

Term Project

Social Recommendation System & Social Search Engine

Web & Social Media Mining





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Music Recommendation System - Muse

I. Object

► Project CodeName : Muse

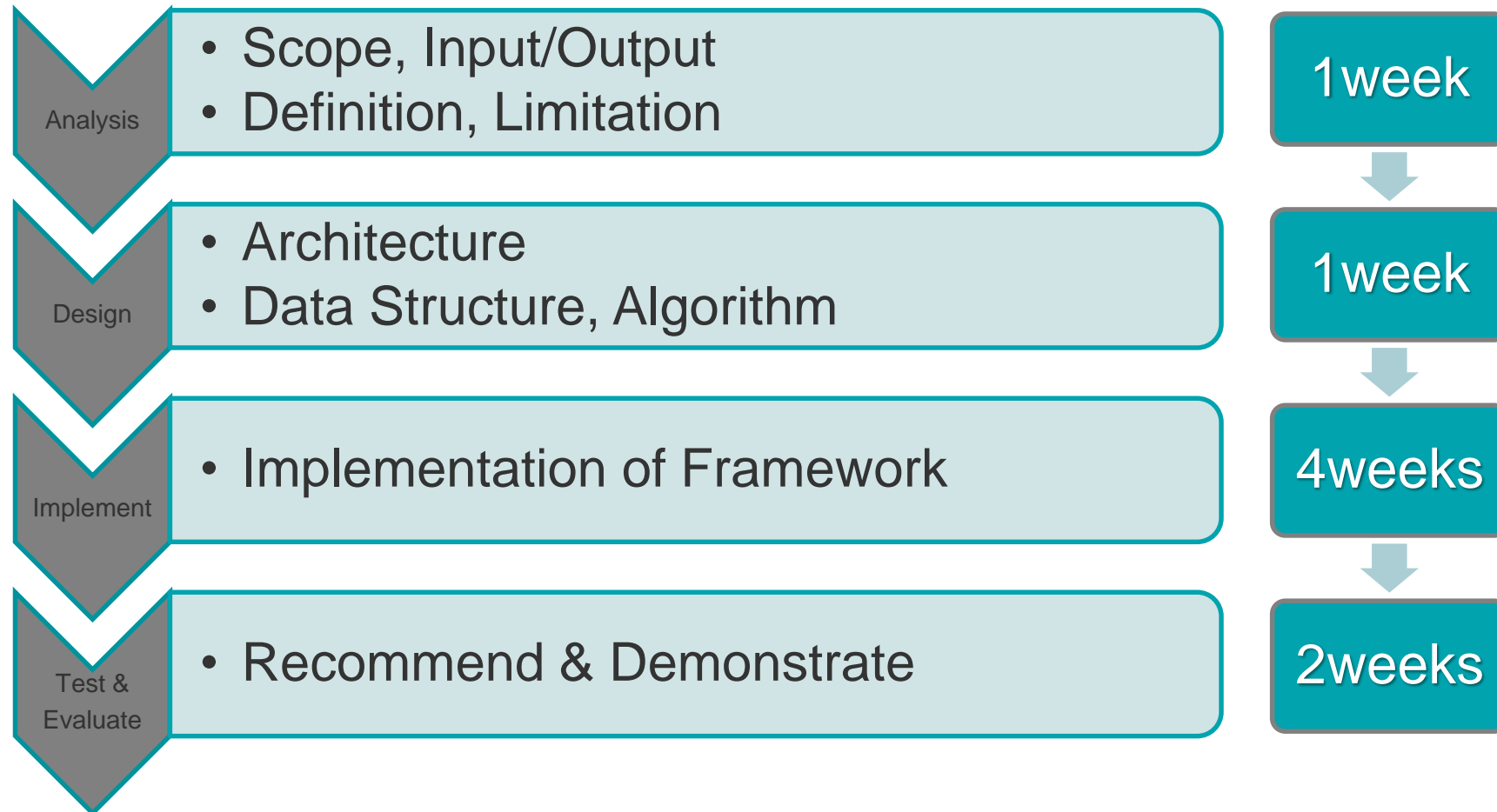
- Music Recommendation System(Simulator)
- User's Music Preference (Category, Context, TopTrends) ⇒ Display Best/Love/Like
- Social Relationship ⇒ Surprise Me & Display Graph by Friend Relationship
- Programmed by Python 3.6



Welcome Muse !

**Music Recommendation Service Just-for-you
@Muse 2018**

II. Progress Plan & Schedule



III. Analysis (1/2)

► Schema

- UserInfo = {{UserID, Name, Gender, Location, FavoriteArtists, FavoriteTitles, BirthDate, Gender, Friends}}
- MusicClassification = {{Classification, Code}}
- ContextClassification = {{Classification, Code}}
- MusicInfo, TopChartMusicInfo = {MusicID, Title, Artist, Beat, MusicClassification, {ContextClassification}}
- TopChartMusicInfo = {UserID, MusicID, Date, Time, Rating}

► Interface

- Select UserID \Rightarrow Listen & Feedback : Give Rating \Rightarrow Recommend Music \Rightarrow Visualize Friends by Graph \Rightarrow Friends Behavior affect on recommendation

► Algorithm

- TF, similarity, dissimilarity, collaborative filtering, content based, context based

III. Analysis (2/2)

▶ Recommendation Model A

- Similarity = MusicInfo[MusicClassification, ContextClassification]
- Recommend by Preference & Context

▶ Recommendation Model B

- Similarity = UserInfo[Gender, FavoriteArtists, FavoriteTitles, Friends]
- Recommend by Friend's Favorite
- Recommend by Surprise Me = Tracks that my friends are listening,
but not in my favorite ones (New One, Try it ~)

IV. Dataset

► Real Data : Top Trend Chart from Last.fm API, JSON import

The screenshot shows the Last.fm Web Services page for the `chart.getTopTracks` endpoint. The page has a red header with the Last.fm logo and navigation links: Music, Listen, Events, and Charts. A search bar is also present. The left sidebar contains links for Account, API Guides, API Methods, and Auth. The main content area is titled "Last.fm Web Services" and "chart.getTopTracks". It includes a description "Get the top tracks chart", example URLs for JSON and XML formats, parameters for page, limit, and api_key, an authentication note stating that no authentication is required, and a sample JSON response showing track details for "Dark Fantasy" by Kanye West.

lost.fm Music search Music Listen Events Charts

Account
Add API account

API Guides
Introduction
User Authentication
Scrobbling
Radio API
Playlists API
Tools
REST requests
XML-RPC requests
Error codes
Terms of Service

API Methods

Album
album.addTags
album.getInfo
album.getTags
album.getTopTags
album.removeTag
album.search

Artist
artist.addTags
artist.getCorrection
artist.getInfo
artist.getSimilar
artist.getTags
artist.getTopAlbums
artist.getTopTags
artist.getTopTracks
artist.removeTag
artist.search

Auth

Last.fm Web Services
chart.getTopTracks

Get the top tracks chart

Example URLs
JSON: /2.0/?method=chart.gettoptracks&api_key=YOUR_API_KEY&format=json
XML: /2.0/?method=chart.gettoptracks&api_key=YOUR_API_KEY

Params
page (Optional) : The page number to fetch. Defaults to first page.
limit (Optional) : The number of results to fetch per page. Defaults to 50.
api_key (Required) : A Last.fm API key.

Auth
This service does **not** require authentication.

Sample Response

```
<tracks page="1" perPage="50" totalPages="20" total="1000">
  <track>
    <name>Dark Fantasy</name>
    <playcount>124394</playcount>
    <listeners>42141</listeners>
    <mbid/>
    <url>http://www.last.fm/music/Kanye+West/_/Dark+Fantasy</url>
    <streamable fulltrack="0">0</streamable>
    <artist>
      <name>Kanye West</name>
      <mbid>164f0d73-1234-4e2c-8743-d77bf2191051</mbid>
      <url>http://www.last.fm/music/Kanye+West</url>
    </artist>
  </track>
  ...
</tracks>
```


V. SiteMap of Muse

► User Profile



Content-based

- Select UserID
- User Preference
- Favorite :
Category
Artist
Title

► Recommend Music



Recommend by Context

- Top Chart Rating
- Recommendation by context
- Location, Activity

► Musical Soulmate



Collaboration Social Network

- Visualize my Soulmate
- Similarity/Dissimilarity
- Surprise Me by new tracks of my friends

VI. Muse Demonstration & Summary

- ▶ Hybrid Recommendation :
Music & User Preference & External Context & User Context & Social Relationship





Welcome Muse !

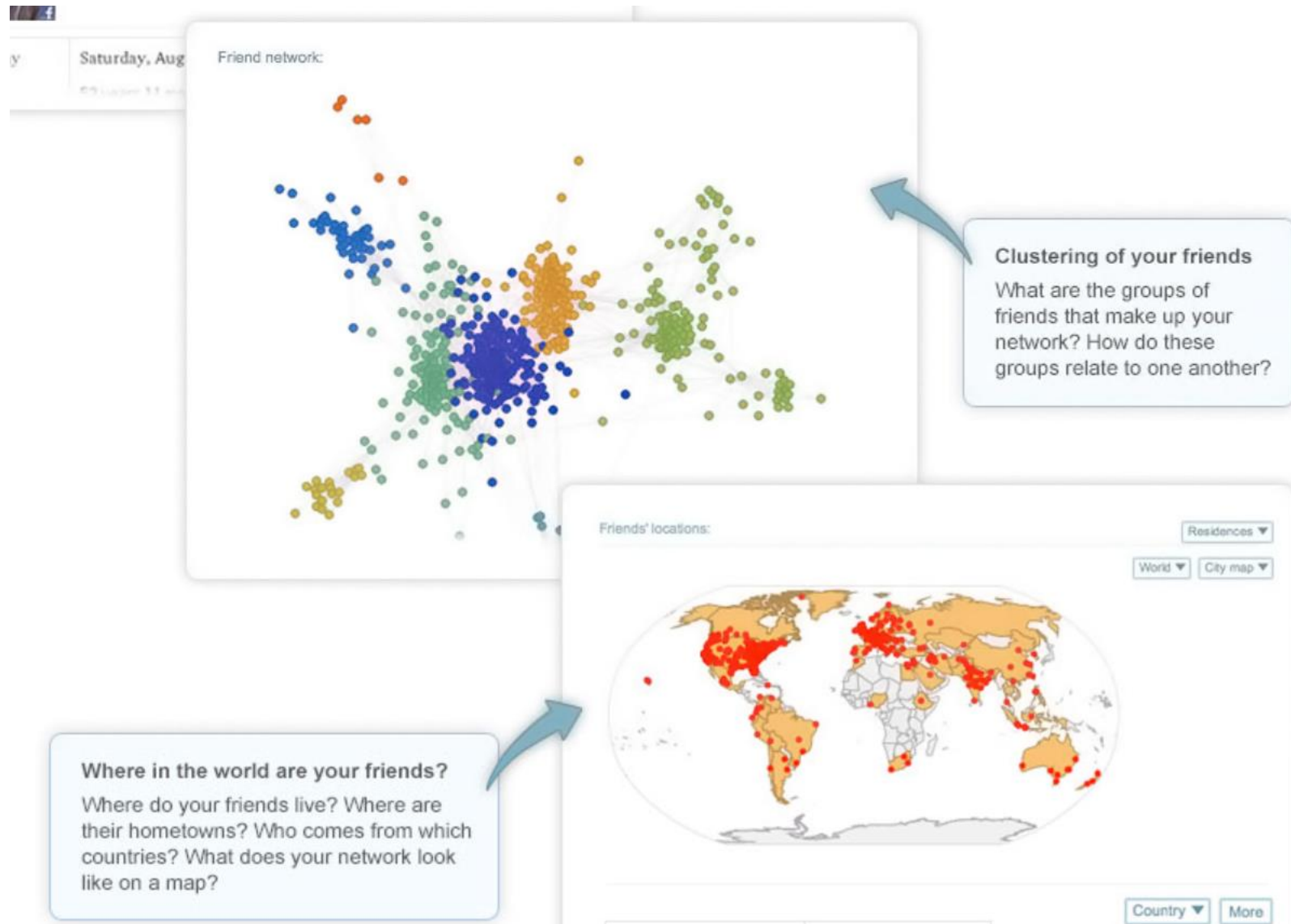
**Music Recommendation Service Just-for-you
@Muse 2018**

Select Muse User

anna : userid1
mike : userid2
christine : userid3
anold : userid4
chaemee : userid5
russel : userid6
maria : userid7
jun : userid8
pibee : userid9
won : userid10
wong : userid11
rama : userid12
rose : userid13
tom : userid14
superman : userid15
batman : userid16
jorda : userid17
deen : userid18
rosa : userid19
inbee : userid20
jordan : userid21
humprey : userid22
natasha : userid23
papa : userid24
choi : userid25
park : userid26
smith : userid27

Select User

Muse User Name : anna
Preference Category : ['office', 'library']
Favorite Artist : ['artist1', 'artist2']
Favorite Title : ['title2', 'title3', 'title4', 'title5']

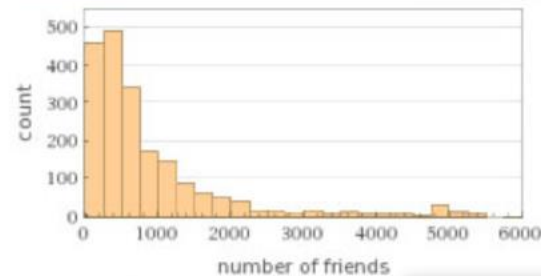
[FYI] wolframalpha

[FYI] wolframalpha

How popular are
your friends?

How many friends
do your friends
have?

Distribution:

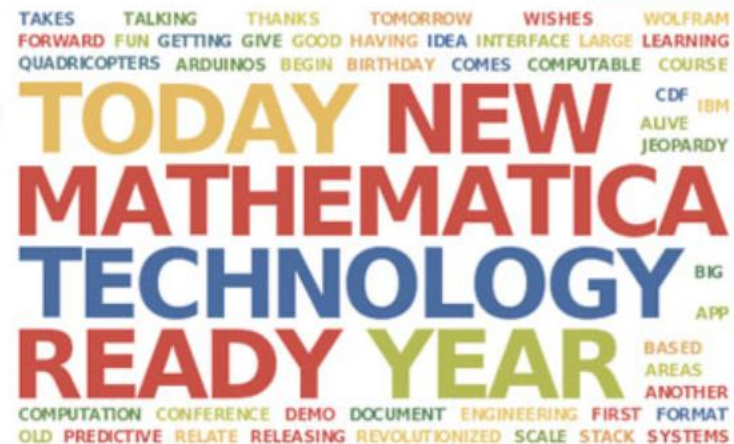


(based on data from 2038 of 2515 friends)

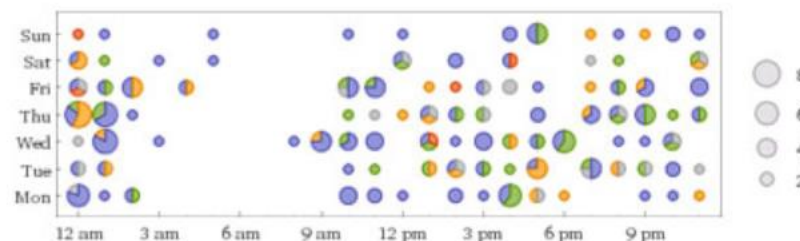
What do you talk about on Facebook?

The bigger the word, the more often it's
used in your conversations.

Word cloud:



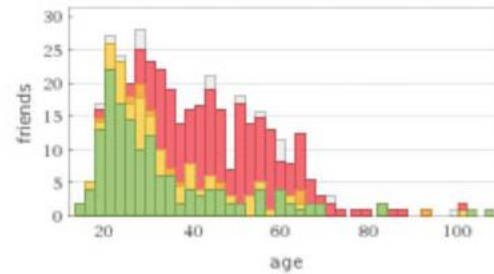
Weekly app activity:



When do you use
Facebook?

[FYI] wolframalpha

Distribution of reported ages:



■ single | ■ in a relationship | ■ engaged | ■ married | ■ other
(based on data from 444 of 2515 friends)

Where are your friends at in life?

Do your friends' ages reflect what kinds of relationships they're in?

Color-coded friend network:



Explore the structure of your friend network

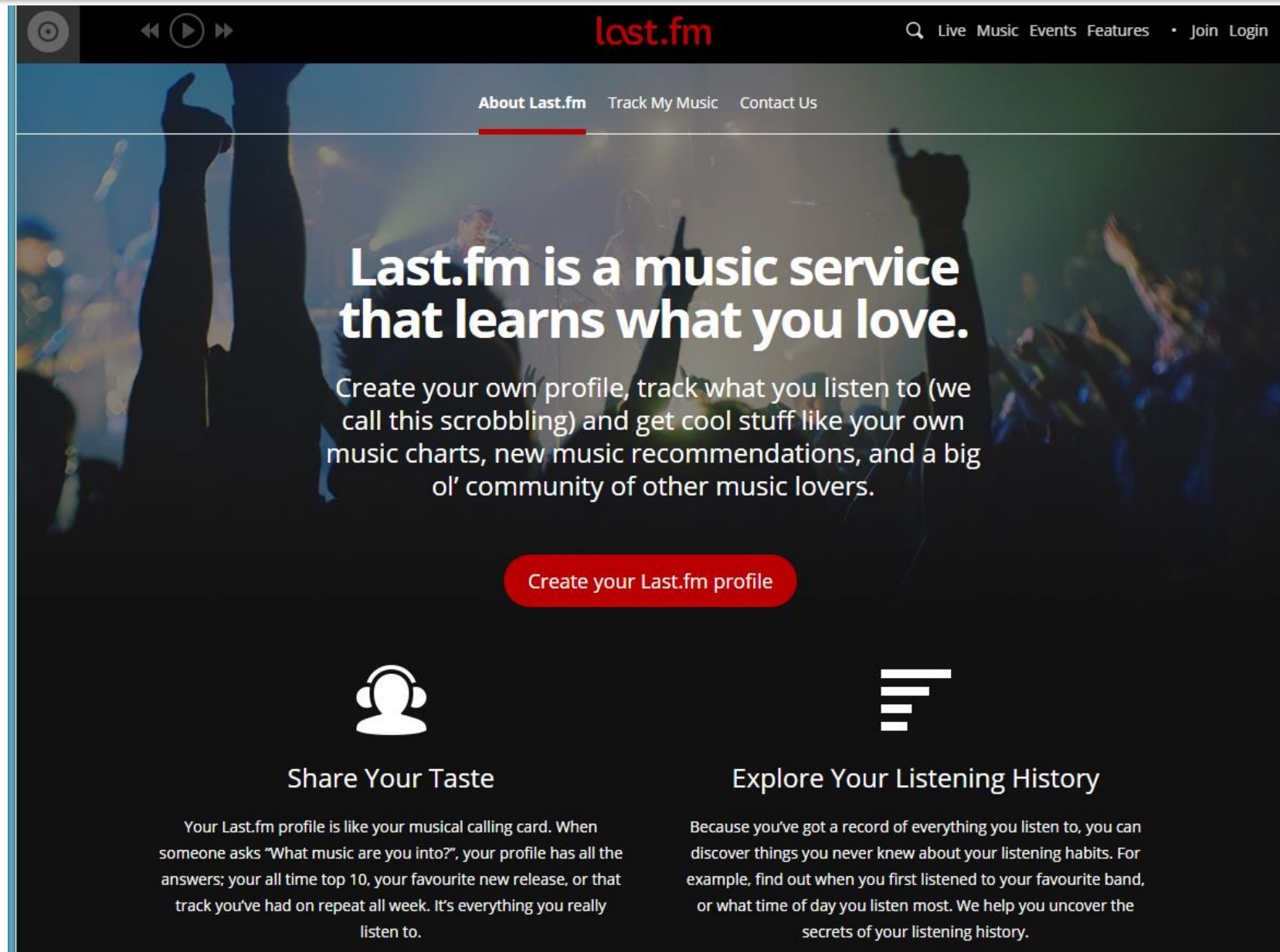
How do your friends connect you to your other friends? Highlight your graph by relationship status, age, gender, or Facebook activity.

Highlighted friends:

More friends

Who plays the special roles

[FYI] Reference Site : Last.fm

The image is a screenshot of the Last.fm website's homepage. At the top, there is a dark navigation bar with the Last.fm logo in red, a search icon, and links for 'Live', 'Music', 'Events', 'Features', 'Join', and 'Login'. Below this is a secondary navigation bar with links for 'About Last.fm', 'Track My Music', and 'Contact Us'. The main content area features a large background image of a concert crowd with silhouettes of people raising their hands. Overlaid on this image is the text 'Last.fm is a music service that learns what you love.' in a large, white, sans-serif font. Below this headline is a paragraph explaining the service: 'Create your own profile, track what you listen to (we call this scrobbling) and get cool stuff like your own music charts, new music recommendations, and a big ol' community of other music lovers.' A prominent red button with white text 'Create your Last.fm profile' is centered below the paragraph. At the bottom, there are two columns of content. The left column is titled 'Share Your Taste' and features a white icon of a person wearing headphones. The right column is titled 'Explore Your Listening History' and features a white icon of a list. Both columns contain descriptive text about the benefits of using the service.

Last.fm

Live Music Events Features • Join Login

About Last.fm Track My Music Contact Us

Last.fm is a music service that learns what you love.

Create your own profile, track what you listen to (we call this scrobbling) and get cool stuff like your own music charts, new music recommendations, and a big ol' community of other music lovers.

Create your Last.fm profile

Share Your Taste

Your Last.fm profile is like your musical calling card. When someone asks "What music are you into?", your profile has all the answers; your all time top 10, your favourite new release, or that track you've had on repeat all week. It's everything you really listen to.

Explore Your Listening History

Because you've got a record of everything you listen to, you can discover things you never knew about your listening habits. For example, find out when you first listened to your favourite band, or what time of day you listen most. We help you uncover the secrets of your listening history.

[FYI] Reference Site : Last.fm Recommendation



Share Your Taste

Your Last.fm profile is like your musical calling card. When someone asks "What music are you into?", your profile has all the answers; your all time top 10, your favourite new release, or that track you've had on repeat all week. It's everything you really listen to.



Explore Your Listening History

Because you've got a record of everything you listen to, you can discover things you never knew about your listening habits. For example, find out when you first listened to your favourite band, or what time of day you listen most. We help you uncover the secrets of your listening history.



Discover New Music

Sometimes it's difficult to find new music. What you need is an expert who knows your taste inside out to do the hard work for you. We make discovery easy by recommending things you'll like, based on your taste and the taste of other listeners just like you.

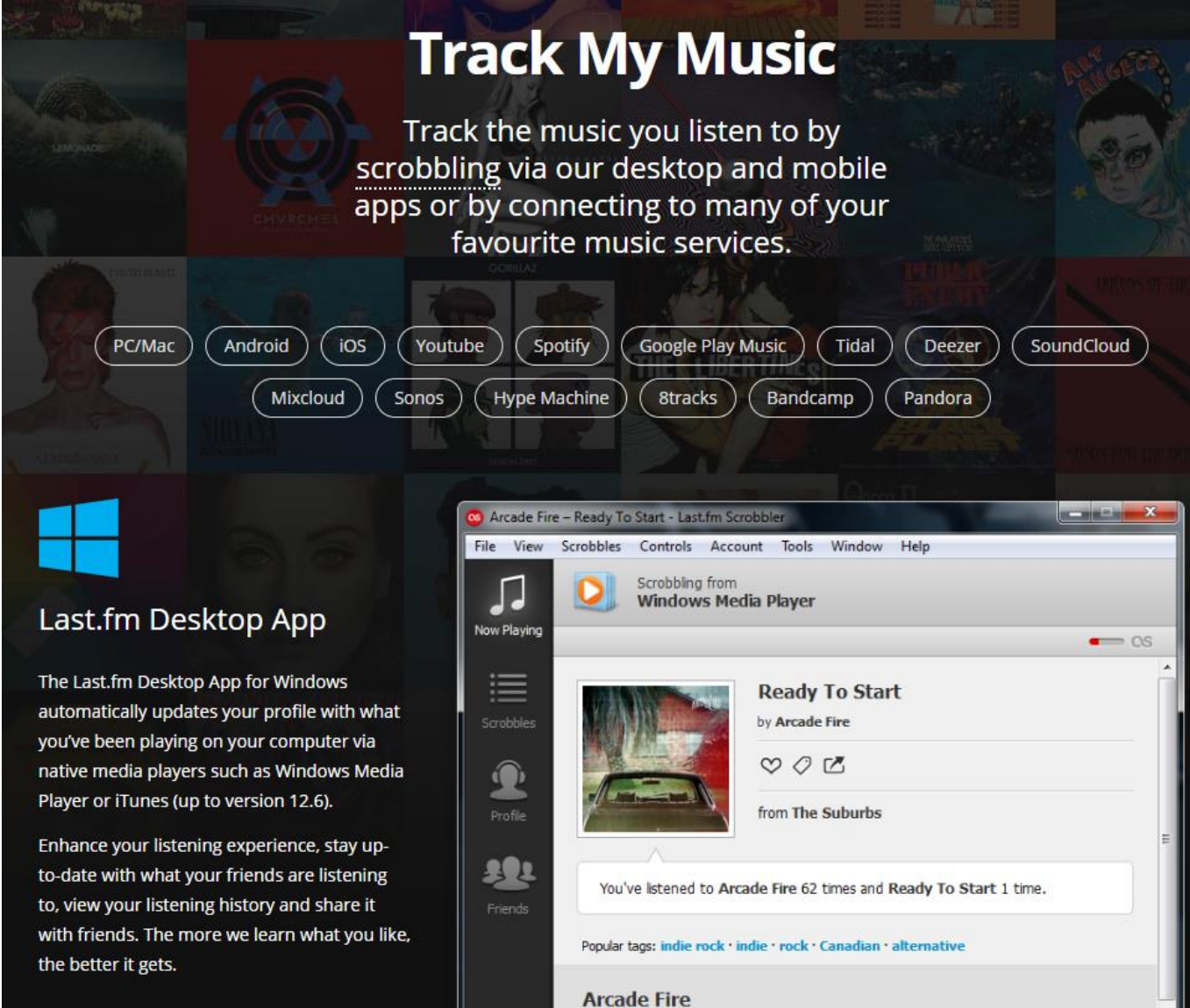


Meet Your Musical Soulmates

Music's a lot more fun when you're sharing it with someone. On Last.fm you can find like-minded music fans and discuss everything from your favourite artists and albums, to the latest obscure genre or big summer festival. No matter what you're into, everyone's welcome.

- ▶ **Listening History**
- ▶ **My Profile**
- ▶ **Discover My Taste**
- ▶ **Recommend based on my taste & others like me**
- ▶ **Social Musical Mates**

[FYI] Reference Site : Last.fm Scrobbling



Track My Music

Track the music you listen to by scrobbling via our desktop and mobile apps or by connecting to many of your favourite music services.

PC/Mac Android iOS Youtube Spotify Google Play Music Tidal Deezer SoundCloud Mixcloud Sonos Hype Machine 8tracks Bandcamp Pandora

Last.fm Desktop App

The Last.fm Desktop App for Windows automatically updates your profile with what you've been playing on your computer via native media players such as Windows Media Player or iTunes (up to version 12.6).

Enhance your listening experience, stay up-to-date with what your friends are listening to, view your listening history and share it with friends. The more we learn what you like, the better it gets.

Windows Media Player window: Arcade Fire - Ready To Start - Last.fm Scrobber

File View Scrobbles Controls Account Tools Window Help

Now Playing

Scrobbling from Windows Media Player

Ready To Start by Arcade Fire

from The Suburbs

You've listened to Arcade Fire 62 times and Ready To Start 1 time.

Popular tags: indie rock · indie · rock · Canadian · alternative

Arcade Fire

[FYI] Reference Site : Last.fm My Home

The screenshot displays the Last.fm 'My Home' interface. At the top, a music player shows 'We Are Bulletproof, Pt. 2' by BTS. The navigation bar includes links for Home, Live, Music, Events, and Features, along with a user profile icon for 'cmkim'. A dropdown menu for 'cmkim' lists options: View profile, Notifications, Inbox, Settings, Subscribe, and Logout.

The main content area features several music recommendations:

- Top Left:** A notification stating 'You've scrobbled Dillon before, but not this release'.
- Top Center:** A recommendation for '145,408 listeners' with a 'Similar to Dillon' tag.
- Top Right:** A 'Similar to Dillon' section featuring 'Intro: 2 Cool 4 Skool [Feat. Dj Friz] (1:03)' by BTS, with 11 listeners and a note 'You have scrobbled this track once'.
- Middle Left:** A recommendation for 'I Thought I Was an Alien' by SoKo, with 15 tracks and 142,493 listeners, and a 'Similar to Dillon' tag.
- Middle Center:** A recommendation for 'We Sink' by Soley, with 13 tracks and 69,090 listeners, and a 'Similar to Dillon' tag.
- Middle Right:** A recommendation for 'Love Yourself 承 'Her'' by BTS, with 8 tracks and 44,427 listeners, and a 'Similar to Dillon' tag.
- Bottom Left:** A recommendation for 'CocoRosie', with a 'Similar to Dillon' tag.
- Bottom Center:** A recommendation for 'Fame (6:01)' by The Acid, with 36,446 listeners, and a 'Similar to Dillon' tag.
- Bottom Right:** A recommendation for 'Thirteen Thirtyfive (3:44)' by Dillon, with 119,737 listeners, and a note 'You have scrobbled this'.
- Bottom Far Right:** A recommendation for 'Soap&Skin', with a 'Similar to Dillon' tag.

[FYI] Reference Site : Last.fm My Profile

Skit: Circle Room Talk
BTS

last.fm

[Home](#)
[Live](#)
[Music](#)
[Events](#)
[Features](#)

Recent Tracks

	♡ BTS — We Are Bulletproof, Pt. 2	Scrobbling now
	♡ BTS — We Are Bulletproof, Pt. 2	3 minutes ago
	♡ BTS — Intro: 2 Cool 4 Skool [Feat. Dj Friz]	4 minutes ago
	♡ Agnes Obel — It's Happening Again	8 minutes ago
	♡ David Guetta — Flames	17 minutes ago
	♡ Dillon — Thirteen Thirtyfive	27 minutes ago

[More tracks](#)

Top Artists

Last 7 days ▾

BTS
2 plays

Agnes Obel
1 play

David Guetta
1 play

Dillon
1 play

[More artists](#)

Top Albums

Last 7 days ▾

You haven't listened to any music in the selected date range.

Top Tracks

Last 7 days ▾

1	♡ Agnes Obel — It's Happening Again	1
2	♡ Dillon — Thirteen Thirtyfive	1
3	♡ BTS — We Are Bulletproof, Pt. 2	1

cmkim
View profile

Notifications

Inbox

Settings

Subscribe

Logout

Don't want to see ads? [Subscribe now](#)

Listening Reports

Last week

27 Apr — 3 May →

Last year

2017 →

Around The Web

Sponsored Links

30 Amazing Uses Of Coconut Oil
Healthy, Sporty & Beautiful

This Woman Reads 100 Books In A Month (And How You Can Too)

다 진짜 똑같았어 그러면 뭐 우리는 Fly 들을 때 우리 힘이 좋은 뭐 했는가?
da jinjja Hoggatasseo geudaeomyeon muo ulineun Fly deuleul Hae uli hobi hobeun muo haessneunga?
So while we were listening to Fly, what was our Hobi Hope doing?

[FYI] Reference Site : Last.fm OpenAPI

last.fm

Music search

Q

Music Listen Events Charts

Account

Add API account

API Guides

[Introduction](#)
[User Authentication](#)
[Scrobbling](#)
[Radio API](#)
[Playlists API](#)
[Tools](#)
[REST requests](#)
[XML-RPC requests](#)
[Error codes](#)
[Terms of Service](#)

API Methods

Album

[album.addTags](#)
[album.getInfo](#)
[album.getTags](#)
[album.getTopTags](#)
[album.removeTag](#)
[album.search](#)

Artist

[artist.addTags](#)
[artist.getCorrection](#)
[artist.getInfo](#)
[artist.getSimilar](#)
[artist.getTags](#)
[artist.getTopAlbums](#)
[artist.getTopTags](#)
[artist.getTopTracks](#)
[artist.removeTag](#)
[artist.search](#)

Auth

[auth.getMobileSession](#)
[auth.getSession](#)
[auth.getToken](#)

Chart

[chart.getTopArtists](#)

Last.fm Web Services

track.getInfo

Get the metadata for a track on Last.fm using the artist/track name or a musicbrainz id.

Example URLs

JSON: /2.0/?method=track.getInfo&api_key=YOUR_API_KEY&artist=cher&track=believe&format=json

XML: /2.0/?method=track.getInfo&api_key=YOUR_API_KEY&artist=cher&track=believe

Params

mbid (Optional) : The musicbrainz id for the track

track (Required (unless mbid)) : The track name

artist (Required (unless mbid)) : The artist name

username (Optional) : The username for the context of the request. If supplied, the user's playcount for this track and whether they have loved the track is included in the response.

autocorrect[0|1] (Optional) : Transform misspelled artist and track names into correct artist and track names, returning the correct version instead. The corrected artist and track name will be returned in the response.

api_key (Required) : A Last.fm API key.

Auth

This service does not require authentication.

Sample Response

```
<track>
  <id>1019817</id>
  <name>Believe</name>
  <mbid/>
  <url>http://www.last.fm/music/Cher/_/Believe</url>
  <duration>240000</duration>
  <streamable_fulltrack="1">1</streamable>
  <listeners>69572</listeners>
  <playcount>281445</playcount>
  <artist>
    <name>Cher</name>
    <mbid>bfc66d75-a6a5-4bc6-8282-47aec8531818</mbid>
    <url>http://www.last.fm/music/Cher</url>
  </artist>
  <album position="1">
    <artist>Cher</artist>
    <title>Believe</title>
```

[FYI] Reference Site : AccuRadio


AccuRadio
 Incredible variety and unlimited skips

 Sign up
  Log in
  Themes
  Help

SEARCH

SHORTCUTS
[Most Popular](#)
[Surprise Me](#)

FEATURED
[Looking for something new to try?](#)
[Workplace Moods Channels](#)
[Five-Star Radio](#)

GENRES
[Adult Contemporary](#)
[Adult Rock](#)
[Alt-Country](#)
[Alternative Rock](#)
[Alternative Rock Classics](#)
[Americana](#)
[Artist features](#)
[Beautiful Music](#)

Theme Changer
 To change theme, just click on the desired screenshot below.


BRIGHT
 This is our new default website design (i.e., unless you change it on this page) -- freshened up for 2018!


CLASSIC
 If you're a traditionalist, you might prefer the more subdued color scheme that AccuRadio used during the years 2015-2017


U.S.S. DISCOVERY
 We're big fans of the new TV series "Star Trek: Discovery," so we created a theme that's an homage to the ship's computer displays.


BLUER THAN BLUE
 Here's a theme inspired by the Michael Johnson pop



BEIN' GREEN
 Here's a theme inspired by Kermit the Frog's signature song



rr for Cello and Orchestra
Yo-Yo Ma
 Cello Concerti
 2009 - Sony Classical - Edouard Lalo
 00:06 - -12:57



 Please rate song:
 ☆☆☆☆☆
 Log in first if you want your rating to affect your individual stream

Share
[Ban artist/song](#)
[Buy music](#)
[Channel options](#)

► **Surprising Recommend & feedback**

Surprise Me



BritRock
 Bored with the USA? UK Rock, Pop, Electronic, and Classic underground

 **Play**

[Pick similar >](#)
[Pick different >](#)

[FYI] Reference Site : AccuRadio Channel & Rating

The screenshot displays the AccuRadio website interface. On the left is a sidebar with various music categories: Celtic, Chill, Christian, Classic Rock, Classical, Comedy, Country, Dance, Decade: '50s, '60s, '70s, '80s, '90s, '00s, '10s, Disco, Electronic, and Folk. The main content area features a grid of 'Listeners' Top 100' channels, including Love Songs, Oldies, Pop Standards, R&B, Smooth Jazz, World Music, and a 'Surprise Me' option. A settings menu is open in the top right, showing options like Channel settings, Rename channel, View rated songs, View song history, Account settings, and Sign out. A dialog box titled 'Blend in a new channel?' is centered, explaining the blending feature and offering 'Yes! Let's blend' or 'No thanks' options. The bottom player bar shows the current song 'Love You Like a Love Song' by Selena Gomez & the Scene, along with playback controls, volume, and a rating system.

- ▶ Category
- ▶ Listen & Rating
 - * **Ban**
- ▶ Channel Setting
- ▶ Blend Channel
- ▶ Recommend based on my rating & Top 100

[FYI] Reference Site : AccuRadio History & Favorites

chaameekim@gmail.com
Themes
Help

SHORTCUTS

My Channels

Most Popular

Surprise Me

FEATURED

Looking for something new to try?

Workplace Moods Channels

Five-Star Radio

GENRES

Adult Contemporary

Adult Rock

Alt-Country

Alternative Rock

Alternative Rock Classics

Americana

Artist features

Beautiful Music

Bluegrass

MY HISTORY

My Favorites

Edit

Five-Star Radio

You've rated 6 songs so far... Activate your very own Five-Star Rad...

Listeners' Top 100

Listeners' Top 100: Love Songs

The Top 100 listener-rated Love Songs

Listeners' Top 100

Listeners' Top 100: Smooth Jazz

Our 100 highest-rated Smooth Jazz tracks

Listeners' Top 100

Listeners' Top 100: Classic Rock

Our listeners pick the top Classic rock tracks

Listeners' Top 100

Listeners' Top 100: Lite Hits

Our 100 highest-rated Lite Pop Hits

K-Pop

The hottest Korean Pop music...so much more than just Psy!

Soloists: Cello

Classical music performed by the world's top cellists

[View your song history →](#)

ay like:

Listeners' Top 100

Top 100 Songs: Listeners' Top 100: Love Songs

Can't Fight This Feeling

REO Speedwagon

Wheels Are Turnin'

1985 - Epic - Cronin

04:44 - 00:09

Vol

Your rating: ★★★★★

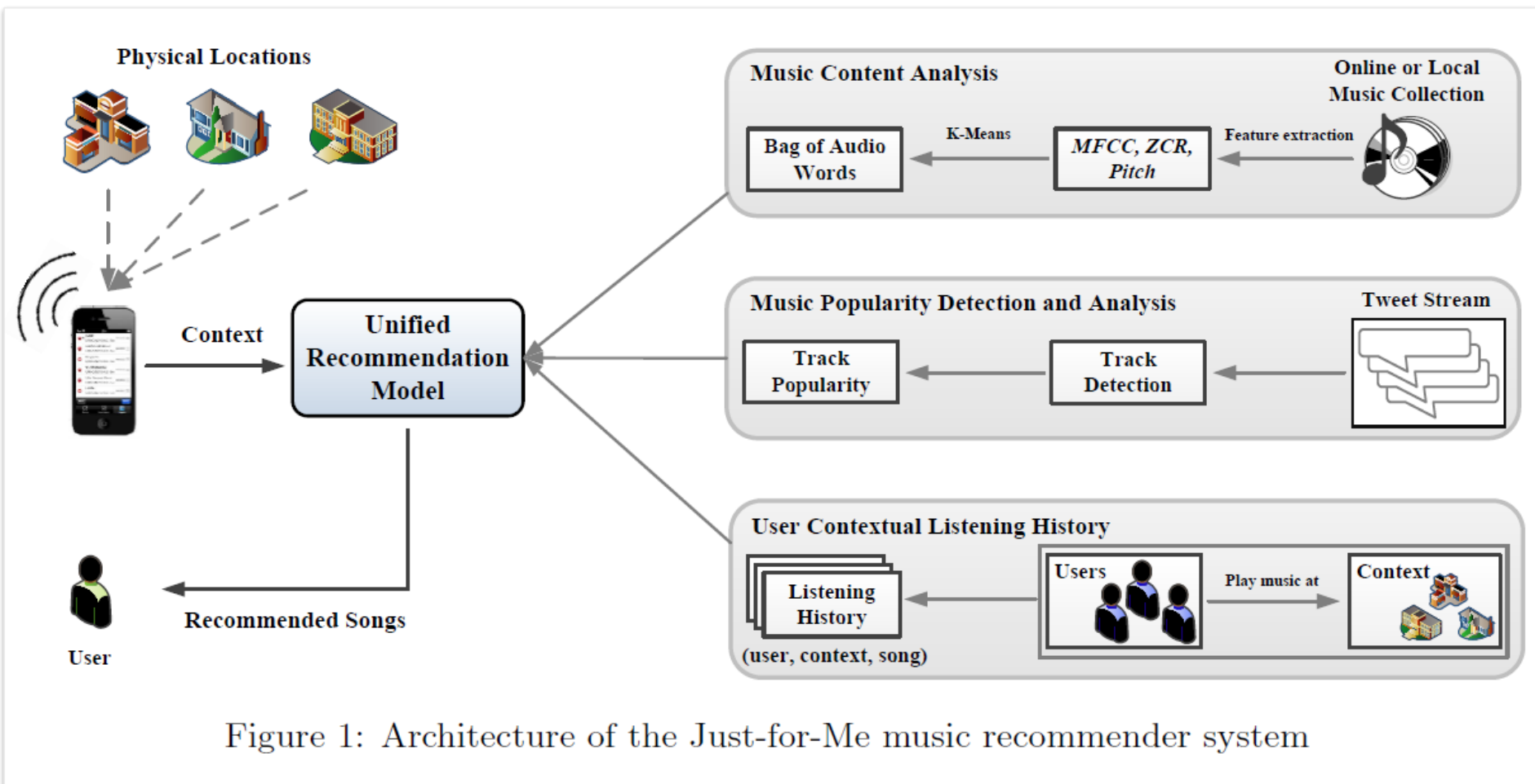
You have rated 6 songs while logged in as chaameekim@gmail.com

► My Favorites :
Five Star Radio

[FYI] Just-for-Me

► 4 Components with Latent Topics

- intrinsic factors (why users prefer music/location/time)





Thank You

chaemeekim@gmail.com