# Lyric Search Engine

-INFORMATION RETRIEVAL SYSTEM

Group Members:

Project ID – 30

1.  SAI SWETHA MEKALA --> Indexing, Refining Search based on artist name, Capturing Feedback (using Rocchio Algorithm)

2.  HESHVITHA MARUBOINA --> Searching, Refining Search based on genre, Assessment component

Project files drive link:

https://github.com/Heshvitha/IR_LyricFinder

**Project Description:**

Individuals who possess fragments of song lyrics in their thoughts can easily retrieve the complete lyrics using our advanced retrieval model. Users submit queries containing partial lyrics, and our system recommends a curated list of lyrics closely resembling the input. The search engine employs the vector space model to calculate similarity, providing the top 10 results.

Additionally, our search engine is equipped to refine results based on user feedback. By leveraging the vector space model, we assess the similarity between the query and available lyrics. User feedback influences the system's ranking, ensuring that the most relevant and accurate lyrics are presented.

**1. Indexing components:**

We take the all documents and create a dictionary,keys are the all-unique words and the posting list is the document ID and frequency of that word in that document.

**2. Searching components:** We calculate the tf and idf values and assign the weights to each document by creating a vector. Similarly find the vector to query, and now find the similarity between

Query each document by using cosine similarity, based on that we rank the document and return the top 10 documents.

**3. Refining searches based on specific filters**

a. Search based on the genre we search the documents based on the genre of each document, in our data set we have only 7 genres, if the user enters the genre we return the top 10 documents based on the entered genre and the similarity of that document

b. Search based on artist name we search the documents based on the artist's name, if the user enters any artist we return the documents related to the artist's name

**4. Capturing Feedback :**

By taking the relevant feedback from the user, we find the new query using the Rocchio algorithm (Qnew = alpha(q) + beta(u®)gamma(u(NR))) a = 1, B = 0.75,r = 0.25 after getting new query we find cosine

similarity between the new query and each document and return the top 10 documents
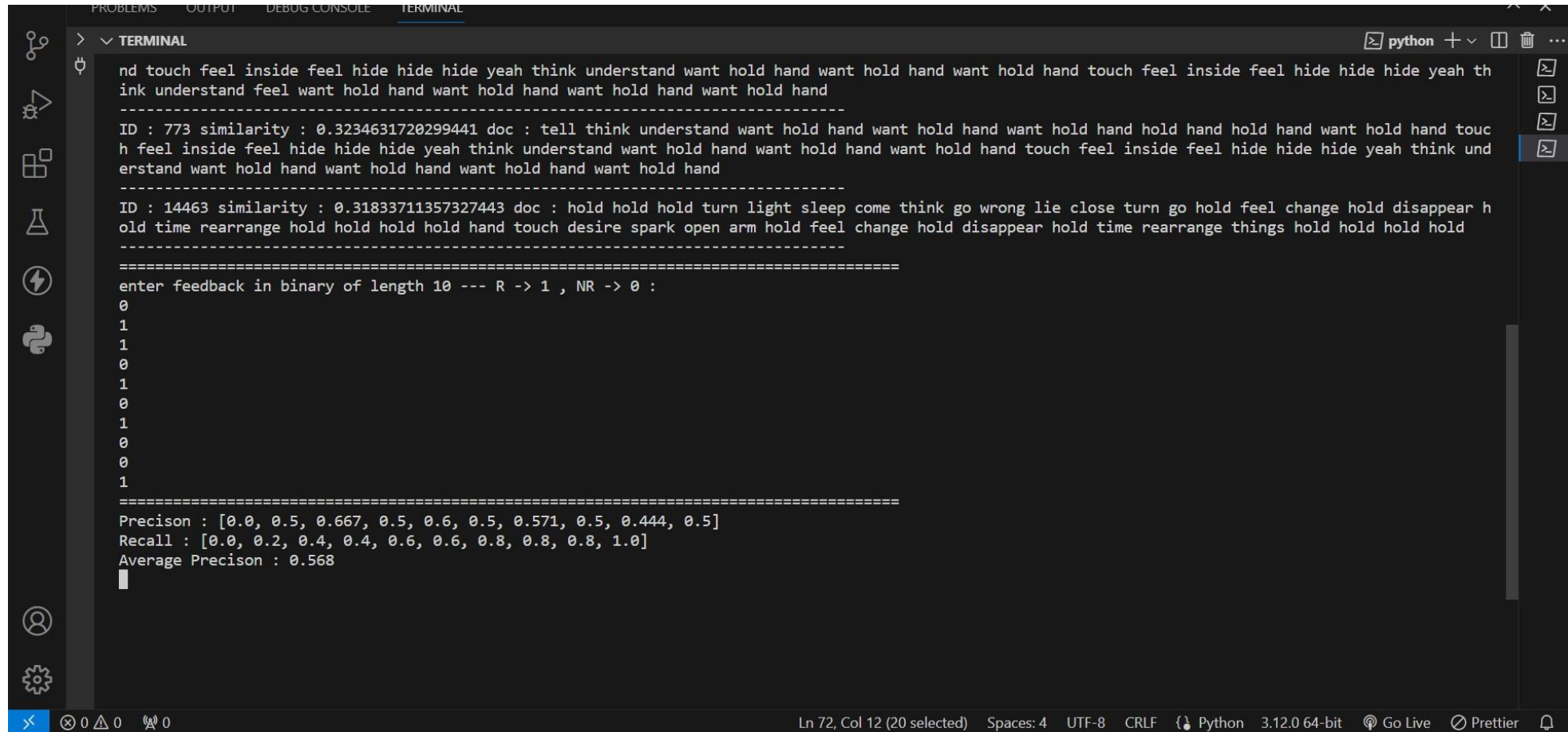
**5. Assessment Components :**

We calculate the Precision, Recall, and avgP and plot a graph of Precision and Recall

**Indexing and first round of search results**



```
PROBLEMS    OUTPUT    DEBUG CONSOLE    TERMINAL    JUPYTER                                          python  + ∨  ⊟  🗑  ∨  ✕

[nltk_data] Downloading package stopwords to
[nltk_data]     C:\Users\nukas\AppData\Roaming\nltk_data...
[nltk_data]   Package stopwords is already up-to-date!
creating inverted index.....
inverted index is created.
=================================================================================
finding ranking for a given query....
enter the query: hold time feel break
top 10 documents are :
ID : 19215 similarity : 0.44194899026787393 doc : feel feel feel feel feel feel feel feel feel feel feel feel feel feel feel feel feel feel feel feel feel
--------------------------------------------------------------------
ID : 26006 similarity : 0.3840966619944812 doc : near hold hold near fear hold hold hold hold hold
--------------------------------------------------------------------
ID : 2707 similarity : 0.36769722964000306 doc : heart break heart break heart break heart break seven heart break heart break
--------------------------------------------------------------------
ID : 25383 similarity : 0.34531244007792483 doc : hold heart hold feel know know happen hold heart cause look shoulder rush time feel hold heart throw lifeline place deep inside ho
ld heart tell patient cause time want recall feel know want hold heart cry matter hold heart hold feel know know happen hold heart hold heart gonna hold heart hold heart hold hold
heart hold hold hold hold
--------------------------------------------------------------------
ID : 8887 similarity : 0.3411770242444031 doc : home home sweet home go home wait share yeah kind love mess know women feel heart completely free hold hold close completely free ye
ah hold hold hold hold hold hold hold hold hold hold hold hold hold hold hold hold hold hold hold hold hold hold hold hold hold hold hold hold hold hold hold hold hold hold ho
ld hold hold hold hold hold hold
--------------------------------------------------------------------
ID : 20580 similarity : 0.3289879823489308 doc : time time
--------------------------------------------------------------------
ID : 1324 similarity : 0.3281390525888006 doc : anybody lovin hearts start wrong feel slip away time baby feelin hold tight baby break heart heart feelin time lonely time baby feel
in hold tight baby break heart heart feelin time lonely better lovin start wrong feel slip away time baby feelin hold tight baby break heart heart feelin time lonely time baby feel
in hold tight baby break heart heart feelin time lonely time baby feelin hold tight baby break heart heart feelin time lonely time baby feelin hold tight baby break heart heart fee
lin time lonely time baby feelin break heart fade
--------------------------------------------------------------------
ID : 24004 similarity : 0.3279171794836191 doc : yeah tell think understand want hold hand want hold hand want hold hand hold hand hold hand want hold hand touch feel inside feel h
ide hide hide yeah think understand want hold hand want hold hand want hold hand touch feel inside feel hide hide hide yeah think understand feel want hold hand want hold hand want
 hold hand want hold hand
--------------------------------------------------------------------
ID : 773 similarity : 0.3234631720299441 doc : tell think understand want hold hand want hold hand want hold hand hold hand hold hand want hold hand touch feel inside feel hide hid
e hide yeah think understand want hold hand want hold hand want hold hand touch feel inside feel hide hide hide yeah think understand want hold hand want hold hand want hold hand w
ant hold hand
--------------------------------------------------------------------
ID : 14463 similarity : 0.31833711357327443 doc : hold hold hold turn light sleep come think go wrong lie close turn go hold feel change hold disappear hold time rearrange hold hol
d hold hold hand touch desire spark open arm hold feel change hold disappear hold time rearrange things hold hold hold hold
--------------------------------------------------------------------
=================================================================================
enter feedback in binary of length 10 --- R -> 1 , NR -> 0 :
```

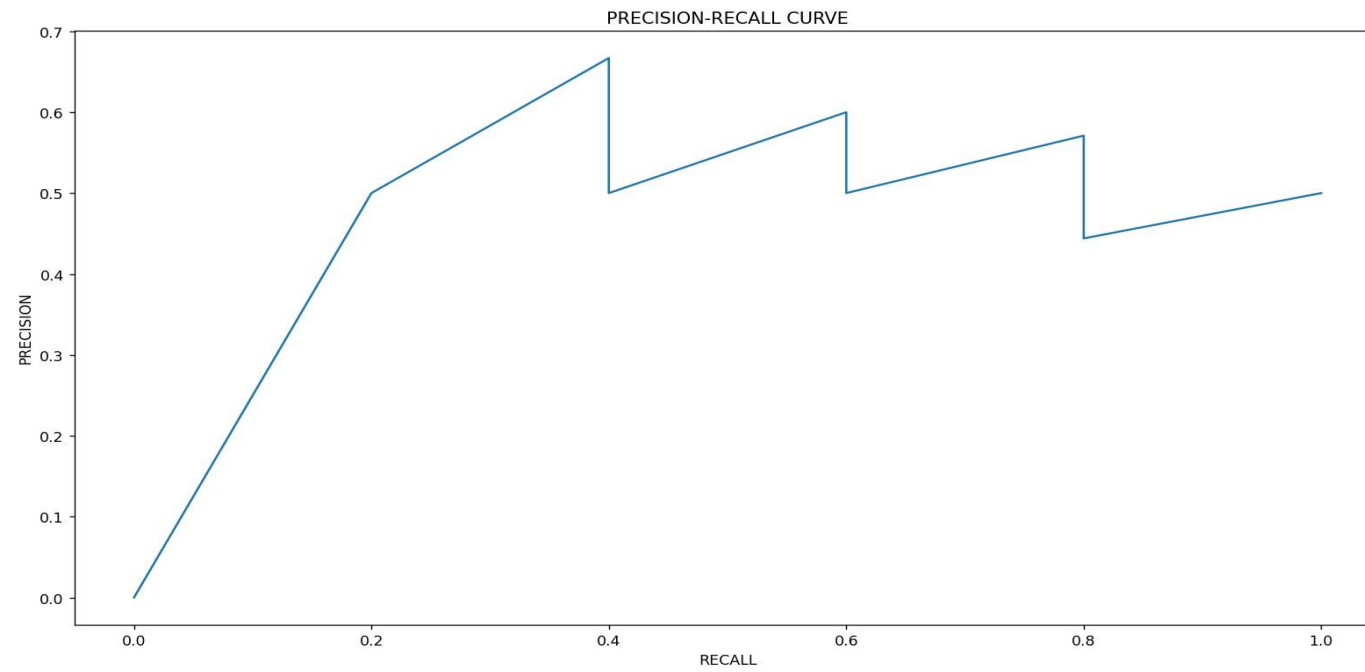# Taking relevance feedback and giving precision, recall and average precision



```
nd touch feel inside feel hide hide hide yeah think understand want hold hand want hold hand want hold hand touch feel inside feel hide hide hide yeah th
ink understand feel want hold hand want hold hand want hold hand want hold hand
-------------------------------------------------------------------------------
ID : 773 similarity : 0.3234631720299441 doc : tell think understand want hold hand want hold hand want hold hand hold hand hold hand want hold hand touc
h feel inside feel hide hide hide yeah think understand want hold hand want hold hand want hold hand touch feel inside feel hide hide hide yeah think und
erstand want hold hand want hold hand want hold hand want hold hand
-------------------------------------------------------------------------------
ID : 14463 similarity : 0.31833711357327443 doc : hold hold hold turn light sleep come think go wrong lie close turn go hold feel change hold disappear h
old time rearrange hold hold hold hold hand touch desire spark open arm hold feel change hold disappear hold time rearrange things hold hold hold hold
-------------------------------------------------------------------------------
===============================================================================
enter feedback in binary of length 10 --- R -> 1 , NR -> 0 :
0
1
1
0
1
0
1
0
0
1
===============================================================================
Precison : [0.0, 0.5, 0.667, 0.5, 0.6, 0.5, 0.571, 0.5, 0.444, 0.5]
Recall : [0.0, 0.2, 0.4, 0.4, 0.6, 0.6, 0.8, 0.8, 0.8, 1.0]
Average Precison : 0.568
```
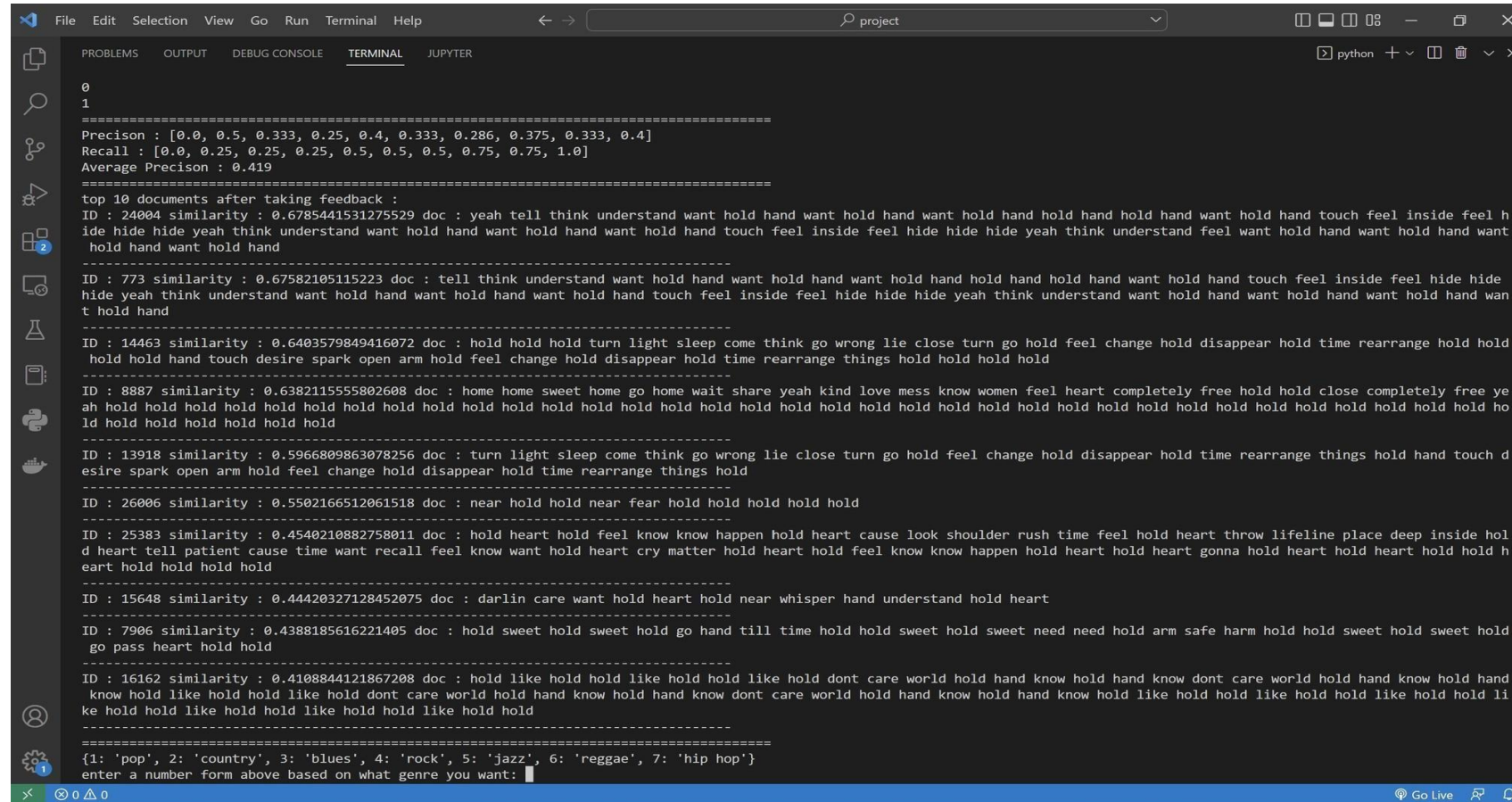
Figure 1

PRECISION-RECALL CURVE

PRECISION

RECALL

x=0.4586 y=0.4366

# New results after relevance feedback



```
0
1
===============================================================================
Precision : [0.0, 0.5, 0.333, 0.25, 0.4, 0.333, 0.286, 0.375, 0.333, 0.4]
Recall : [0.0, 0.25, 0.25, 0.25, 0.5, 0.5, 0.5, 0.75, 0.75, 1.0]
Average Precison : 0.419
===============================================================================
top 10 documents after taking feedback :
ID : 24004 similarity : 0.6785441531275529 doc : yeah tell think understand want hold hand want hold hand want hold hand hold hand hold hand want hold hand touch feel inside feel h
ide hide hide yeah think understand want hold hand want hold hand want hold hand touch feel inside feel hide hide hide yeah think understand feel want hold hand want hold hand want
 hold hand want hold hand
-------------------------------------------------------------------------------
ID : 773 similarity : 0.67582105115223 doc : tell think understand want hold hand want hold hand want hold hand hold hand want hold hand touch feel inside feel hide hide
hide yeah think understand want hold hand want hold hand want hold hand touch feel inside feel hide hide hide yeah think understand want hold hand want hold hand want hold hand wan
t hold hand
-------------------------------------------------------------------------------
ID : 14463 similarity : 0.6403579849416072 doc : hold hold hold turn light sleep come think go wrong lie close turn go hold feel change hold disappear hold time rearrange hold hold
 hold hold hand touch desire spark open arm hold feel change hold disappear hold time rearrange things hold hold hold hold
-------------------------------------------------------------------------------
ID : 8887 similarity : 0.6382115555802608 doc : home home sweet home go home wait share yeah kind love mess know women feel heart completely free hold hold close completely free ye
ah hold hold hold hold hold hold hold hold hold hold hold hold hold hold hold hold hold hold hold hold hold hold hold hold hold hold hold hold hold hold hold hold hold hold ho
ld hold hold hold hold hold hold
-------------------------------------------------------------------------------
ID : 13918 similarity : 0.5966809863078256 doc : turn light sleep come think go wrong lie close turn go hold feel change hold disappear hold time rearrange things hold hand touch d
esire spark open arm hold feel change hold disappear hold time rearrange things hold
-------------------------------------------------------------------------------
ID : 26006 similarity : 0.5502166512061518 doc : near hold hold near fear hold hold hold hold hold
-------------------------------------------------------------------------------
ID : 25383 similarity : 0.4540210882758011 doc : hold heart hold feel know know happen hold heart cause look shoulder rush time feel hold heart throw lifeline place deep inside hol
d heart tell patient cause time want recall feel know want hold heart cry matter hold heart hold feel know know happen hold heart hold heart gonna hold heart hold heart hold hold h
eart hold hold hold hold
-------------------------------------------------------------------------------
ID : 15648 similarity : 0.44420327128452075 doc : darlin care want hold heart hold near whisper hand understand hold heart
-------------------------------------------------------------------------------
ID : 7906 similarity : 0.4388185616221405 doc : hold sweet hold sweet hold go hand till time hold hold sweet hold sweet need need hold arm safe harm hold hold sweet hold sweet hold
 go pass heart hold hold
-------------------------------------------------------------------------------
ID : 16162 similarity : 0.4108844121867208 doc : hold like hold hold like hold hold like hold dont care world hold hand know hold hand know dont care world hold hand know hold hand
 know hold like hold hold like hold dont care world hold hand know hold hand know dont care world hold hand know hold hand know hold like hold hold like hold hold like hold hold li
ke hold hold like hold hold like hold hold like hold hold
-------------------------------------------------------------------------------
===============================================================================
{1: 'pop', 2: 'country', 3: 'blues', 4: 'rock', 5: 'jazz', 6: 'reggae', 7: 'hip hop'}
enter a number form above based on what genre you want:
```

# Application of filters based on Genre and Artist



```
=================================================================================
{1: 'pop', 2: 'country', 3: 'blues', 4: 'rock', 5: 'jazz', 6: 'reggae', 7: 'hip hop'}
enter a number form above based on what genre you want: 2
---------------------------------------------------------------------------------
ID : 8887 doc : home home sweet home go home wait share yeah kind love mess know women feel heart completely free hold hold close completely free yeah hold hold hold hold hold hold
 hold hold hold hold hold hold hold hold hold hold hold hold hold hold hold hold hold hold hold hold hold hold hold hold hold hold hold hold hold hold hold hold hold hold hold hold
---------------------------------------------------------------------------------
ID : 7906 doc : hold sweet hold sweet hold go hand till time hold hold sweet hold sweet need need hold arm safe harm hold hold sweet hold sweet hold go pass heart hold hold
---------------------------------------------------------------------------------
ID : 9055 doc : want woman like hold want good baby hold friends think fool tell cool want woman like hold want know hold slow baby hold girls head lie want know hold reason kind b
elieve blind think need woman like hold want mind baby hold small talk keep apart hide feel hearts think need woman like hold want woman like baby hold hold hold hold baby hold hol
d hold hold hold
---------------------------------------------------------------------------------
ID : 8678 doc : like think treat badly madly hold hold hold hold baby want need want kiss need wrong strong hold hold hold hold baby want hold hold hold hold hold hold tie tie want
 leave want stay want spend want split quit hold hold hold hold baby want hold hold hold hold hold hold hold hold say hold hold hold baby
---------------------------------------------------------------------------------
ID : 10164 doc : need hold look like time know want time like time want hold want heart look eye want feel inside want know instrumental learn lonely nights strangers take time rea
l feel invitation body like look inside soul want hold want heart look eye want feel inside want know want hold want heart look eye want feel inside want know
---------------------------------------------------------------------------------
ID : 8413 doc : gonna hold gonna hold gonna hold life rough kind real good life hard best know make grow live kind want bring happiness away gonna hold gonna hold gonna hold time t
ell right wrong know right hold future fill want gonna hold gonna hold gonna hold gonna hold gonna hold gonna hold
---------------------------------------------------------------------------------
ID : 7262 doc : hold heart till hold arm like hold think dream night away till arm star know reason feel blue away hold heart till hold arm darling star
---------------------------------------------------------------------------------
ID : 8308 doc : feel feel hold till night fade feel feel hold close feel away run tell remember wrap tight shelter arm stay feel feel
---------------------------------------------------------------------------------
ID : 9992 doc : catch smile corner easy pretend know feel dream fall asleep night think turn light hard live hold tight wish tonight close heart feel hide love hold inside know for
ever
=================================================================================
enter the artist name to search:
```