

Deep learning Assignment 3

Training Phase

The chosen architecture of the models:

1.The first model:

Layer 1: Embedding – input is one-hot vector of the tokens (it's size same as the corpus'), output is the embedding by word2vec in size 300, followed by relu activation.

Layer 2: one layer of LSTM with hidden of size 256 – input is concatenate of the embedded lyrics & melody (size 432), followed by relu activation.

Dropout with probability of 0.5 (after the LSTM layer)

Layer 3: Fully connected layer with – input size 256, output - one-hot vector of score for each token, followed by relu activation.

2.The second model:

Layer 1: Fully connected – input is the melody_features (size 132), output size 10. followed by relu activation.

Layer 2: Embedding – input is one-hot vector of the tokens (it's size same as the corpus'), output is the embedding by word2vec in size 300, followed by relu activation.

Layer 3: one layer of LSTM with hidden of size 256 – input is concatenate of the embedded lyrics & melody (size 310), followed by relu activation.

Dropout with probability of 0.5 (after the LSTM layer)

Layer 4: Fully connected layer with – input size 256, output - one-hot vector of score for each token, followed by relu activation.

Our approach for integrating the melody information together with the lyrics:

First – assign melody timing for each of the tokens in the lyrics (the length of the melody is included in the midi, and the lyrics length is including in the csv, so we concluded the timing of melody for each token.

Second – Now after knowing the timing ("time_signature_changes" attribute), we can extract which instrument used (with "instrument.program" attribute) for each token and its volume and velocity what gives our network an information about the melody played for each token (with length of "get_beats()" and average of "get_chroma()" methods).

Last – after we conclude the melody timing for each token in the lyrics, we concatenated the melody features described above to the token itself and fed the LSTM with it.

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TensorBoard graphs showing the training and validation loss:

Split train-Validation sets: We chose to split our train by taking 20% of it to validation set in order to be able to check for each epoch of the training the model is not over fit on the train.

Hyper parameters:

Loss function – CrossEntropy.

Adam optimizer – learning rate = 10^{-3}

Batch size – 128

Dropout probability – 0.5

Max epoch – 100

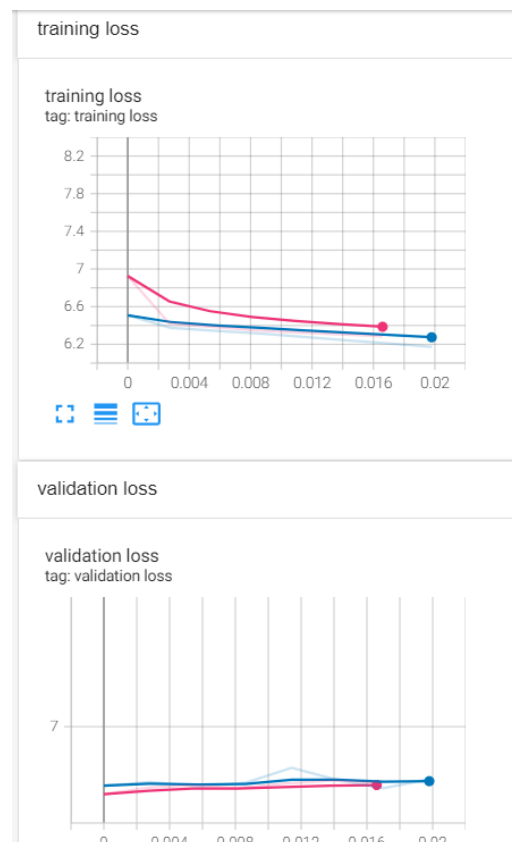
Stopping criteria (for this assignment is so important because the model is easily going into overfit)– stop if for 5 time the validation loss is not lower than the validation loss of the previous epoch.

The best performance we got was for the above parameters:

For first model (pink curve): training loss – 6.285, validation loss – 6.57

For second model (blue curve): training loss – 6.172, validation loss - 6.584

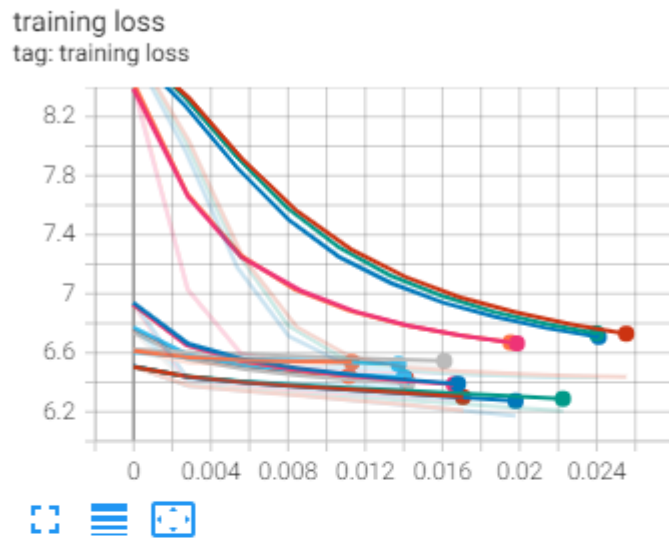
*The performance pretty similar for both of the LSTMs, it looks the architecture changes for the second model were not helpful.



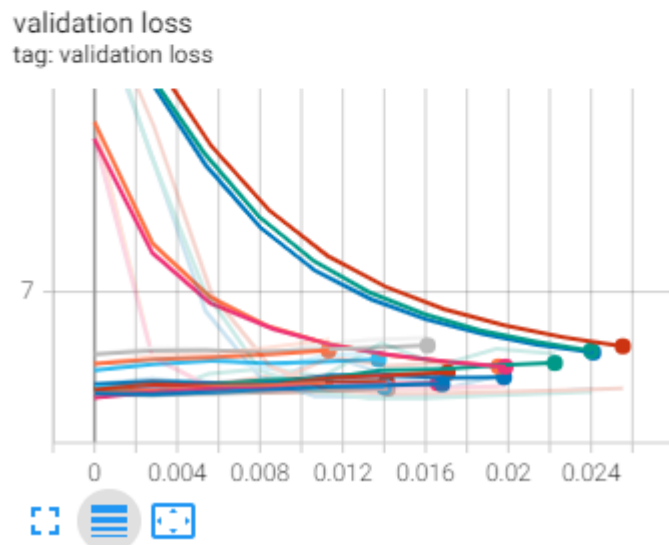
The validation set loss isn't reduce under 6.5, so we tried different combinations of parameters (learning rate= $[10^{-3}, 10^{-4}]$, dropout p = $[0.4, 0.5, 0.6]$, tensor board for all of the experiment:

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training loss



validation loss



Test Phase (all the generated lyrics are in the python notebook as well)

- For each of the melodies in the test set, produce the outputs (lyrics) for each of the two architectural variants you developed. (input - the melody and the initial word of the output lyrics).

All generated lyrics:

For the first LSTM:

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First song, start with - "close":

```
----- Artist name: the bangles -----  
----- Song name: eternal flame -----  
Model's lyrics:  
close vincent living i called  
was we what softly down  
the go ass heart child  
like recover radio daa in  
hope through say now the  
it times wrong saffron freedom  
  
reggae i my shes heart  
taking like deo i christ  
york me what do spark  
love do oh sin the  
used stood it the undeniable  
down longest one im it  
  
pretend let finally plan the  
now the happened take hes  
instantly again its blue i  
been nobody lovers it dark  
never they tonight up need  
i sky with heart feeling  
  
want boy sunglasses look down  
we heart around get rock  
lovely cant your beat shining  
mind could worker the your  
facing slept tomorrow on tries  
hittin always then your things  
  
about take guard always splinters  
experiencia more in making life  
meets tell they sister ive  
she youll night go kick  
the teach well surely the  
half eyes the sister just  
  
flesh was night river always  
they theres the eyed what  
your race long time alright  
it mission i us here  
the up whenever known be  
ron i when maternal could'
```

Second song, start with - "if":

```
----- Artist name: billy joel -----  
----- Song name: honesty -----  
Model's lyrics:  
if cassette put wonders ghosts  
down devils the roll in  
way let in question why  
by no one twelfth sabotage  
past one yeah body why  
all waters oh i i  
  
i my autograph an dark  
innocence label our no ask  
me need one prosperity i  
years i from sinned ill  
it i is they meS  
inside he if anymore caught  
  
your its kick know up  
my my trues do window  
come when baby yeah factors  
it by princess me come  
poison words time he it  
me sheets um anybody talking  
  
me when in member our  
boogie other the playing me  
lose me ride the im  
i girl i boy or  
lonely crazy be me call  
hot so bye ever yourself  
  
broken in pay dog forever  
er when yeah down wont  
da what your dont had  
this day left us down  
me know brains me ass  
i on it dont the  
  
i oh hear evry goodbye  
the in y fool big  
never the waits i im  
chauffeured say her oh calm  
i only rhythm that cash  
stay had oh my ihn'
```

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Third song, start with - "dear":

```
----- Artist name: cardigans -----  
----- Song name: lovefool -----  
Model's lyrics:  
dear lost paradise best watching  
is loves seems wish remembering  
dont understand just mama me  
tha it it leave have  
what it needed dawning what  
would been es bonny that  
  
sometimes man ah can radio  
im his world bringing knee  
harmony one without cry whole  
in corners call last paradise  
hug need bull youre yall  
not history have your cant  
  
but but it place the  
this youll it dark tomorrow  
guide so my extreme lonely  
just say me push that  
good couch is if in  
need mine goodbye dont hiya  
  
place paid got make down  
the written settle fingers been  
its make me boo so  
just if iola her happy  
on cue i little thats  
has mind do heart it  
  
end only baby what pride  
fading your inside rhyme is  
your on saying my out  
time chaka body charlie like  
take am world me me  
it chance with come into  
  
had understand all in how  
ever magic her i two  
killing i lots can time  
sweet na foot the middle  
alive i wear i away  
me my no this washes'
```

Fourth song, start with - "hiya":

```
----- Artist name: aqua -----  
----- Song name: barbie girl -----  
Model's lyrics:  
hiya blanket guile other ground  
along damned tender direction five  
have it once speed now  
is in way mine shots  
his lived fool stupid start  
old help must want because  
  
window what oh tie i  
her free love is boy  
many all in wrote look  
gets wonder do guard its  
that please we hanging strangers  
through fantastic friends called oh  
  
me the twist knew look  
mine over on i your  
baby close need eyes smile  
my asleep way let lady  
everywhere nichts photograph im its  
for lover dreams somehow oh  
  
porno break into it the  
what it for on what  
me thump eee i well  
throw all mistake stronger this  
sha most sail the he  
oh me the what the  
  
blues california yonder i see  
put in way town soon  
where finger lonely how bop  
theyre who that one straighten  
the hell got this solution  
the may ive the now  
  
again freak i awake be  
ill la this the away  
i one grow better impossible  
drag casbah need really love  
cant if servant me the  
the played face the dust'
```

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Fifth song, start with - "all":

```
----- Artist name: blink 182 -----  
----- Song name: all the small things -----  
Model's lyrics:  
all superman unrequited the were  
sorry baby me always know  
around my just if when  
through now i all be  
lowly caught soon per die  
me beat an the radiates  
  
crazy anyway for see me  
while id grant i spent  
fool wounds it ding dont  
be really first than refugees  
me up be let brushes  
on rendezvous we place dont  
  
i back im glee throwing  
catch old me dont let  
on got cast clouds gonna  
story free son dont apart  
like ron my know shape  
summer farm sometimes read run  
  
at ba bitch hide me  
for turn i in mind  
i about want like loneliness  
make baby i yeah that  
cries megaphone shes are living  
your time tooth as auch  
  
if stolen potion tha draw  
then up make now government  
its your feels okay but  
i we simple me it  
conscience like every eyes the  
forever lyrics now feel at  
  
i i were me out  
in so child through ride  
theres the are goodbye i  
american dont the were our  
caught lot your think together  
ill ive sad cant got
```

For the second LSTM:

First song, start with - "close":

```
----- Artist name: the bangles -----  
----- Song name: eternal flame -----  
Model's lyrics:  
close curse really that with  
say in pain man all  
name be dixie two vez  
heart one it em last  
i please i me say  
makes all planned supposed it  
  
hey ear raindrops past wont  
baths on me many last  
dream fading just the i  
themes close wrong emotions the  
is idea me high theres  
down nobody grab why its  
  
one heard tick lamb do  
everybodys tomorrow eagle my know  
away for cada burn creole  
the no i me i  
here on fuel oo must  
beautiful if lets playin meet  
  
just hey forget lover could  
closer more whole one dancin  
on home love once gonna  
can need see burns think  
jack me that cry floor  
in know roger when down  
  
shelter the will it me  
heart will its but your  
ride have throw your losing  
laid the your your is  
same i hush till sense  
makin no well ooh lights  
  
love in shes shit up  
hollywood be achy blood dreams  
me if saddle i stand  
grab its too that say  
i im i is i  
i if the gloom oh'
```

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Second song, start with - "if":

```
----- Artist name: billy joel -----  
----- Song name: honesty -----  
Model's lyrics:  
if so us for disrupt  
night theres get can train  
on boys hes i so  
falls raps be broomstick ride  
me south well frontiers mean  
work no the the sittin  
  
baby romantic time peeps false  
in heel loves it the  
experiencia is hes please times  
child meant youre dont wrapped  
it good i stronger smart  
obsession is am it time  
  
oh ever my youll oh  
but your wake got track  
the benson it preview lot  
hearts do hang be your  
tell bridge cars like see  
me guys can so time  
  
heard better is comb gray  
mistakes hello caught youd so  
ice inside gonna givin oh  
way through que heartache plastic  
i blame the as about  
special be night limit got  
  
john the judge inland i  
from youve if be the  
horse me saturday stop inside  
oh mary with on out  
but me waiting please true  
earn for why chanting woman  
  
arms boy out be i  
savin news my want your  
are make every wanna im  
on liked so be the  
me something was have at  
ill no that pipe only'
```

Third song, start with - "dear":

```
----- Artist name: cardigans -----  
----- Song name: lovefool -----  
Model's lyrics:  
dear boys knew i is  
girl heavy jacks son the  
the while all sincerely night  
anyway true lovers light boo  
i old lets comes needs  
boogie days at it thousands  
  
its we start love would  
know can hands friend my  
it love be me like  
my im fly wind see  
what baby again your where  
when will talking the for  
  
feel it believe all must  
come took hard hard without  
ill someone then waited than  
dreams feel me ride there  
just my be dreams come  
son deserves feel its hey  
  
what its im tied i  
more no little best the  
we me dope fine can  
the ally go love sherry  
loves we old dont sean  
the state dont greater hurricane  
  
me wouldnt thats in started  
difference got dee its night  
believin ooh away its come  
but wanna on feel ron  
yall love ive love bring  
im stopped arms through jump  
  
secret awake time those cause  
scared too offer behind i  
show o proceeding leaves go  
for at right or fight  
stand your get on middle  
hmmm i me but if'
```

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Fourth song, start with - "hiya":

```
----- Artist name: aqua -----  
----- Song name: barbie girl -----  
Model's lyrics:  
hiya words banana fiji sayin  
dont your down in for  
huh twice live be true  
its made alive will the  
some heart satin still me  
wall gone i would sometimes  
  
when sometimes do had feel  
the cant sail i time  
leaving it play come balls  
eyes free when come i  
sun im heart remember reason  
dont oh wanna crawled stan  
  
out never partial day down  
so but king somebody the  
spirits let prerogative ill black  
hoo be turn operate who  
look dont boys secret what  
the hope where free forgot  
  
up out wont me got  
like many for eat never  
need ah me the time  
law get the baby fostering  
woman the good walk i  
maybe i strangled fall head  
  
it found be i cause  
i away down out big  
fell es wanna get fine  
second evry riot church crew  
are in big watch id  
me why asking dolce leave  
  
me he listen the puppy  
like i that at your  
thanks out as theres oh  
cried day in slapped the  
mornin got chapter dont wish  
the alright been can for'
```

Fifth song, start with - "all":

```
----- Artist name: blink 182 -----  
----- Song name: all the small things -----  
Model's lyrics:  
all obvious he the terrible  
party someone get look high  
is find live in please  
be like the mine style  
only dont chances mover its  
always just be for at  
  
soul mad o buy above  
flow cold shes all mammals  
depths have sit thats get  
i for make complete with  
some along anyone givin i  
day i again i she  
  
in my in clock better  
too would me me there  
heartache like the than then  
valley by do my seams  
its what the all turn  
me save ho be stick  
  
silhouette believe the crying up  
are all me baby over  
were out the dark fall  
so youre forgotten hear think  
away rest so low on  
know up baby can it  
  
spirit marching cap tell our  
it mistake one cant this  
my on chaka be make  
show world know forgive am  
before try they this do  
the blow know but run  
  
oh soir direction fall are  
i else bell where it  
be turnin nose girl mind  
here some go me come  
that leaf i as hoop  
for can was this wide'
```


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- b. For each melody, repeat the process described above three times, with different words.

(input - the melody and initial word, the same words used for all melodies)

All generated lyrics for each of the melodies in the test set:

For the first LSTM:

First word - "fear":

```
.
----- Artist name: the bangles -----
----- Song name: eternal flame -----
Model's lyrics:
fear hour hed ooh my
bop breaky it na suspect
wouldnt make strong made yall
call will its foolish take
as think free lover how
my stupid in ice rye

war in like fire lets
spread without me head was
it he decide yeah made
his what in kill que
lets ran for want in
one with fantasies comin rightly

right one time how judge
i for but laughing take
dont forgotten edge it can
youre farewell street i despair
turn carry i me quick
in tape really support clear

why make no bathe could
buffalo were elses beside poco
me there be leaf dirty
i is chorus talked late
down my when yes they
can was just this the

love ill light that broadway
lazy hollywood what can boogie
would best like do touch
let as playing shining as
feet younger was if yes
i oh me fall my

in bustle do heart second
ah drove for city here
divides like young dimension fernando
what whenever eyes bates think
sleep calm do its in
dirty love it intergalactic know'
```

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----- Artist name: billy joel -----
----- Song name: honesty -----

Model's lyrics:
fear l the never want
happy my heals khan i
just little my dreaming faster
know new simple acne heel
things helped me she search
discovery bandits me other leave

check san t bear if
here times love is when
for ronnie soul looked help
rock then the all why
call hard for the pillars
romance thank kind me some

things almost give pinky superfly
the gonna check life him
want id know gave effect
baby cool get wonderland we
summer night on take me
it on two over better

east way have in i
me now washes wedding all
its cut do know me
on timin top the everybody
when lost always walk mine
in know no now believe

now o is he gotta
it its my me evening
fade that right about too
father were the heart see
holding the u like never
tonight well echoed mind beside

the behind suddenly my dre
said its ringin one deliver
forget p the ting pound
was ye papers back the
this know ill life one
down or things on go'

----- Artist name: cardigans -----
----- Song name: lovefool -----

Model's lyrics:
fear chorus before love hear
dick some like get i
thousand feeling up remember have
funk abandoned uptown lie my
know still prerogative thats it
but lost my sweetly been

but like go home intended
oh in think knees one
the gats world plane be
the white need alone i
nights in hoo its it
sing where breathe is me

we at entity sad go
the look my they especially
so all although till want
my be me talk moon
i i we live as
i touch born share the

your its the let bad
as me think girl living
tomorrow around in slim its
for oh play when cried
that feelings got your some
rest someday theres a for the

sent stop all on night
from wish misunderstanding the stars
im carnation will through have
when before we people sister
the me key head not
no party smack just matter

your the nothing baa dick
me want yeah grew story
new movie bar stream bring
smile i doctor gets matter
looking even slap way bali
me la never yeah na'

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----- Artist name: aqua -----
----- Song name: barbie girl -----

Model's lyrics:
fear pale pulls passed people
writing boardwalk so from save
around ill angels in last
when out just feel chorus
my my gone are see
was im deny gon see

then bring would dont me
this all sup dont come
better me blame find so
in wedding think not remember
cause stranger way or price
know place is the my

it when us let street
them tease your there which
broadway talking sight malts that
heaven i whoa tell want
someone dre good live been
all me the your standin

one that eighteen ive there
i shepherd when things now
think life that the not
ever could her your it
somehow time that shes takes
but goody dope im if

night mind my it unite
for light im long just
the in radio cherish got
not were da landed cleared
that its love they tell
cmon oh gonna lullaby shell

we i not youve its
sun have no got me
will we magic the start
beyond meet away embrace oh
from mind they come sitting
been sad i love is'

----- Artist name: blink 182 -----
----- Song name: all the small things -----

Model's lyrics:
fear fence won we just
stand where gets go bitter
my my in re your
i always hiding is it
me eyes thumping i listen
think hold things chance made

not want carson midnight i
marshall yoo baby how id
in youre baby from i
its can your have baby
la it days need away
your withholding feel shing the

deeds time lose from i
relax its baby but latino
control had can your i
chaka yeah like the go
should sorry did till i
upstanding turn i distance poison

oh future kinda mountain huh
forgotten mean out for better
re theres if hed everywhere
the is make ive spirits
me touch egyptian radio at
other bone the cut face

have tell the darling has
pushin days i short come
up he proves top if
without the everything no the
by i me common her
thats finally him sing your

got they truly old hero
do my kids me im
bad come her old it
just i zone yeah night
youre the so four down
voices look loving asleep by'

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Second word - "facing":

----- Artist name: the bangles -----
----- Song name: eternal flame -----

Model's lyrics:
facing do slut this youre
remember left on ooh have
mine homework i die sometimes
free every intergalactic dream meant
see happiness bed them myself
woah in i symbol im

me love relax ive would
someones yall say the be
wont be no more again
dark stand are part bitch
see never industry come meet
in my gotta be give

your new fucking love can
i limit yeah he mistakes
i dont those my i
my its ooh me another
gonna better nothing waiting why
is bad show that fates

time leaf that fairy share
my wit turn be chorus
there is in theyre right
know right on darkness mammals
love no everythings i flesh
cause nights were can the

the fire the over warriors
sleep not cant me there
theyre meet way i eyes
so me the sacrifice cause
knows shadow bars town like
up the that the now

but there say at choke
feeling moon light pushers goes
baby he they he knows
the its have niggas i
cant do big so good
way someday winding jokes its'

----- Artist name: billy joel -----
----- Song name: honesty -----

Model's lyrics:
facing beautiful boat working sleigh
can is beautiful the at
snow bye every heart well
with roll on these no
well believe if it says
your where that the the

what fit if there my
shoe needles do the wo
that have soir the lips
will it who yeah moving
will not her on never
wanna baby theres oh me

si want feeling have hit
be said its girls the
out want know musics im
when with here itself believe
through shorty me im my
grant set gonna will walking

im was im impregnate think
shit i me tired where
save red receive collects just
may was no him me
stress another deep stinking the
gift my losing the way

see so all noisy stars
help the mine with young
thug for rain the ha
be the huh we spin
strike like alone where my
gonna hes time get sea

school the me be right
in serious bad turn in
id without even the way
rock make hope were the
why i night illegal surrounds
deo ive what my passion'

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----- Artist name: cardigans -----
----- Song name: lovefool -----

Model's lyrics:
facing quiet months me pleading
key away think face sorry
the still walk salvation yeah
i through belong i or
game your be i for
used ill i see make

do this da i also
bell know superstar it the
devil love why the lie
j gonna oh know bein
that in up on woke
christmas ive walking heart the

the details come i here
on la rest we his
like down know in another
wish the me turning let
ring storm when got em
sing need then your long

tomorrows then flowers all child
when beside i knew la
no cant if stop bridge
beautiful more go should dream
man something saviors night baby
the the now nine i

me anymore me are all
the pretend take oh way
my prepared rather im own
relive give if feet it
thank the ive the that
ba be started new green

did cause it fo christmas
the ooo here the dream
cared dont baby life anything
other the in the different
we singin round well so
growing but gonna love too'

----- Artist name: aqua -----
----- Song name: barbie girl -----

Model's lyrics:
facing guiding any want why
love drank as off the
in like before yourself forever
tambourine someday every tonight i
again gonna da can diggity
gotta so me if i

ahead state too come think
game away love the the
through words me take knew
yeah cause the over studio
way man from open youve
light i be ones down

we is lies oh your
let one just fuckin i
me thing more start come
only santas beat beautiful i
whenever lightnin the mom princess
turn thats monday cap sister

could the fuckin sweet dreams
my when oh fuckin me
grand dead huh for been
date gold store me faithfull
night remember whiskey me guitar
switch grabbed it is me

home rising outlaws whoa more
new cup take the lets
whos down me go frightening
here face loves la can
dancing gon out love all
that rum the youre me

see year luck that like
mean time wish i now
love i in brian one
the in for here the
or by what me the
me more listen that rhythm'

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```
|
----- Artist name: blink 182 -----
----- Song name: all the small things -----
Model's lyrics:
facing sketch thats rock sons
jasmine ive levee na the
beside set tell show do
it tried it wiff sky
me peeps clown me my
brothers go back we body

ronnie then on night on
do we my cryin into
the grabbing moi im be
large more we tell am
minds come was the soon
these see in i guess

say mean for bloody what
just line wakin men will
tomorrow think where in voulez
oh from ooh i beneath
brother or believe at that
might need dont fallen past

in for i it i
easy i take puttin but
see no charmless really her
the with y she band
like tattoo need would in
what use in was seem

that girl he happy at
together i from always its
communicate broken similar used gone
that fast answer dont pay
i give moss sister love
we the is oh him

across e its latino i
holding i so years i
tell once win loudmouth around
leaving daa wana freeway let
rat telling the matter in
word comin just um used'
```

Third word - "problem":

```
----- Artist name: the bangles -----
----- Song name: eternal flame -----
Model's lyrics:
problem home think hands how
cause eyes they close it
together when daily be when
it i square if cause
baby casbah could stars when
i scream that intergalactic we

found man just my me
sea good your me better
ill klein cry down away
till this from home push
blade ill every song me
busy wishin cut barnes control

things got dont i this
motion the me cause the
what sueno crazy the do
wine on loving want da
show be me respect believe
air images it my me

hungry nothin new me around
sight storm marmalade go sold
come beat pull now ohhh
in much i tonight when
please happens on stuff like
me its through from my

never want in back make
i gonna takes when follow
dont belong i the lyin
me we lovers clique me
devil come so left cause
kicked assassin park any it

firelight pretty my hide bouncin
caught better it news some
be taking tomorrow the on
destiny something where me me
me damn i miles nothing
feel smiled his time i'
```

Deep learning

Assignment 3

----- Artist name: billy joel -----
----- Song name: honesty -----

Model's lyrics:
problem prayer girl darkness me
drunk id child know happens
should this love help die
along we cupid its they
watchin dancer me hard i
that new chaka alle your

time the me my the
again shining gives your find
because the woohoo let boy
no nameless ive in hear
things im mind sign its
her ooo well sweet always

dub me i me time
me cool oh justify quarter
night that yeah would leave
they cause rain beat heart
be cannot cant like see
mama lend youre can on

trouble still even its not
me got dance wrong it
the native that with thug
i my belong green sola
new daa groove baby that
illegal get now come it

like way by will sunk
away work named then nothin
the countless through in come
shot dawn summit time breathe
bring want times sharing i
date whiskey its get the

hold it on away love
fun on waste love make
human again on friends say
wiped chance sign me blame
its ahhh than could the
frontin the anything what did'

----- Artist name: cardigans -----
----- Song name: lovefool -----

Model's lyrics:
problem strangers about remained when
broke one win get the
dont for no knows youve
good the life oh day
snow were time were spinning
me dream but up me

the crazy baby think pull
tugboat he someone live i
lifetime oh just was drama
oh youre side as now
it whoa thing up sayin
father love gimme in me

cup hands your see say
in thats the need theres
we house me i ahh
worth my i gone answer
just gloom watch darling too
want word time one remember

star i desert dreams your
bed watching who yeah by
all when take witchy street
helped right the that the
in space was chucky i
seems smoke is id shady

white words know sane great
fool soft shes anyway theyre
let as only ive think
the ladies holding dont go
its middle mony down they
on im like my now

carry back them two that
destroy load restraining ah blink
can them yeah me through
baby it the only do
myself now deserves something passes
your but on taught jumping'

Deep learning

Assignment 3

----- Artist name: aqua -----
----- Song name: barbie girl -----

Model's lyrics:
problem dop freedom takes apart
the when theyre song at
the looking i not find
miss need is too evening
wanda still back set for
turned youre think need can

bootie cause is too right
know that chases me can
two safe waiting game alright
full my her i know
the stop them heart dre
youll boardwalk be your in

rico theyve love world again
on are stopping witchy the
asap bull goes the ya
knife bout makes no never
forty use im have jeans
with what get the oh

catholic things dont let got
mistletoe hold are never bop
yourself come right love i
gonna world torso me off
i mama nigga i what
need only baby back for

hand that the your is
for closer my right away
like did my we made
never i what little in
fields stomped i its thank
feet give frame washes hurting

die for tavern then what
my bird see me so
want way way said see
the your even rum me
bridge reconsider that want is
step your let me are'

----- Artist name: blink 182 -----
----- Song name: all the small things -----

Model's lyrics:
problem dream ancient girl black
many his this the gentle
alight i fire dance really
the race said say im
those need got in family
that theres the sunday i

motherfucker the schemes river me
fine yeah boy have on
wanna go i copa porch
can everything one say eyes
oblivion will goody the can
touch him want it cheatin

start gonna every never one
is i we wrap girl
this hungry little world doll
smokin could through feeling the
breaky find lets the it
could i again whats two

out rude broken christmas up
be with please me the
get way love deeply how
lucy got tastes an find
be it ba for gonna
shop frame finger i girlfriends

tonight we roof when when
forever reggae me di planned
way i me look the
make for on do i
story ive beside cant prison
the say gonna paid package

away not i look we
when he out womens la
seems toast it old gold
quit not oh down i
life did on youll wind
gotta i i right that'

Deep learning Assignment 3

For the second LSTM:

First word - "fear":

```
----- Artist name: the bangles -----  
----- Song name: eternal flame -----  
Model's lyrics:  
fear bedroom id murder tomorrows  
no feet chaka e but  
forever miss reason under gang  
i on drums ever hear  
ring but its me in  
over love honestly youre again  
  
it stage kind get jeans  
for tension chase love out  
be me are till in  
mouth right go room guy  
well world i may in  
ticket bad hello ba i  
  
could me your oo cut  
made makin my i icy  
she i even understand its  
faith invisible ride make so  
game me ive slipped all  
do my now stolen in  
  
be amor hollywood my finger  
then ill side avenue rock  
headed on youve it baby  
too how lane lipstick there  
play time one fernando potion  
go fucked way wind will  
  
come like thinking cat closer  
mind bodys i upon afraid  
me they when real more  
race on do are here  
make around the me see  
under there undress when smiling  
  
funk love the show love  
we mess blood another knew  
letter i tragedy oh youre  
someday inside change so right  
the thousand me now i  
ooh me donut graces out'
```

```
----- Artist name: billy joel -----  
----- Song name: honesty -----  
Model's lyrics:  
fear sip elvis babys proceeding  
york is life or come  
i soul do forgive rainy  
me the but not moon  
me game never see as  
do there know boardwalk me  
  
one not here ohh say  
just i fulfilled stronger by  
radio its anyway out thought  
twist with full the passed  
puppy four easily is air  
is come such always your  
  
theyll all cried find will  
wondering again the tonight up  
on im lonely on the  
me stop ooo be dont  
how my it gift yall  
see then changes so the  
  
for beats show come shoot  
never if ooh leave come  
me together let shit the  
read waterloo oh on wanna  
the youre music on youre  
forever knowin fun can me  
  
like dance love young arise  
but call feels green be  
round would people my heart  
come timing smile place like  
dont if up can been  
beach it my i have  
  
really timin the awkward with  
rock nobody sola ding sentimental  
better explain just ooh go  
nobody out chose end put  
hold let get in harder  
fire drowns show murderer over'
```

Deep learning Assignment 3

----- Artist name: cardigans -----
----- Song name: lovefool -----

Model's lyrics:
fear pose that tight on
gay memories gotta know say
my or i party words
me need die searching made
call when the time cause
tragedy ive us is it

this got just men i
on finally i does truck
let time that rolls nothing
this my get colors eye
around by i think liquor
really seen easy would home

i my shes hurtin shes
again losing live for shell
said this we whys on
true beside just gonna in
r na rich your is
in up ive on the

till down i i in
beautiful youll around the one
had my hand practice this
here night the drunk put
show known life i your
tried think my box needs

me hail tomorrows the ladies
on show i gone shell
it feeling pushing our me
behind know when stormy my
nah the in oh me
i fighting be bout enough

pink theres right she he
for turn san one i
me five never because from
must my back largo me
love name love so control
yeah toast me the alone

----- Artist name: aqua -----
----- Song name: barbie girl -----

Model's lyrics:
fear pleased hot drum oh
wont well accusation i hahaha
flesh tale mention it kicked
in im set had wait
he up get show im
by go so forms then

basis in be hes uh
doing if for i it
well the your about your
me in mo fires one
well me for settle inflate
cant your road youre biting

well out can for the
your can me understand tall
no get evening making these
daddy is turn time the
me could youre that understand
with me risk soon make

never heart heart which i
best dont me i in
orient the will for act
shoes this its ooh this
goodbye like world out my
believes will that say felt

stronger with happens the like
would whoa make oh my
i i down stay all
collect is fairy lose out
do burn limousine it when
little oh the dee dust

it standin so staying too
the are just like praising
down my poor stop can
wicked door chorus rum hand
me the i the gonna
could but thats think long

Deep learning Assignment 3

```
,
----- Artist name: blink 182 -----
----- Song name: all the small things -----
Model's lyrics:
fear broadway always lost so
right grain be my it
i minute lives out lovin
impatiently over do your fly
the smoke are blue than
with feed when outrageous measure

paul gold pride robin eight
racing for through loved ooh
oasis chew in tender fightings
i surround here me fed
knight may tonight back it
yet were planetary please youll

walks smile little soft hear
with what me no bungalows
when realize sayin law my
me i your tried dear
law deep the my pipe
on be know heart questions

the til not ring when
nights in let one the
from breaky ill load the
now horas loved right tomorrow
ron hear magic each passages
really we words beside for

the asking i state anywhere
dance cause for saddle sign
once wonders but flesh sleep
working show inside fade is
the why made my beside
will the lovers letter lonely

call can let what it
ready think then good play
us tell i watch love
down if the we sad
i now have will advice
my mind with im yeah
```

Second word - "facing":

```
,
----- Artist name: the bangles -----
----- Song name: eternal flame -----
Model's lyrics:
facing told keep into stares
youre forget believin me oh
en oh have the right
live love explodes think was
while whose many apart must
warmth like mr the girls

show ill your can like
say done or early all
ooh be im time the
me go day corners too
will who back na want
dont city your starry games

thangs i again away reaching
reminds color but smuggling what
feel me i way egyptian
tired ninety it easy too
footsteps your it for world
why offer seem day the

per all go what tremble
beat seems heaven little makes
life in ceiling not are
were the want dare me
do man beat time soul
clap the theyll can stare

the soon never work round
is save little me shot
harder run in two me
seem hell it brown eyes
love another broadway he have
theyre time know see break

up got oh know from
than come follow big it
about have chorus got down
show i the lovesick but
cry from lane bring gees
looking some left all need
```

Deep learning

Assignment 3

```
.
----- Artist name: billy joel -----
----- Song name: honesty -----
Model's lyrics:
facing peep pumpkin bell pretty
along she dawn chick your
my your know i never
upon but made skies is
have will forward well knows
tell it we lovers the

they young in your hug
hip chorus feel the fooling
i me rise me my
know worse played gossip is
georgia goin us maps gonna
weak wanna heart para box

so hearts gentle now everybody
the shady when the my
me its sunglasses dont nine
we classroom would streams relax
walk i ooh missiles together
know may how im youve

broadway i theres it beg
me balloon but me games
es life goodbye apart i
your the would blood how
must only there after i
whats destruction funk nicky people

i i the woman its
the is set i ive
oh up like dont will
what blade quarter fire nothin
wit i boogie i yeah
matter memory it your i

his poison over cold have
sentimental helped from out bout
dawn yeah i frail beat
could nigga head our all
my crime come waste misunderstanding
brother shes becomes incense will
```

```
.
----- Artist name: cardigans -----
----- Song name: lovefool -----
Model's lyrics:
facing trains yard learn can
ring scribble sure think alligator
knowing trust spent we i
songs so me catch care
jesus married knee mean happen
assure every bop the deaf

thats id here already my
ever shy say baby wants
down me still die time
how ill shes that playing
go had id close dream
was the passages my me

looks still they got bitch
greed i games all let
broken at or decent run
can it hip eyes say
i off its here cause
both kick your country its

tribal i ride poison everybodys
find drip love us my
love in ive whole sweetly
i tight die crime other
feel creation find friendship her
dont could sucks spinning in

see hot dont trees try
or foreigners do soul baby
niggaz me off me be
vibration is know eyes wrong
everybodys the spend dont know
girl devil yourself id me

make believe me jumped ser
my let got old think
least they drinking me say
our my far arms i
will them round theres just
ten is me que la
```

Deep learning Assignment 3

```
.  
----- Artist name: aqua -----  
----- Song name: barbie girl -----  
Model's lyrics:  
facing preparing fairy ourselves seems  
was your always as over  
wonder al i somewhere can  
radio for one know my  
flame this log me yall  
love please that need what  
  
be do pop the who  
there it whats in theres  
right got if the i  
night knew no all god  
no into kill here missed  
pushed not the come look  
  
rock day like smile your  
like it real me story  
the she its theyll one  
would hope loved ill beside  
like can driver times watercolor  
good die headed right really  
  
were shits saw ho chases  
show alright the behind me  
on hate at were ninety  
would that girl find im  
more tellin id la dont  
it i blood the as  
  
they its through feel will  
did the i be light  
arms mind theres the win  
wild my my coming the  
way i light if i  
believin little steel up i  
  
used close in cause yeah  
oh where ground start the  
your whoa measure can i  
by bit did window my  
oh boston on or count  
my cant other tin faces
```

```
----- Artist name: blink 182 -----  
----- Song name: all the small things -----  
Model's lyrics:  
facing tank hills look i  
two hip theres bag bodys  
velvet its years wine im  
they strings eyes out looking  
style he them oh your  
heart lord year dont i  
  
i makes ive rails mad  
more just time in was  
all love toms without our  
when i hair stolen la  
oh gonna strong i nail  
umm itself eyes im often  
  
all ive goodbye will me  
love what we your have  
ways last can baby rhythm  
if go many not drugs  
found it do no says  
your me come gonna stop  
  
turn sister be up that  
be in im stay kid  
casbah good em sky tell  
piano its dee im the  
i honey in have the  
we i the itll just  
  
time jung terminally dancing me  
stuff days beats seems the  
where snow or would i  
in me yeah im i  
air would like california yeah  
is dawn around me know  
  
eve couldnt but names story  
everyday it free try in  
the i world different i  
play them harmony shady did  
i hurting said knowing put  
mad i goes me still
```

Deep learning Assignment 3

Third word - "problem":

----- Artist name: the bangles -----
----- Song name: eternal flame -----

Model's lyrics:

problem clear seen out me
weve prick better try night
betta fair pickin walk if
easily tried love is lovin
ron radiation long thug time
only oh nothin way johnson

always just across they twilight
asking copa ha oh both
well fade friends ozone but
back say different middle be
hands think so at the
hurl love on prince it

out for steps kinda its
walking with eee my dont
sees money time but strangest
lies little loving saw joke
cheer in work it dont
babe its be first with

dreaming find amazing some i
the strong im different follow
vision that sidewalk goes me
broadway me lead was the
as die i be pot
keep very do kick oh

dont oh the not spinning
places love rich it but
your anytime fall i horses
the life got love its
the i be gonna mistakes
i when gonna largo every

heart come moonlit around listen
i boys get now want
out the all i now
bar c or then an
sherry easy me carries coast
all slim tell no it

----- Artist name: billy joel -----
----- Song name: honesty -----

Model's lyrics:

problem belonged younger ive dont
baby ill boyz theres it
lies who but with free
whoa if asylum watch its
heaven your in can everybody
why high the em come

me another voice hair believe
for that when oh man
man really through go that
smokin be co ours oh
dont feed will through marathon
would thing is drives decided

gonna moon the the im
mans but see go shady
oh the the everyday intentionally
cause that on permission i
i world me baby world
miss mostly no ten heart

rendezvous i dont belong he
some tender bells shoe under
leave feel tonight stinkin the
springer here but theres the
they see can romance lie
bye in it are love

we mind there they said
trying ya i road just
just up my holly may
me new it deeds were
lands behind it sha me
the more good well do

backwards your laughing an yeah
stranger im theyre piece yeah
am days slop die just
reconsider cries the the go
go the night why was
hide know high like off

Deep learning Assignment 3

```
----- Artist name: cardigans -----  
----- Song name: lovefool -----  
Model's lyrics:  
problem tease boca back thats  
throwin me deal eyes for  
ill send truth oh i  
industry all your my in  
jasmine the cant instinctively tha  
fortune i mind design like  
  
the tainted mind that with  
here say just radio for  
over is everything on we  
makes hurt rest the right  
need never when high even  
my fires ill hang tha  
  
i me street walk your  
on searching let will started  
north that with the do  
off through what arms showing  
fever real pockets whisper goodbye  
only sentimental i up be  
  
body dont my in up  
more lies town people will  
from feel me im fruitless  
get huh its water da  
on like fall sun like  
go one the that best  
  
up sin fuck phone will  
the i have danger other  
stairs still down want with  
i top your let the  
hey hope oh is forgotten  
me gonna fly i long  
  
harder just may the ride  
rolls we love for beside  
opened knowing feel youve know  
offend i just for your  
take other from if is  
the smile the heats theres
```

```
----- Artist name: aqua -----  
----- Song name: barbie girl -----  
Model's lyrics:  
problem hell although but is  
i your weak up knees  
ivory over but me while  
i questions kind oh but  
i hey clutches been i  
fell enough going no am  
  
do give your before im  
the me alive have just  
georgia hundred take me in  
if good turn he your  
pretended is say my wo  
if me your think just  
  
puppy your bootie somebody my  
fun me your love on  
me but dop they breathe  
love what dont me tore  
what just die me hey  
caught need til an now  
  
gathering get now when love  
old your daylight my will  
our whether want weather momma  
turtle maybe i games already  
can the the did me  
love for i me she  
  
i men broke listen on  
trying able superman who do  
touch for give crowd winner  
is local right succeed shady  
ill new it misunderstanding now  
he moment sex bear kept  
  
oh yeah make stay contract  
its alien at hes gotta  
that no what just are  
ivory me like i de  
me no someday my not  
we la wiped like better
```

Deep learning Assignment 3

```
'
----- Artist name: blink 182 -----
----- Song name: all the small things -----
Model's lyrics:
problem planet it that it
up for letter my loving
turns once alone even with
swimming no fight afraid corners
gonna loves so seasons chance
dont do tries christmas somehow

building the i out heat
so hit everything sex want
young your native that care
your proof for savvy i
somehow i but at knocked
life beer oh no admire

it away freedom free soul
the i me watching is
this like no everywhere that
life stop girl youre id
temper cause be cant we
father i youre tell seen

down if vacation say sweet
baby stop an swallow why
shu superficial dear ill its
cant its i it i
me was but youre lot
mid fight i now like

always jasmine that them with
sha on good all huh
gotta rock clouds been night
all know theres shall problem
round cry happens room i
great out my that on

sheets make hard be hate
need gab em must much
im only the just they
ooo chicken cats my dark
for ken jacks please spark
quiero really bend your when
```

Analyzing the effect of the selection of the first word and/or melody on the generated lyrics:

The selection of the melody – The word 'wrong' exists in the generated lyrics 4 times, 2 of them for the melody of "eternal flame" and two for "honesty" (for different first tokens).

The word 'close' which is the real first token of "eternal flame" appearing 12 times in the generated lyrics, 10 of them for "eternal flame" for different first tokens (1 for "barbie girl" and one for "lovefool")

The word "home" was generated almost just for given the melodies for the songs "eternal flame", "lovefool".

*It seems that there are generated worlds which affected by melodies.

The selection of the first word – the word 'fall' was in the generated lyrics once for every song who got his true first token, and 2 times for different tokens.

The word "problem" was repeated 13 times, only for the evaluations when the given first was "problem" as well.

Here It's harder to detect some pattern, it seems the melody has higher effect.

Moreover – there are common words in the data who repeat a lot a in the generated text as - 'love', 'take', 'you'