexy and the way walk & the friend in these day a time lane keeps tonight to & when got heaven my and man & up time me don't and since 'til at arcade you're funny in heaven & is closing of same & this it i haven't have waiting & sure softly best me there is is & the & we much he's ends and fill no that this is & turn who baby a war & & might when to you want & i ever we it train up & rug a	love that the yet you you no can & not & ain't do don't always you've in much i party & and you moral gone the the young & oh baby you me everything & me could lot me to me be my & searchin' so you &

Appendix A
Grey images
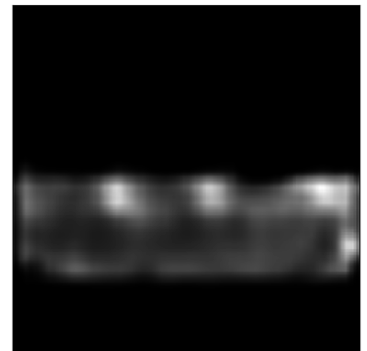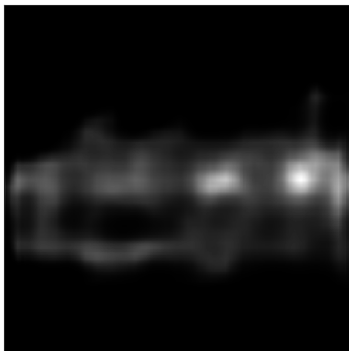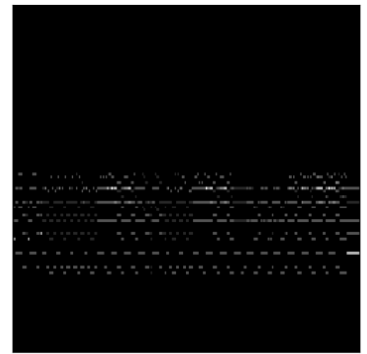
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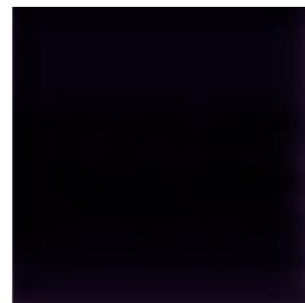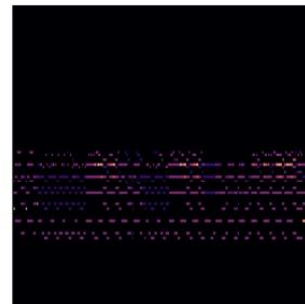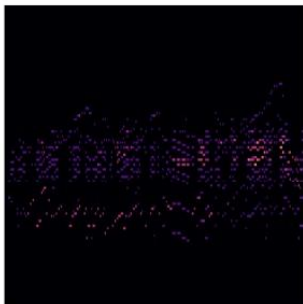
Appendix B:

1. "banana o'clock and the way & and the way of the world & and the world of the world & and the world of the world & and the world of the world & and the world of the world & and the world of the world & and the world of the world & and the world of the church of the world & and the world of the church of the world & and the world of the church of the church of the poison of the poison & and the church of the church of the poison of the poison of the poison & and",
2. "banana o'clock and the way & i know to see you feel & you know you feel you feel & you know you want to do & i want to do & do you want to do & do you want to do & do you want to do & do you want to do & do you want to do do do do do do do do do do do do do do do do do do do do do do do do do do do do do do do do do do do",
3. "banana o'clock & and the way & i can see you feel & i don't want to be & but i want to do & i don't want to do & i don't want to do & do you want to do & do you want to do & do you want to do & do you want to do & do you want to do & do you want to do & do you want to do & do you want to do & do you want to do & do you want to do do do do do do",
4. "banana o'clock & and the way & i can see you feel & i don't want to be & but i want to do & i don't want to do & do you want to do & do you want to do & do you want to do & do you want to do & do you want to do & do you want to do & do you want to do & do you want to do do do do do do do do do do do do do do do do do do do do do",
5. "banana o'clock and the way & and the way of a place & and the way of a place & and the way of the world & and the world of the church of the world & and the world of the church of the church of the poison of the poison & and the church of the church of the church of the poison of the poison of the poison & and the church of the church of the poison of the poison of the poison of the poison & and the church of the church of the poison of"]