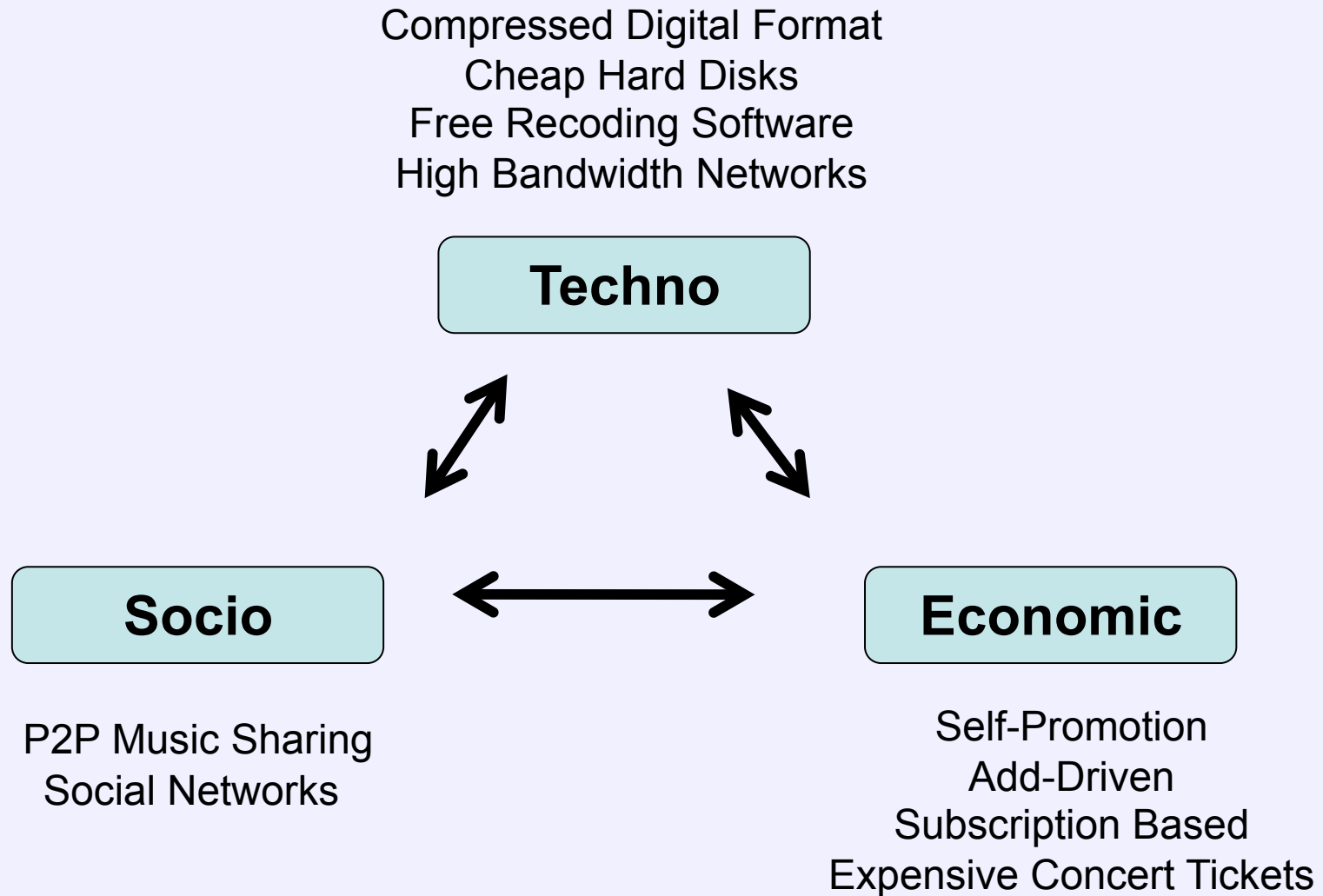




Prologue

The
Techno-Socio-Economic
Music Revolution

The Revolution



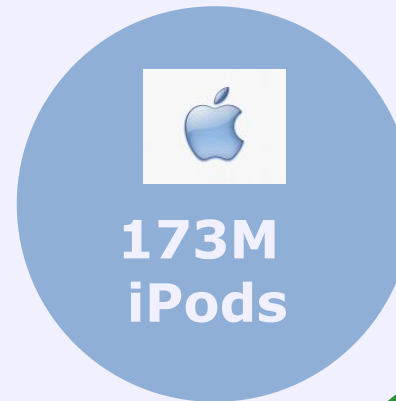
Proliferation

Supply

Demand



**Music
Search &
Discovery
Technology**



Music Search

Search – retrieving of specific audio content

Common Paradigms:

1. Query-by-**Metadata**
2. Query-by-**Performance**
3. Query-by-**Sample**

Music Discovery

Discovery – serendipitous exploration

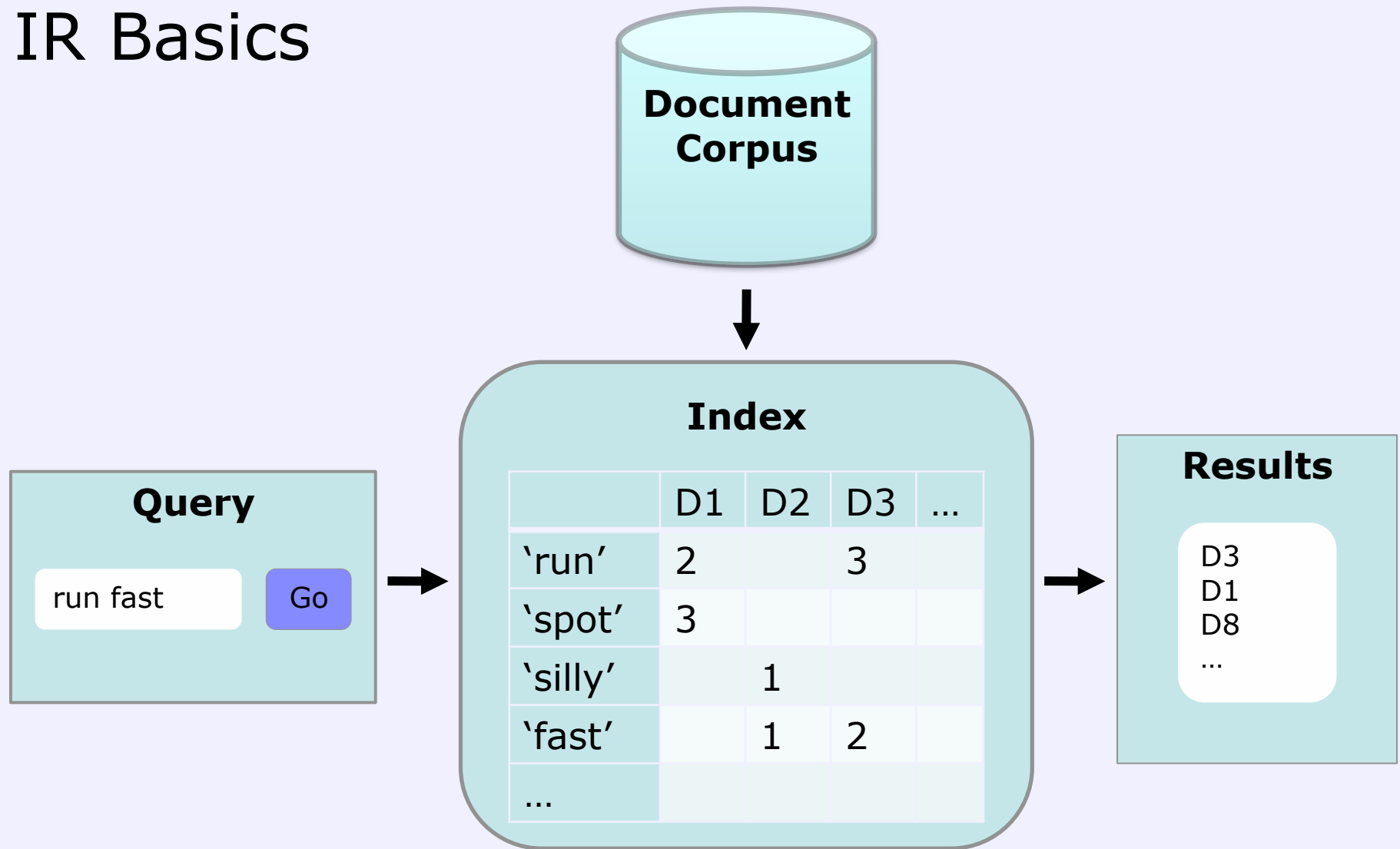
Common Paradigms:

1. Recommendation-by-**Popularity**
2. Browse-by-**Genre**
3. Query-by-**Similarity**
4. Query-by-**Description**

Chapter 1

Music Annotation is Hard

IR Basics



“Apples and Oranges”



How do we annotate **music** with **words**?

Tags

- text-based semantic token
- real-valued weight \propto strength of association

RHCP - *Give it away*

“an **aggressive punk-rock** song with a **funky bassline** and subtle use of **jew’s harp**”

“There just ain’t no truth at all”

Music is subjective

- Personal Experience
- Socially-Situated

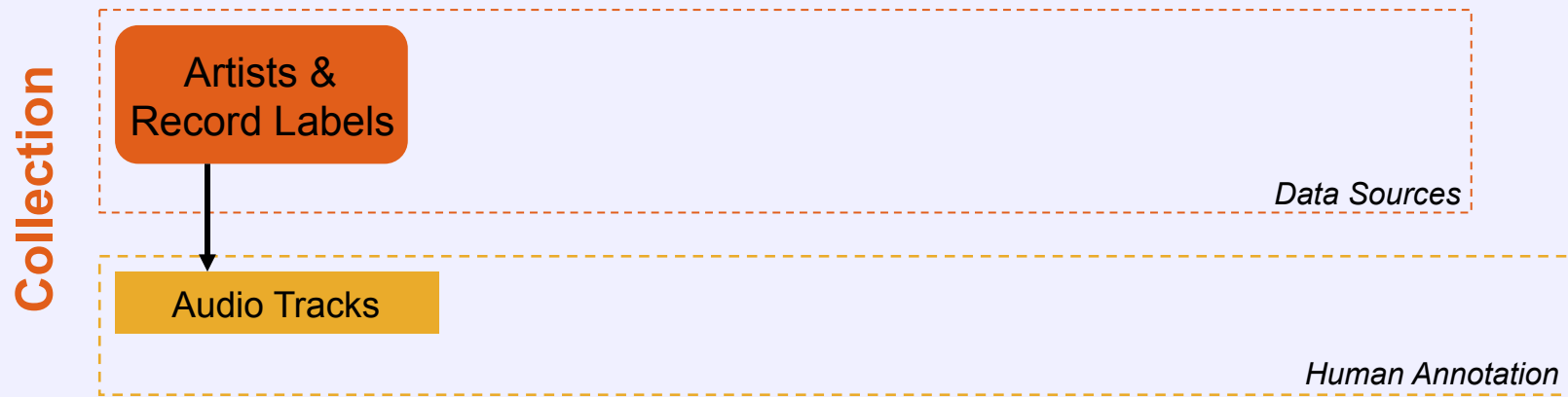
Approach:

Use multiple sources of music information

Chapter 2

Semantic Music Discovery Engine

Semantic Music Discovery Engine



Extraction

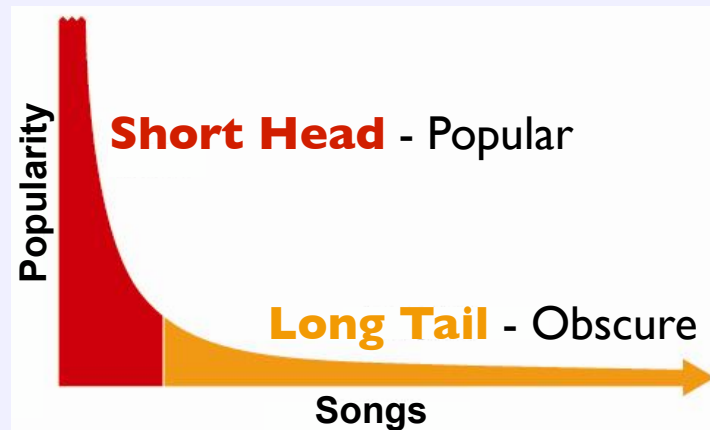
Discovery

Music Corpora

Last.fm - 150M songs by 16M artists

CAL500 - 500 songs by 500 artist

Long Tail Behavior- Chris Anderson (2004)



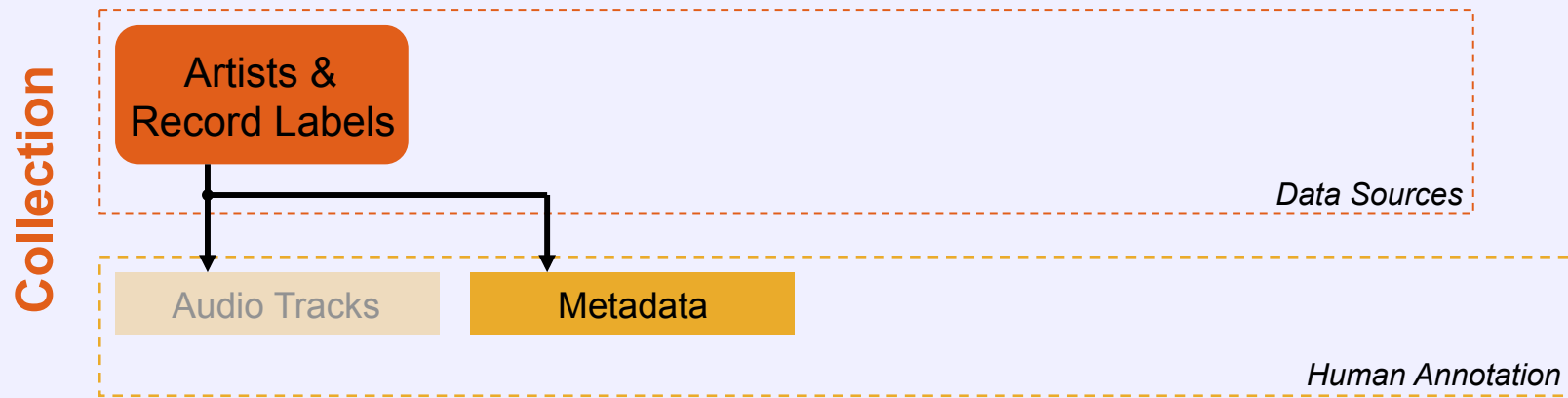
Cold Start Problem

- poorly annotated songs can not be discovered

Popularity Bias

- less popular song tend to be poorly annotated

Semantic Music Discovery Engine



Extraction

Discovery

Metadata

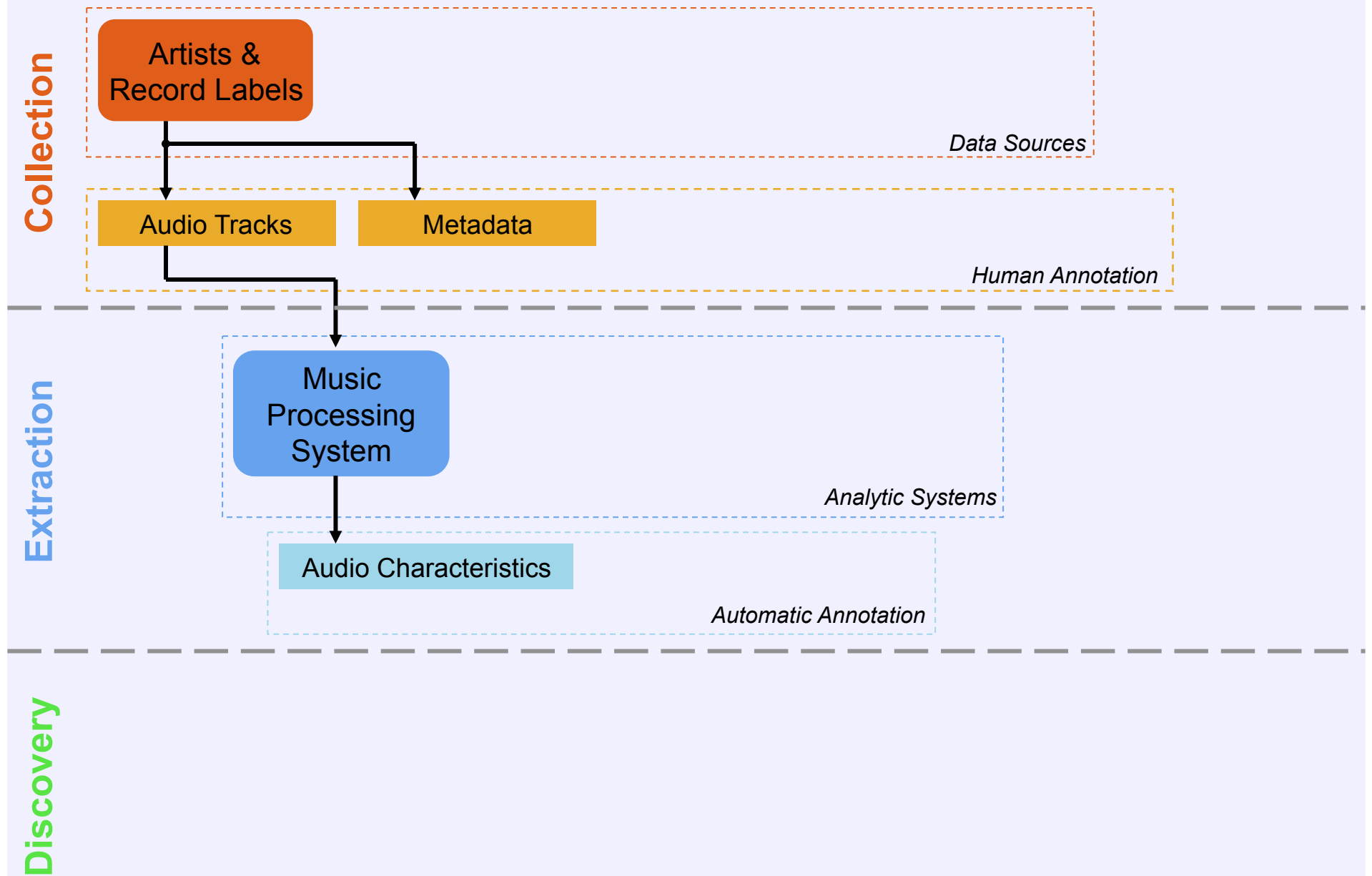
Factual information about music

- song, album, artist, record label
- lyrics
- chronology, biography
- popularity, awards

Heterogeneous data

- strings, numbers, images, graphs

Semantic Music Discovery Engine



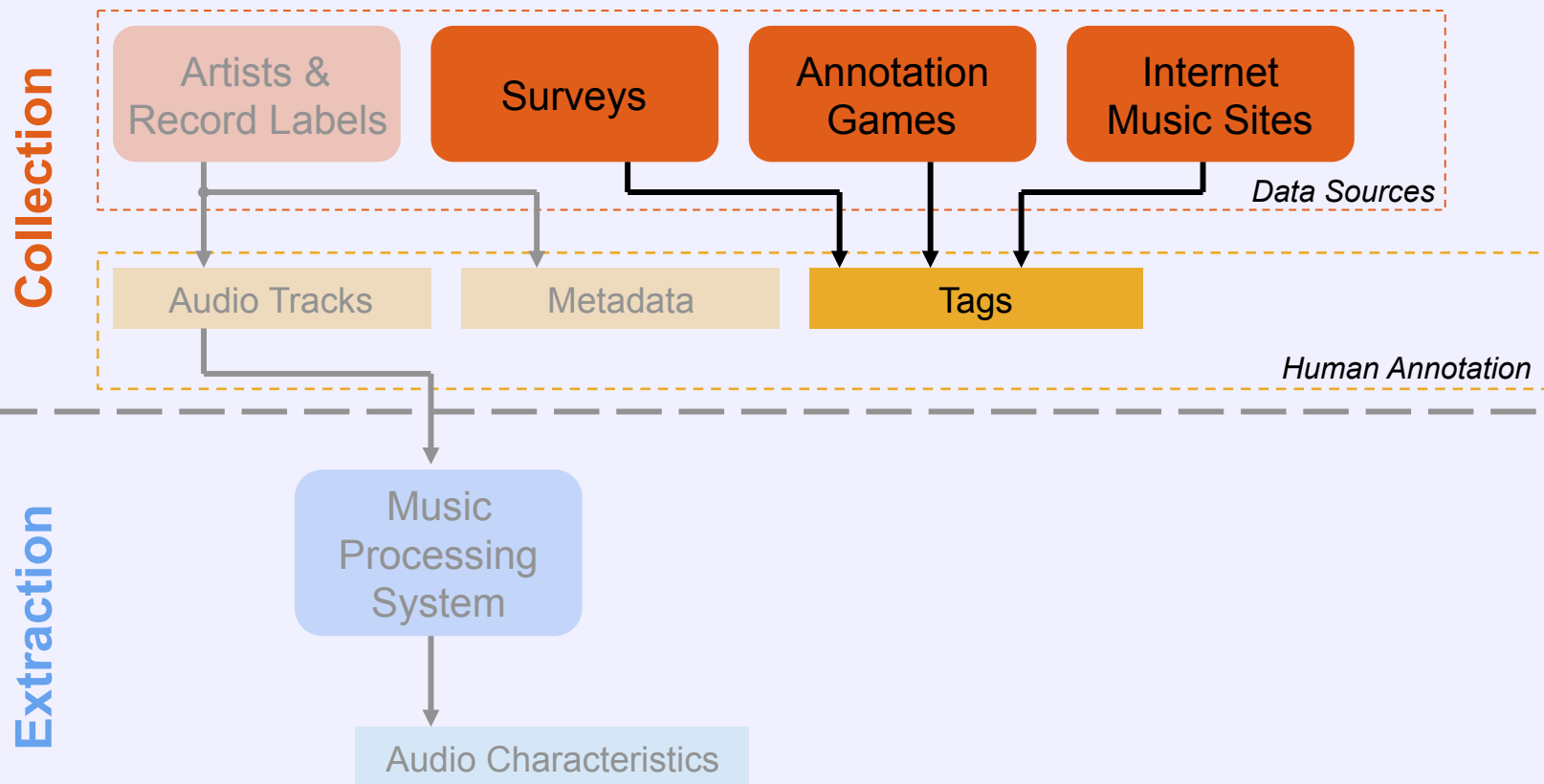
Music Processing Systems

Information extracted from audio signal

- **Acoustic** - noise, roughness
- **Rhythmic** - tempo, patterns
- **Harmonic** - key, major/minor
- **Structural** - chorus locations

Useful for **Experts**

Semantic Music Discovery Engine



Surveys

Pandora Music Genome Project

- 400 “Objective” Genes
- 50 trained music experts
- 750,000 songs annotated



Surveys

CAL500 Survey

- 174-tag vocab - genre, emotion, ...
- Paid 55 undergrads to annotate music for 120 hours
- 500 songs annotated by 3+ people

INSTRUMENTATION									
Which instruments are present, are prominent, or are featured in a solo.									
Instrument	None	Uncertain	Present	Prominent	Solo		Instrument	None	Uncertain
Voice							- String Ensemble	<input type="radio"/>	<input type="radio"/>
- Male Lead Vocals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>		- Orchestra	<input type="radio"/>	<input type="radio"/>
- Female Lead Vocals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>		Wind Instruments		
- Backing vocals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>		- Harmonica	<input type="radio"/>	<input type="radio"/>
- Choir	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>		- Trumpet	<input type="radio"/>	<input type="radio"/>
Guitar Family							- Trombone	<input type="radio"/>	<input type="radio"/>
- Acoustic Guitar	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>		- Saxophone	<input type="radio"/>	<input type="radio"/>
- Electric Guitar (clean)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>		- Horn Section	<input type="radio"/>	<input type="radio"/>
- Electric Guitar (distorted)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>		Electronics		
- Slide Guitar	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>		- Samples	<input type="radio"/>	<input type="radio"/>
- Bass	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>		- Ambient Sounds	<input type="radio"/>	<input type="radio"/>
- Banjo	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>		- Scratches	<input type="radio"/>	<input type="radio"/>

Human Annotations

Conducting a **survey**


- ✓ Reliable, Precise, Tailored to Application
- ✗ Expensive, Laborious, Not Scalable


Annotation Games

“Human-Computation”

- Web-based, multi-player game with real-time interaction
- Player contribute useful annotations through game play
- **ESPGame** for **images** [von Ahn]
- **Listen Game** for **songs**

Listen Game





'Musical Genre'

	best				worst
2			Roots Rock		1
3			R&B		
			Alternative		
			Jazz		
			Bluegrass		1
			Funk		3

Score: 0 + 60

Round leaders:

Superfreak	80
Lucy	80
Big A	60

[Home](#)

[High Scores](#)

[How do I play?](#)

[Troubleshooting](#)

[Spread the Love](#)

[About Listen Game](#)

© 2007 UCSD Computer Audition Laboratory, all rights reserved. Patent Pending.

Human Annotation

Survey

- ✓ Reliable, Precise, Tailored to Application
- ✗ Expensive, Laborious, Not Scalable

Annotation Game

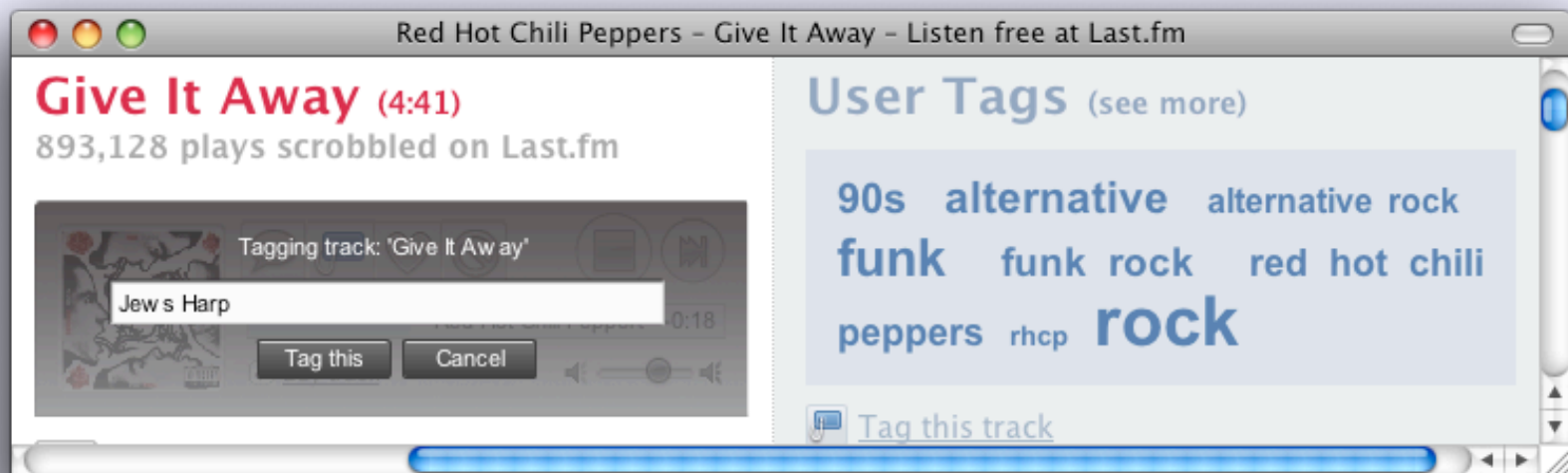
- ✓ Cheap, Scalable, Precise, Personalized
- ✗ Need to create a viral user experience



Music Web Sites

1. Social Tagging Site

- Users annotate music with tags
- Last.fm - 960K distinct tags



Music Web Sites

2. Collecting Web Documents

- Song & Album Reviews
- Artist Biographies
- Music Blogs, Discussion Boards
- Allmusic, Rolling Stone, Amazon, Mog

Web Document

Genres:

Funk (3)
Funk-metal
Funk-rock
Pop
Rap

Vocals:

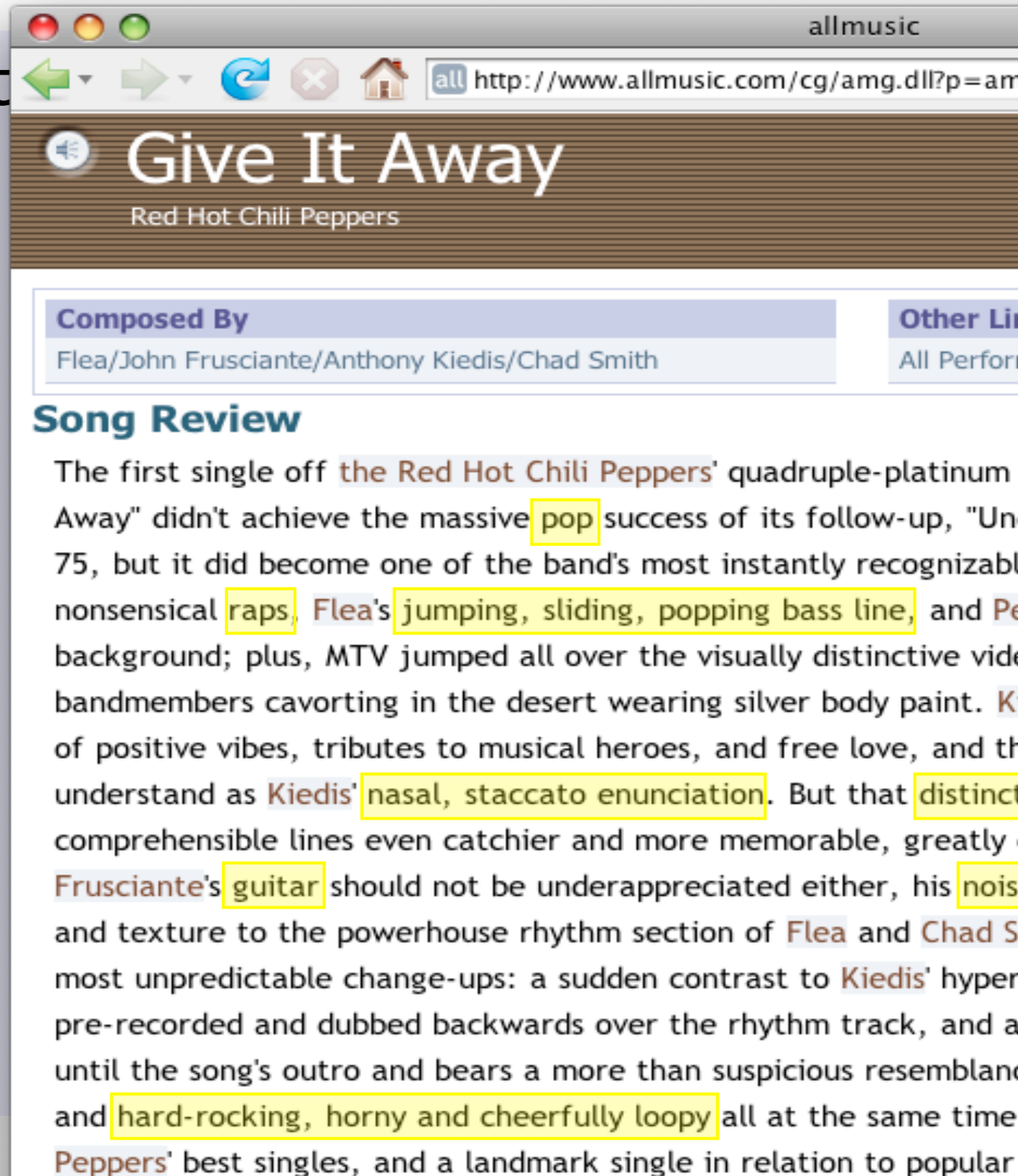
Nasal
Staccato Enunciation
Distinctive vocals

Instruments:

Guitar
Bass
Jew's-harp

Adjective:

Hard-rocking (2)
Noisy
Scratchy



The screenshot shows a web browser window with the address bar displaying "http://www.allmusic.com/cg/amg.dll?p=amg". The page title is "Give It Away" by "Red Hot Chili Peppers". Below the title, there are two tabs: "Composed By" and "Other Lyrics". The "Composed By" tab is active, showing "Flea/John Frusciante/Anthony Kiedis/Chad Smith". The "Other Lyrics" tab is also visible, showing "All Performances". Below the tabs, there is a section titled "Song Review". The review text is as follows: "The first single off the Red Hot Chili Peppers' quadruple-platinum 'Give It Away' didn't achieve the massive pop success of its follow-up, 'Under the Bridge', but it did become one of the band's most instantly recognizable songs. Kiedis' nonsensical raps, Flea's jumping, sliding, popping bass line, and Peppers' background; plus, MTV jumped all over the visually distinctive video of bandmembers cavorting in the desert wearing silver body paint. Kiedis' of positive vibes, tributes to musical heroes, and free love, and the song can be understood as Kiedis' nasal, staccato enunciation. But that distinctive sound is as comprehensible lines even catchier and more memorable, greatly aided by Frusciante's guitar should not be underappreciated either, his noisy and texture to the powerhouse rhythm section of Flea and Chad Smith. The most unpredictable change-ups: a sudden contrast to Kiedis' hyperactive pre-recorded and dubbed backwards over the rhythm track, and a hard-rocking, horny and cheerfully loopy until the song's outro and bears a more than suspicious resemblance to the Peppers' best singles, and a landmark single in relation to popular music."

Collecting an Annotated Music Corpus

Survey

- ✓ Reliable, Precise, Tailored to Application
- ✗ Expensive, Laborious, Not Scalable

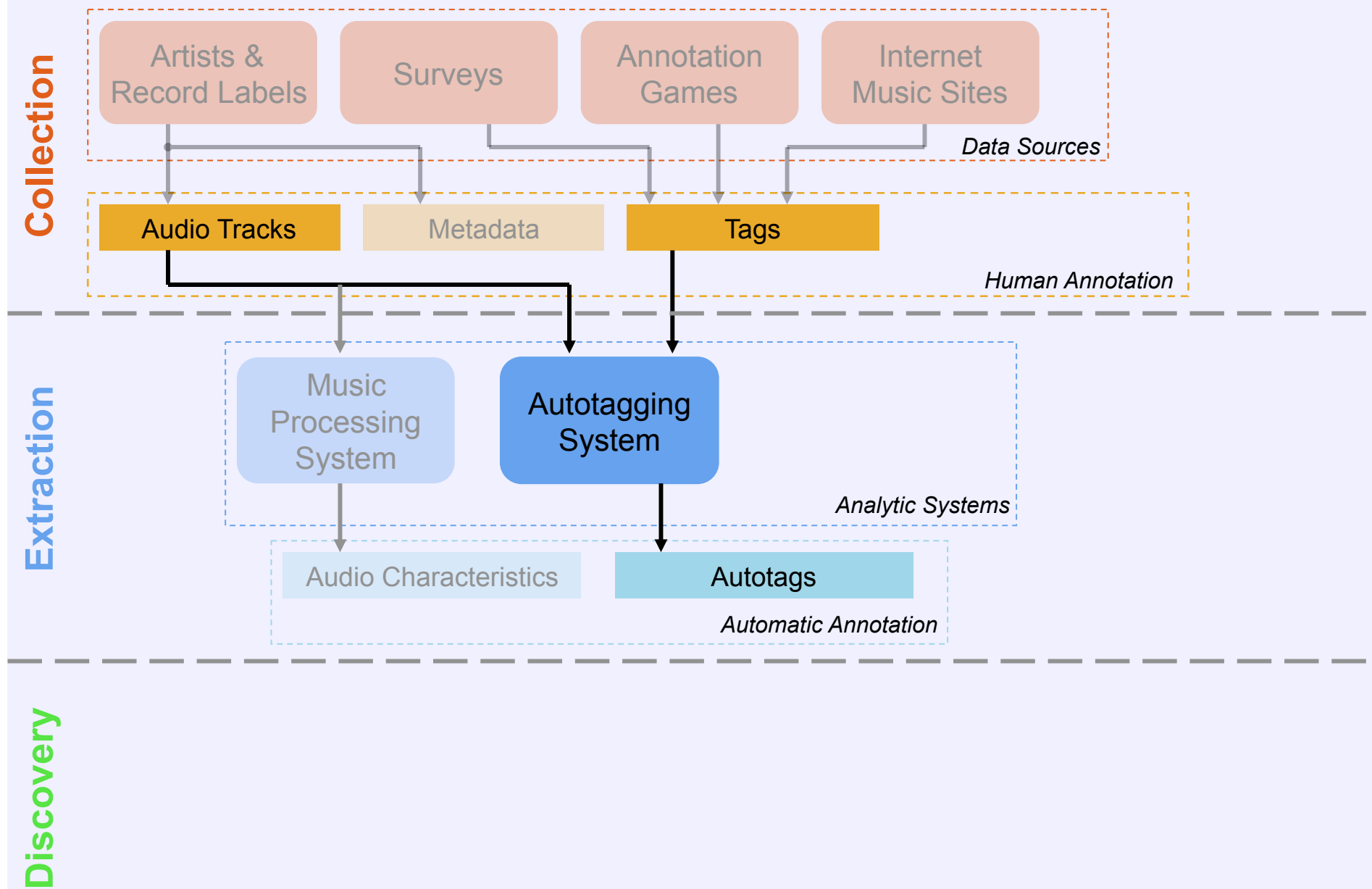
Annotation Game

- ✓ Cheap, Scalable, Precise, Personalized
- ✗ Need to create a viral user experience

Music Web Sites

- ✓ Cheap, Annotations for short-head
- ✗ Noisy, long-tail is poorly represented

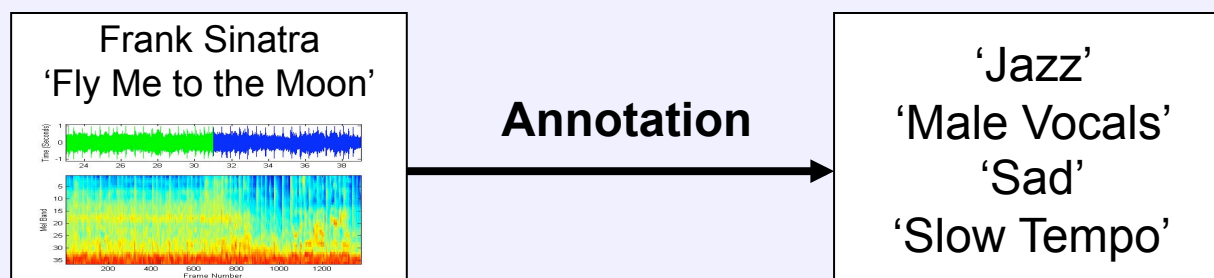
Semantic Music Discovery Engine



Autotagging



Learn a probabilistic model that captures a relationship between **audio content** and **tags**.



Statistical Model


Supervised Multi-class Labeling model

- One Gaussian Mixture Model (GMM) per tag - $p(x|t)$
- Mixture Hierarchies EM Algorithm

Notes:

- Developed for image annotation [Carneiro 06]
- Scalable and Parallelizable
- Top system on 2008 MIREX Autotagging Task

Automatic Music Reviews

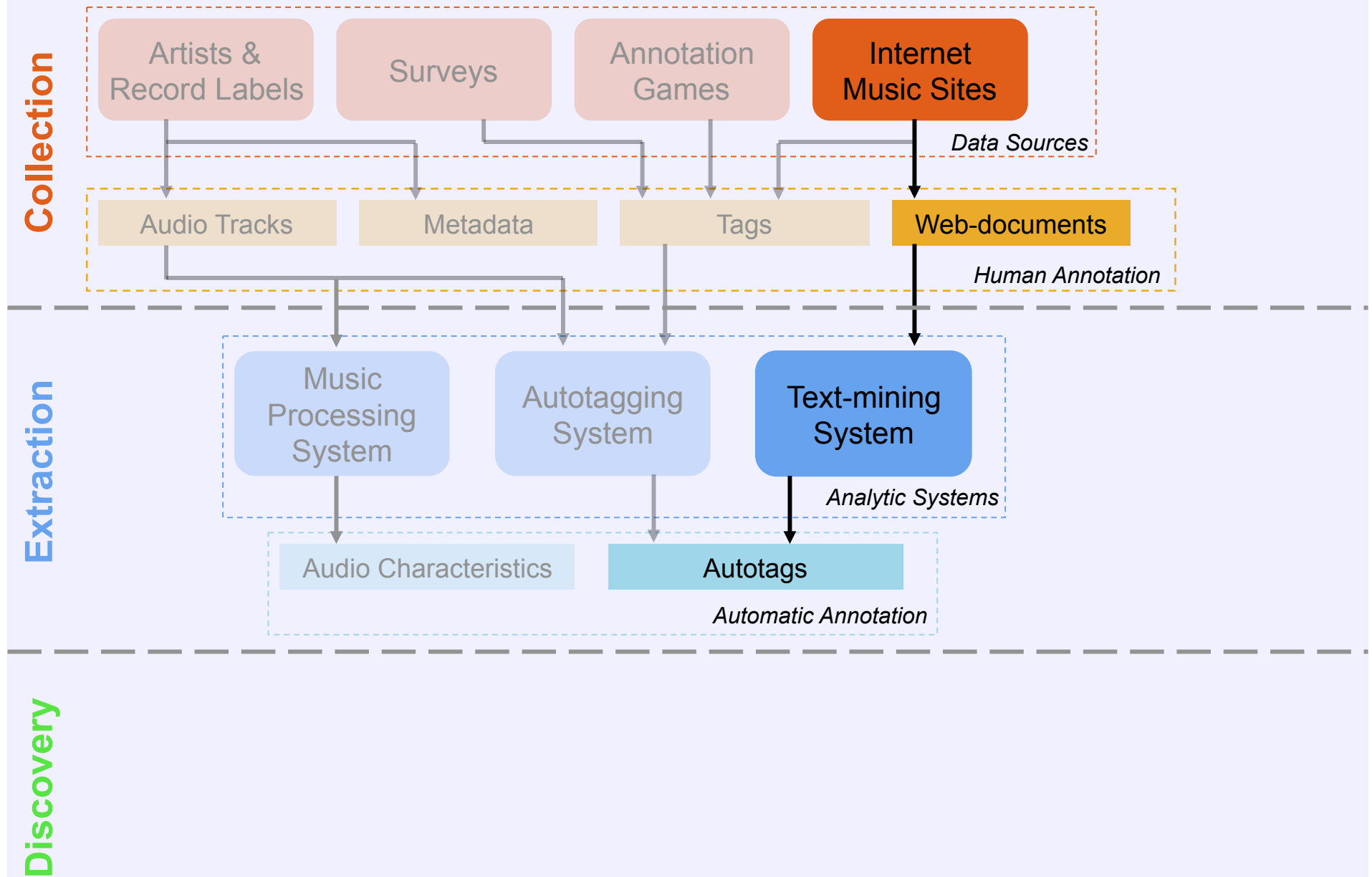
Dr. Dre (feat. Snoop Dogg) - Nuthin' but a 'G' thang 

This is a **dance poppy**, **hip-hop** song that is **arousing** and **exciting**. It features **drum machine**, **backing vocals**, **male vocal**, a nice **acoustic guitar solo**, and **rapping**, **strong vocals**. It is a song that is very **danceable** and with a **heavy beat**.

Frank Sinatra - Fly me to the moon 

This is a **jazzy**, **singer / songwriter** song that is **calming** and **sad**. It features **acoustic guitar**, **piano**, **saxophone**, a nice **male vocal solo**, and **emotional**, **high-pitched** vocals. It is a song with a **light beat** and a **slow tempo**.

Semantic Music Discovery Engine



Text-mining System

Relevance Scoring [Knees 08]

Step 1: Collect Corpus

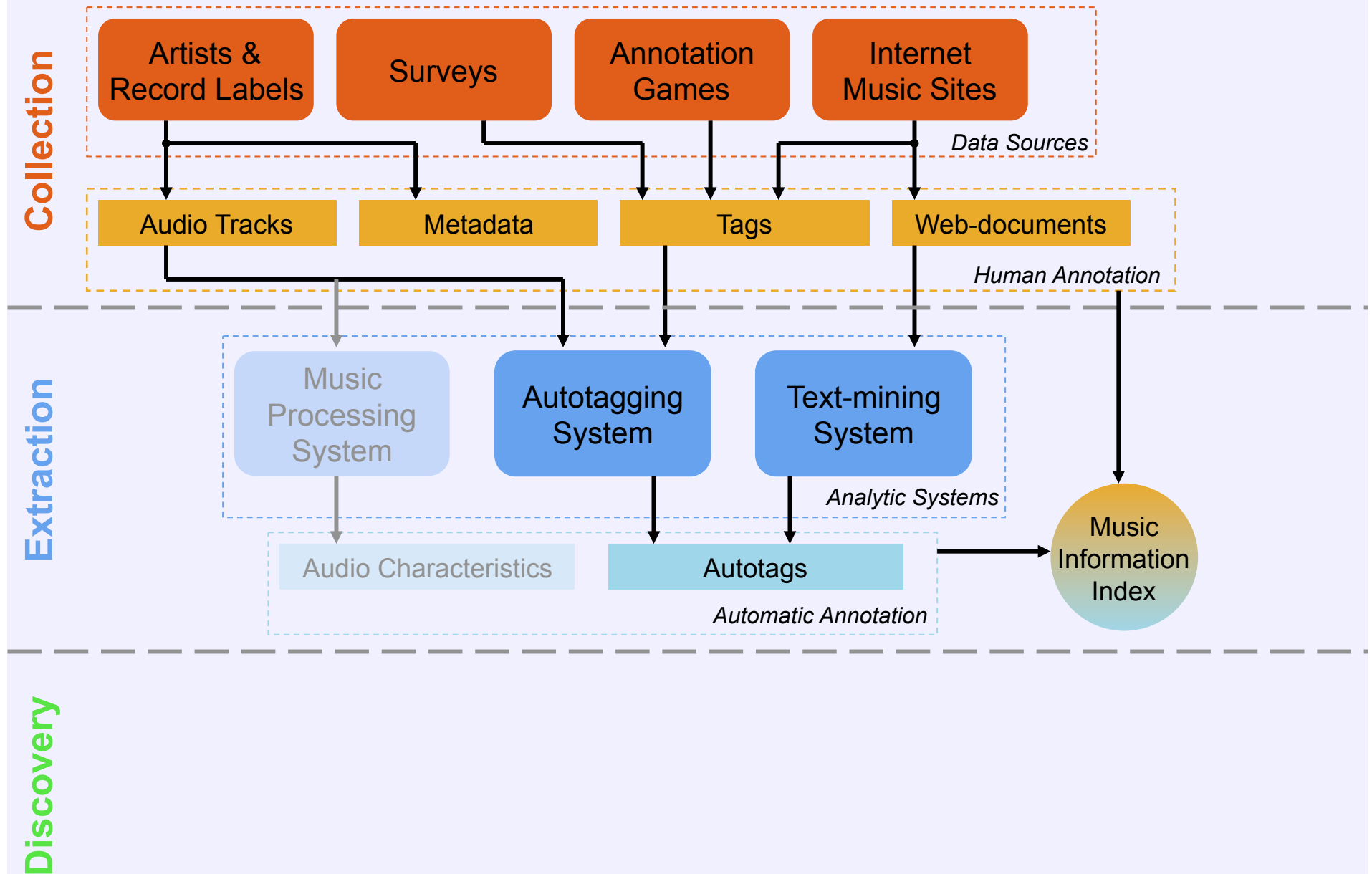
For each song, use a **search engine** to **retrieve web pages**:

- site:<website> "<artist>" music
- site:<website> "<artist>" "<album>" music review
- site:<website> "<artist>" "<song>" music review

Step 2: Generate Tags

1. Query corpus with tag to find relevant pages
2. Map relevant pages back to songs

Semantic Music Discovery Engine



Comparing Data Sources

Groundtruth

- **CAL500** - binary labeling of song-tag pairs
- **Long Tail** - subset of 87 obscure songs

Approaches

1. **Social Tags** - Last.fm
2. **Annotation Game** - Listen Game
3. **Web Autotags** - Site-specific relevance scoring
4. **Audio Autotags** - SML model w/ MFCCs

Comparing Data Sources

For each approach:

For each tag:

1. Rank songs
2. Calculate **Area under the ROC curve** (AROC)
 - 0.5 random ranking (Bad)
 - 1.0 perfect ranking (Good)

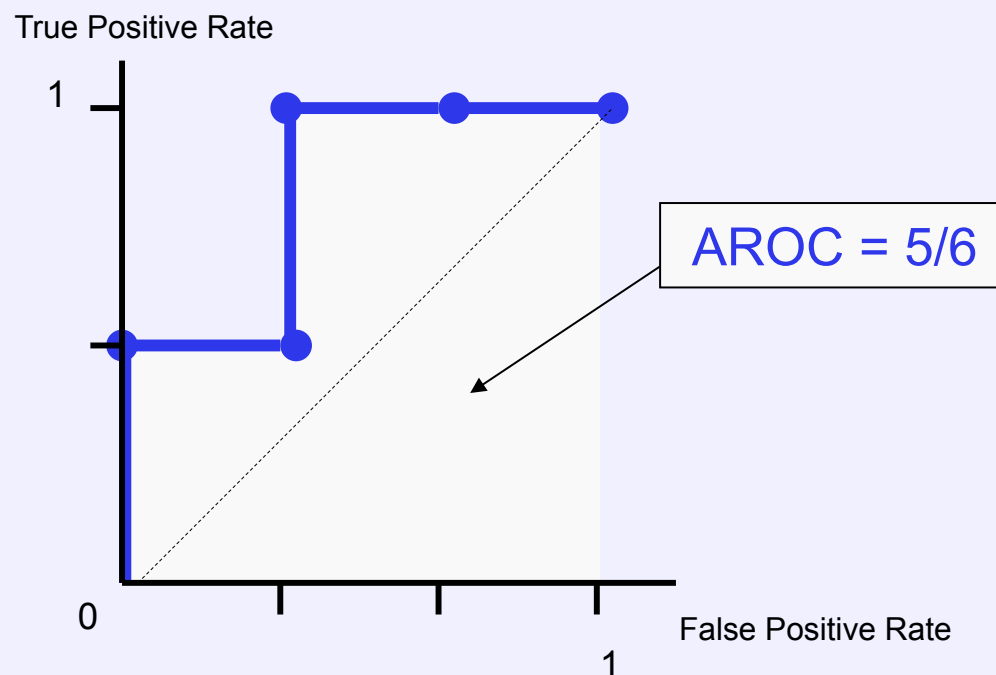
Calculate mean AROC

Comparing Data Sources

Metric: Area under the ROC Curve (**AROC**)

Rank by 'Romantic'

Rank	Label	TP	FP
1	R	$1/2$	0
2	-	$1/2$	$1/3$
3	R	1	$1/3$
4	-	1	$2/3$
5	-	1	1



Comparing Tags

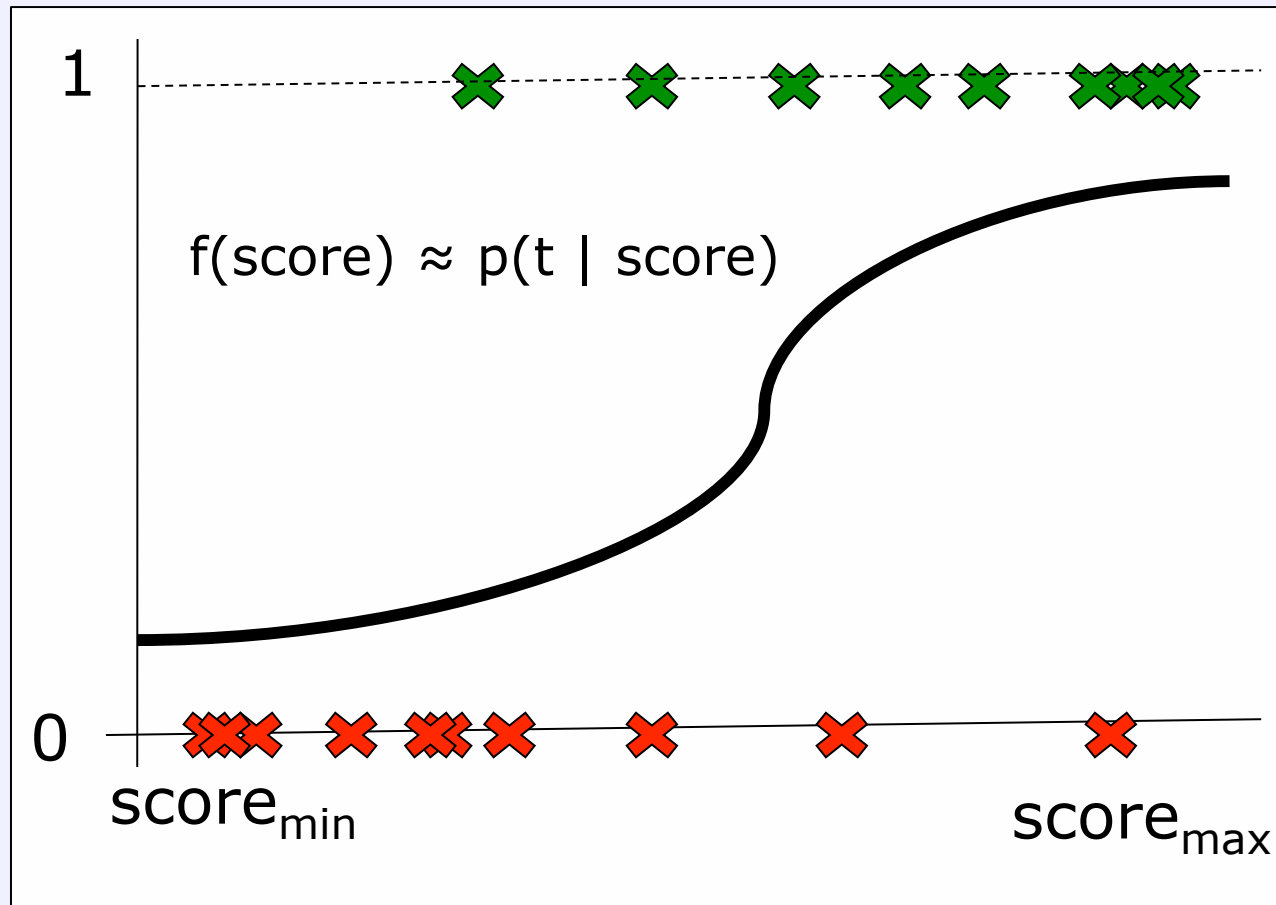
Approach	Songs	AROC
Social Tags	CAL500	0.62
	Long Tail	0.54
Game	CAL500	0.65
	Long Tail	*
Web Autotags	CAL500	0.66
	Long Tail	0.56
Audio Autotags	CAL500	0.69
	Long Tail	0.70

Combining Data Sources

Approaches

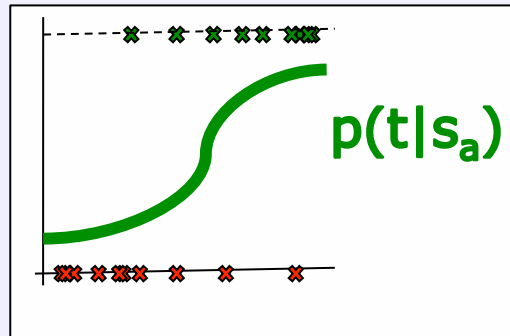
- 1. Calibrated Score Averaging** - [Zadrozny 02]
- 2. RankBoost** - [Freund 03]
- 3. Kernel Combination SVM**- [Lanckriet 04]

1. Calibrated Score Averaging

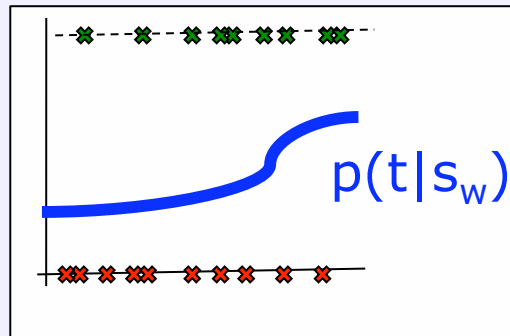


1. Calibrated Score Averaging

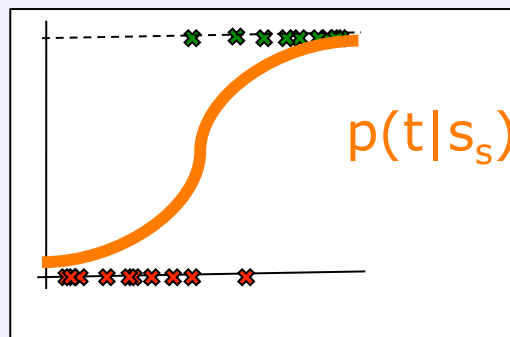
Autotag
Score



Web
Document
Score



Social Tag
Score



$$p(t|\mathbf{s}) = \prod_i p(t|s_i)$$

2. RankBoost

Weak Ranker

- Data Source, Score Threshold & Orientation

Strong Ranker

- Linear Combination of Weak Rankers

Rankboost

- Iterative greedy algorithm
- picks best weak ranker & assigns weight based on loss function in each iteration

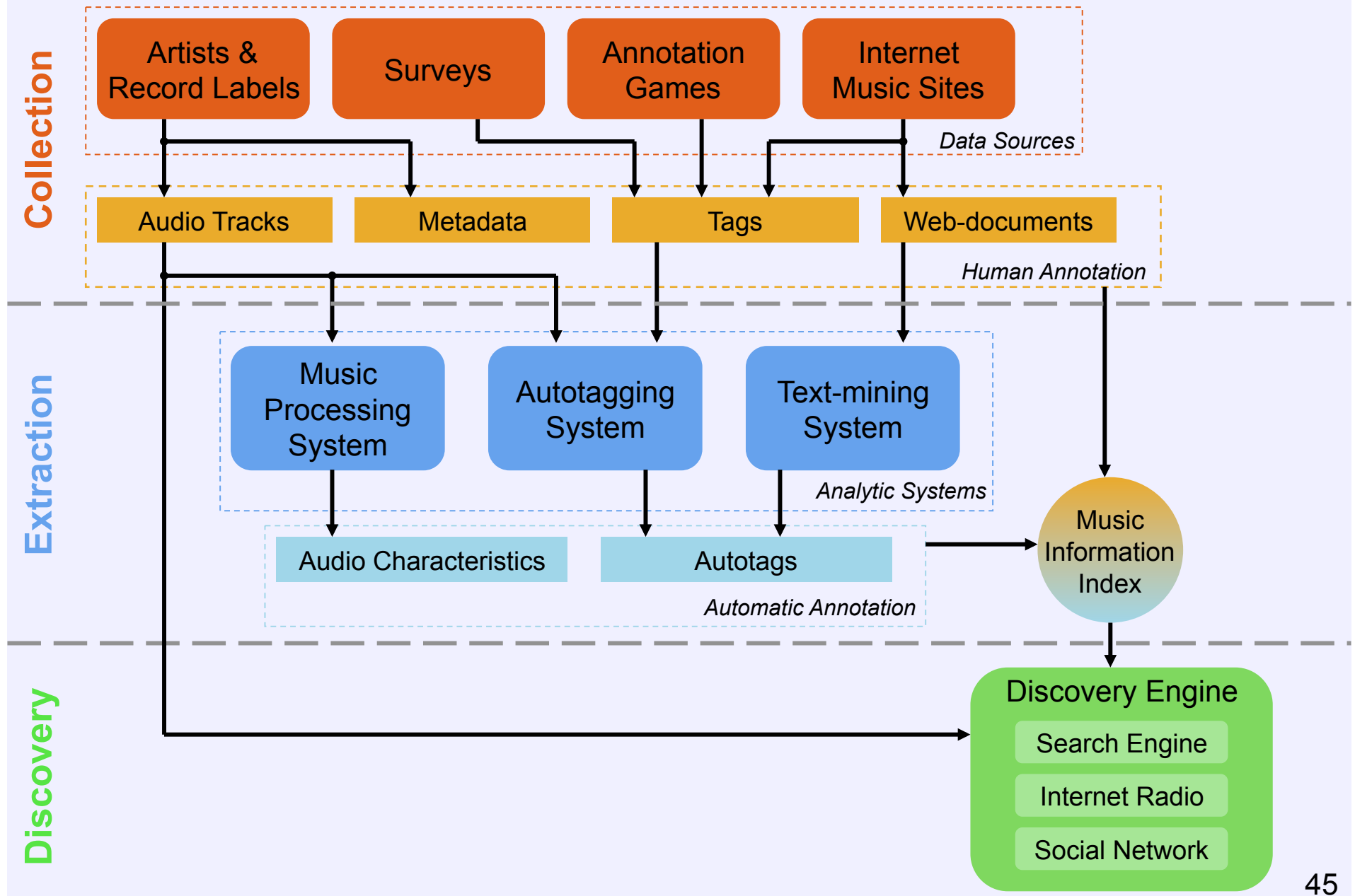
3. Kernel Combo SVM

1. Compute **kernel matrix** for each data source.
 - Song X Song similarity matrix
2. Learn an optimal **linear combination of the kernel matrices** using convex optimization
 - Produces single kernel matrix for SVM
3. Rank songs based on score from SVM
 - **positive distance** from **separating hyperplane**.

Combining Tags

Approach	AROC
Audio Autotags	0.69
Calibrated Score Averaging	0.75
Rankboost	0.75
Kernel Combo SVM	0.74

Semantic Music Discovery Engine



Chapter 3

The User Experience



CALab Search

The screenshot shows a web browser window titled "Music Search" with the URL `http://theremin.ucsd.edu/~a5huynh/search/#`. The page features a search bar with a "search" button and example searches: "punk, calming, party". On the left, a sidebar titled "narrow your search" lists categories: bands, emotion, characteristics, genre, instrumentation, use of music, and vocal. The main content area displays a list of search results, each with a filter tag and a song title. The first two results, "Symphony of Destruction by Megadeth" and "All in the Family by Korn", have a red "aggressive" filter tag. The next three results, "The Frayed Ends of Sanity by Metallica", "Birth Defect by Helmet", and "Hyperactive Child by Dead Kennedys", have a brown "electric guitar" filter tag. The fourth result, "The Thing That Should Not Be by Metallica", is highlighted in light gray. The fifth result, "I Don't Want to Go Down to the Basement by Ramones", has no filter tag. At the bottom, a blue player bar shows playback controls and the title "Symphony of Destruction by Megadeth".

CALab Search

example searches: punk, calming, party

narrow your search

- bands
- emotion
- characteristics
- genre
- instrumentation
- use of music
- vocal

aggressive **electric guitar**

- Symphony of Destruction by Megadeth
- All in the Family by Korn
- The Frayed Ends of Sanity by Metallica
- Birth Defect by Helmet
- Hyperactive Child by Dead Kennedys
- The Thing That Should Not Be by Metallica
- I Don't Want to Go Down to the Basement by Ramones

◀ ▶ | **Symphony of Destruction** by Megadeth o hai there

SMIR – Swarthmore Music IR

SMIR Music Discovery Experience

http://mugwort.cs.swarthmore.edu/smir/playerPage.html

Google

SMIR

About SMIR

A new kind of music discovery experience

Now Playing

Santeria

by Sublime

Enter a tag or artist

I like music with these features...


ska

alternative

Get new music

This song has these features...

reggae	favorites
90s	rock
ska punk	alternative
punk	sublime
ska	chill



Herd-it

Herd It on Facebook

http://apps.facebook.com/herd-it/?ref=ts

facebook Home Profile Friends Inbox Douglas Turnbull Settings Logout

10-Question Survey Report a bug

Herd It

Hi Douglas

Start by choosing a musical style

Everything	Electronic	Pop	Rock	Blues	Hip-Hop
8 players online	8 players online	3 players online	8 players online	5 players online	7 players online

Are you ready to rock out with the world? Challenge Your Friends!

How do I play Herd It?

Play an interactive demo:

play demo

or

View quick instructions:

instructions

Top Scoring Friends Leaderboard Musical Profile

Antoni	Luke	Oscar	Damien
466	459	447	439
Rock	Rock	Rock	Rock

Challenge Your Friends to Play Herd It!

Applications Bookmark Herd It Online Friends (12)

Herd-it

The screenshot shows the Herd-it game interface within a Facebook browser window. The browser's address bar displays the URL `http://apps.facebook.com/herd-it/?ref=ts`. The Facebook navigation bar at the top includes links for Home, Profile, Friends, and Inbox, along with the user's name, Douglas Turnbull, and links for Settings and Logout.

At the top of the game interface, there are links for a "10-Question Survey" and a "Report a bug" option. The main game area features a central question: "What adjective describes the [blank]?" with a word cloud of adjectives including "electronic", "irreverent", "brash", "thuggish", "sardonic", and "theatrical".

On the left side, the "Your Rank" is shown as 5/9. Below this is a "Top 10 Scorers" list with the following entries:

Rank	Score	Name
1	0	Fred
2	0	John
3	0	Alex
4	0	John
5	0	Douglas
6	0	Jane
7	0	Chris
8	0	Andy
9	0	

On the right side, the user's profile "Douglas" is shown with a score of 0. Below the profile is an "agree-O-meter" scale ranging from 0% to 100%.

At the bottom of the interface, there is a "CHAT" section with a text input field and a "CHAT" button. The bottom of the browser window shows a taskbar with various application icons, including Facebook, Applications, and a bookmark for "Herd It". The system tray on the right indicates "Online Friends (12)" and a notification for 3 new messages.

Herd-it

Herd It on Facebook

http://apps.facebook.com/herd-it/?ref=ts

facebook Home Profile Friends Inbox Douglas Turnbull Settings Logout

10-Question Survey Report a bug

Your Rank
1 / 9

GAME ROUNDS ● ● ● ● ● ○ ○ ○ ○ ○

TIMER

Douglas
209

Top 10 Scorers

- 209 Douglas
- 203 Jane
- 191 John
- 181 Alex
- 180 Fred
- 180 Andy
- 169 Chris
- 147 John
- 124

DANCEABLE
UNDANCEABLE
SLOW ← **FAST**

Alex John Jane John Fred Nick Andy

100%
50%
0%

44

agree-O-meter

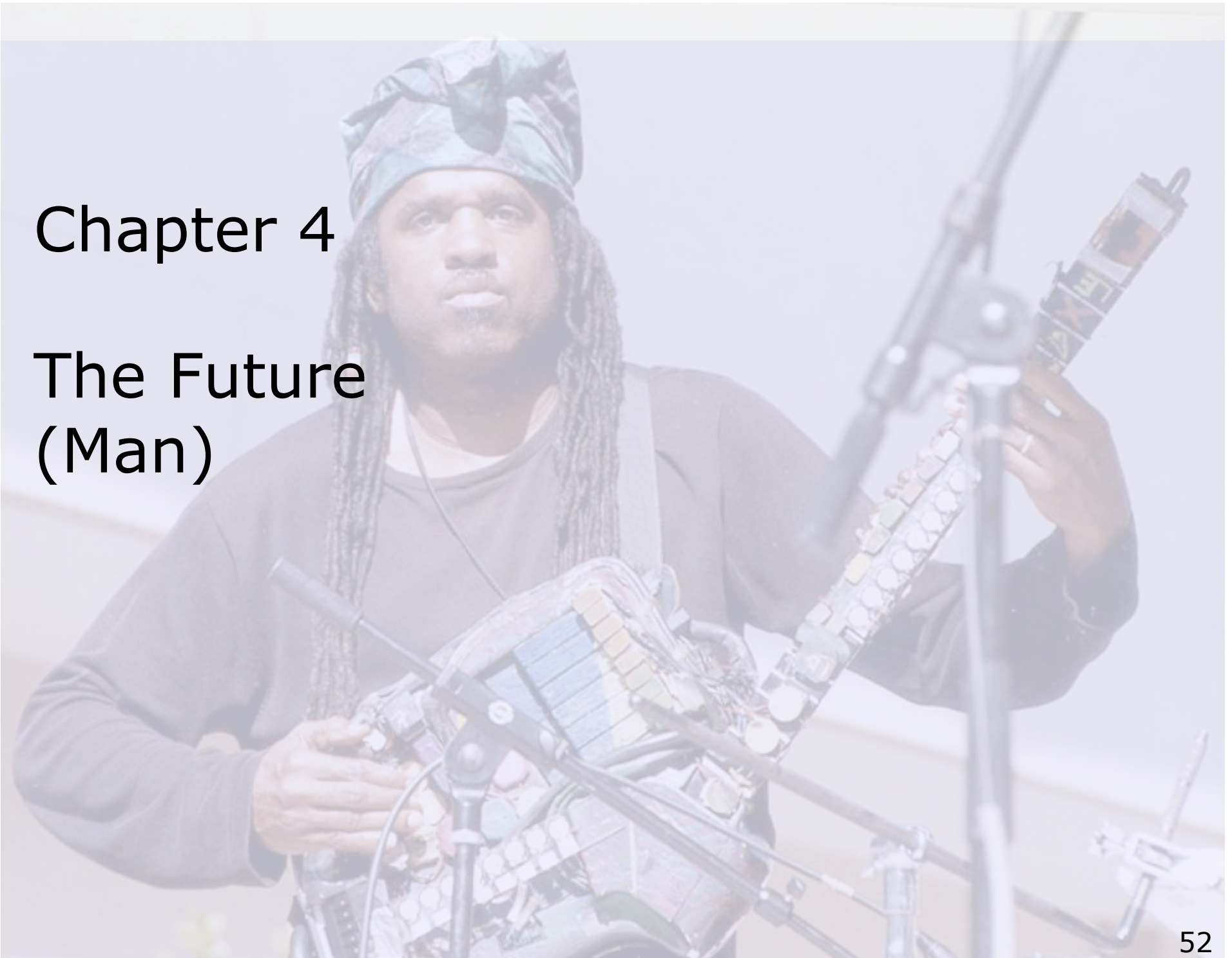
CHAT

Douglas: Hello World
Douglas: What is going on
Last Song: 'I'm Back' by Eminem
Last Song: 'Heat' by 50 Cent
Douglas: West Coast!!!
Last Song: 'Lowrider' by Cypress Hill

Applications Bookmark Herd It Online Friends (12)

Chapter 4

The Future (Man)



Research Challenges

1. Combine Music Information Sources

- Games, Social Networks, Web Documents, Popularity Info

2. Improving Autotagging

- Discriminative Approaches [Mandel 08, Eck 07]

3. Recommendation with Semantics

4. Personalization

- Demographic Groups
- Psychographic Groups
- Individual Preference
- Emotional states of Individual

What's on tap

1. Big new data set

- 10,000 songs
- Acoustic, Genre, Social Tags

2. Herd-it

- Facebook launch
- Analyzing data

3. New Everything

- Autotagging Approaches
- Content-Context Approach
- User Interfaces

References

Social Context-Audio Content [SIGIR 09, ISMIR 08]

Autotagging [IEEE TASLP 08, SIGIR 07]

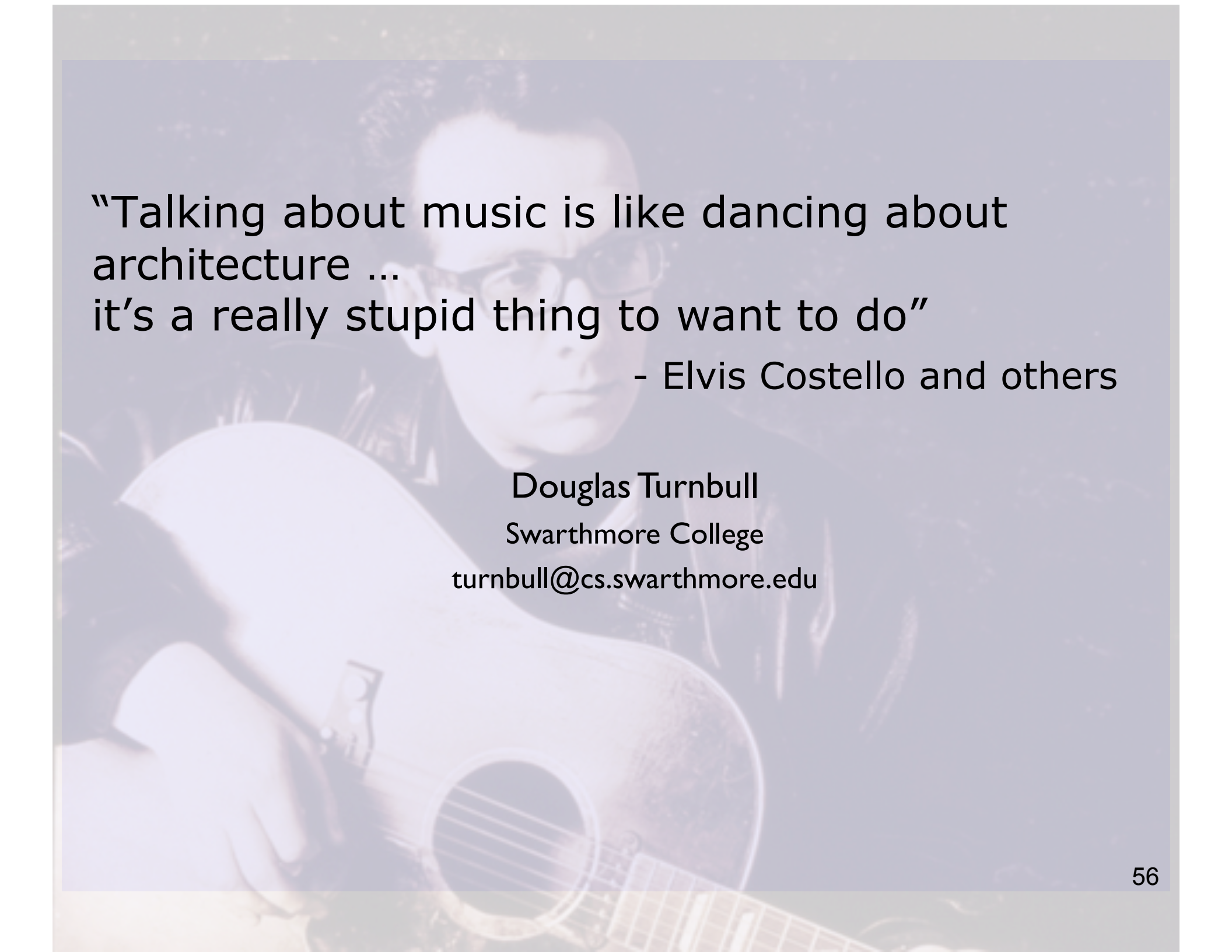
Music Annotation Games [ISMIR 07a]

Related:

Query-by-Semantic-Similarity [ICASSP 07, MIREX 07]

Tag Vocabulary Selection with Sparse CCA [ISMIR 07]

Supervised Music Boundary Detection [ISMIR 07]



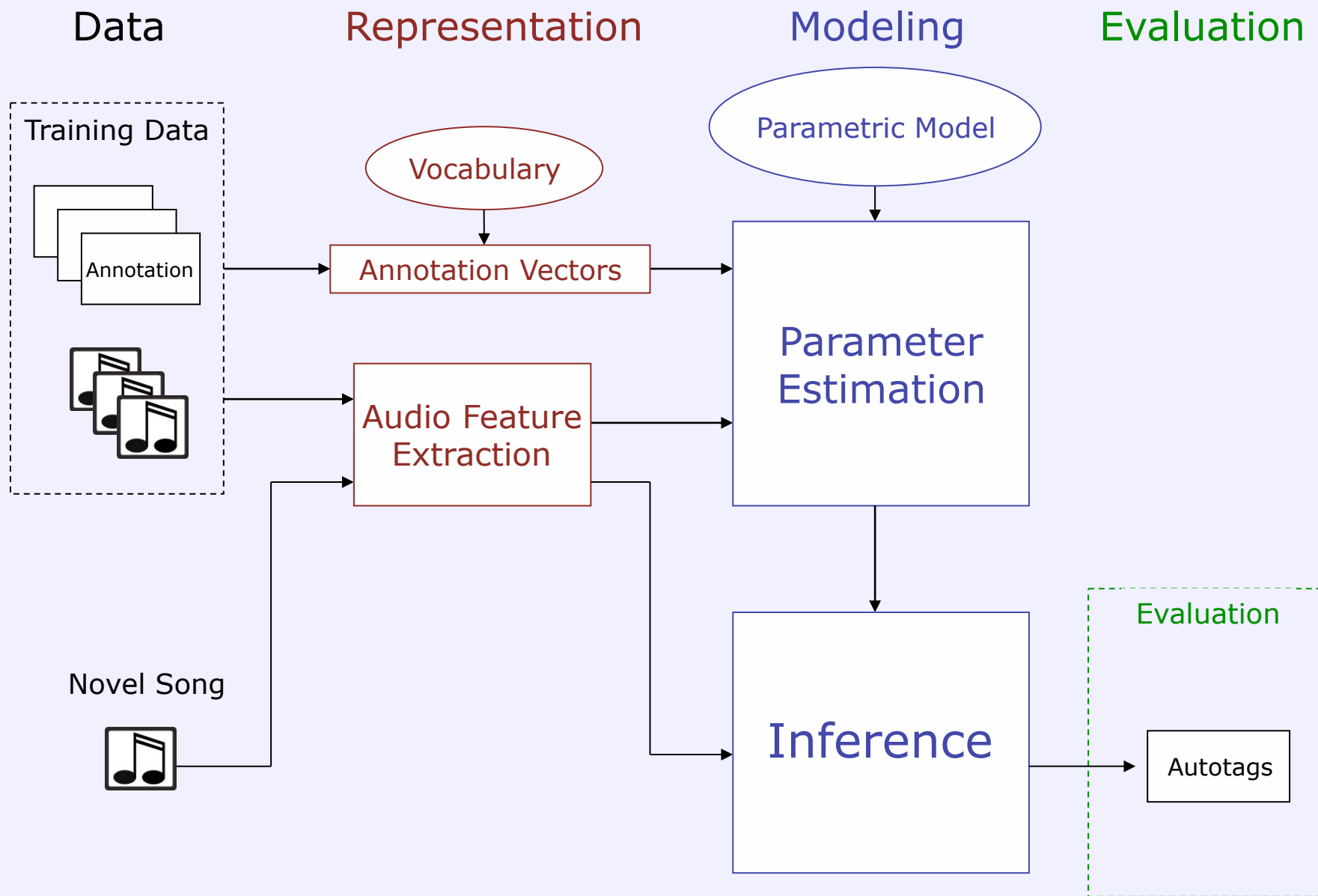
“Talking about music is like dancing about
architecture ...
it’s a really stupid thing to want to do”

- Elvis Costello and others

Douglas Turnbull
Swarthmore College
turnbull@cs.swarthmore.edu

Questions?

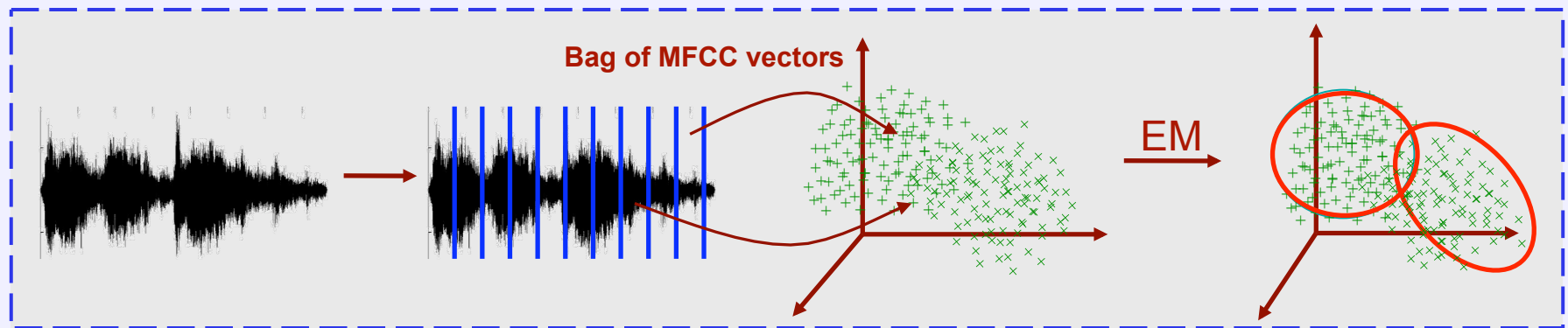
System Overview



Modeling a Song

Algorithm

1. Segment audio signals
2. Extract short-time feature vectors
3. Estimate GMM with EM algorithm



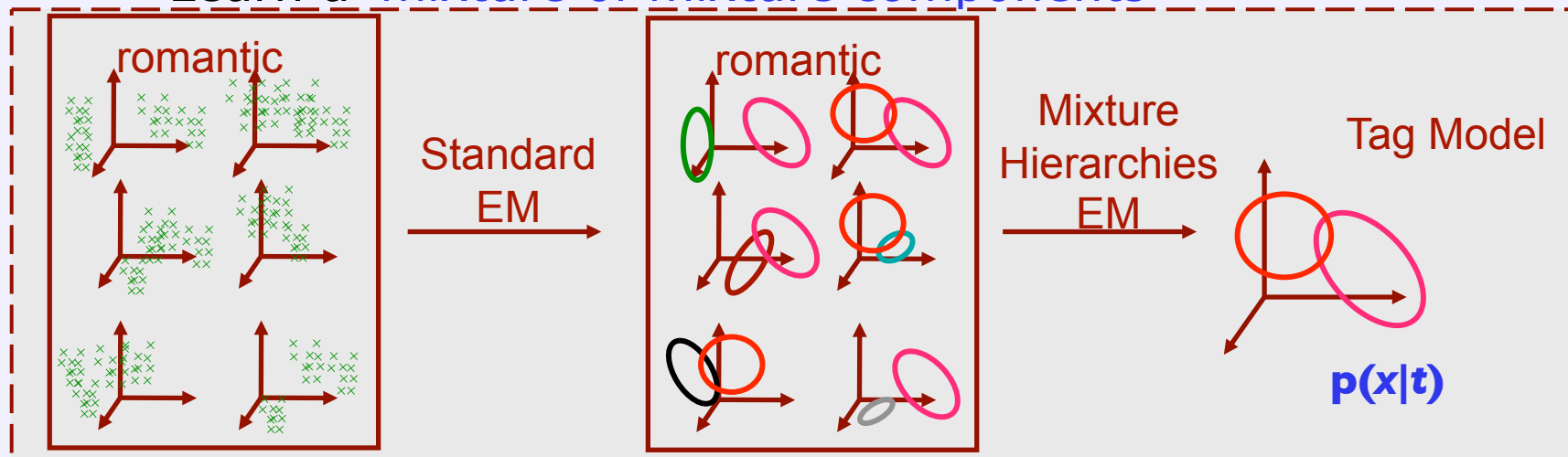
Modeling a Tag

Algorithm:

1. Identify songs associated with tag t
2. Estimate a 'song GMM' for each song - $p(x|s)$
3. Use the Mixture Hierarchies EM algorithm

[Vasconcelos01]

- Learn a 'mixture of mixture components'



Benefits

- + Computationally efficient for parameter estimation and inference
- + 'Smoothed' song representation \rightarrow better density estimate

Annotation

Given a novel song $X = \{x_1, \dots, x_T\}$, calculate

Assuming

$$P(t|X) = \frac{P(X|t)P(t)}{P(X)}$$

1. Uniform tag prior
2. Vectors are conditionally independent given a tag
3. Geometric average of likelihoods
4. Tags are mutually exclusive and exhaustive

$$P(t|X) = \frac{\left(\prod_{i=1}^T P(\mathbf{x}_i|t) \right)^{\frac{1}{T}}}{\sum_{v \in V} \left(\prod_{i=1}^T P(\mathbf{x}_i|v) \right)^{\frac{1}{T}}}$$

Semantic Multinomial:

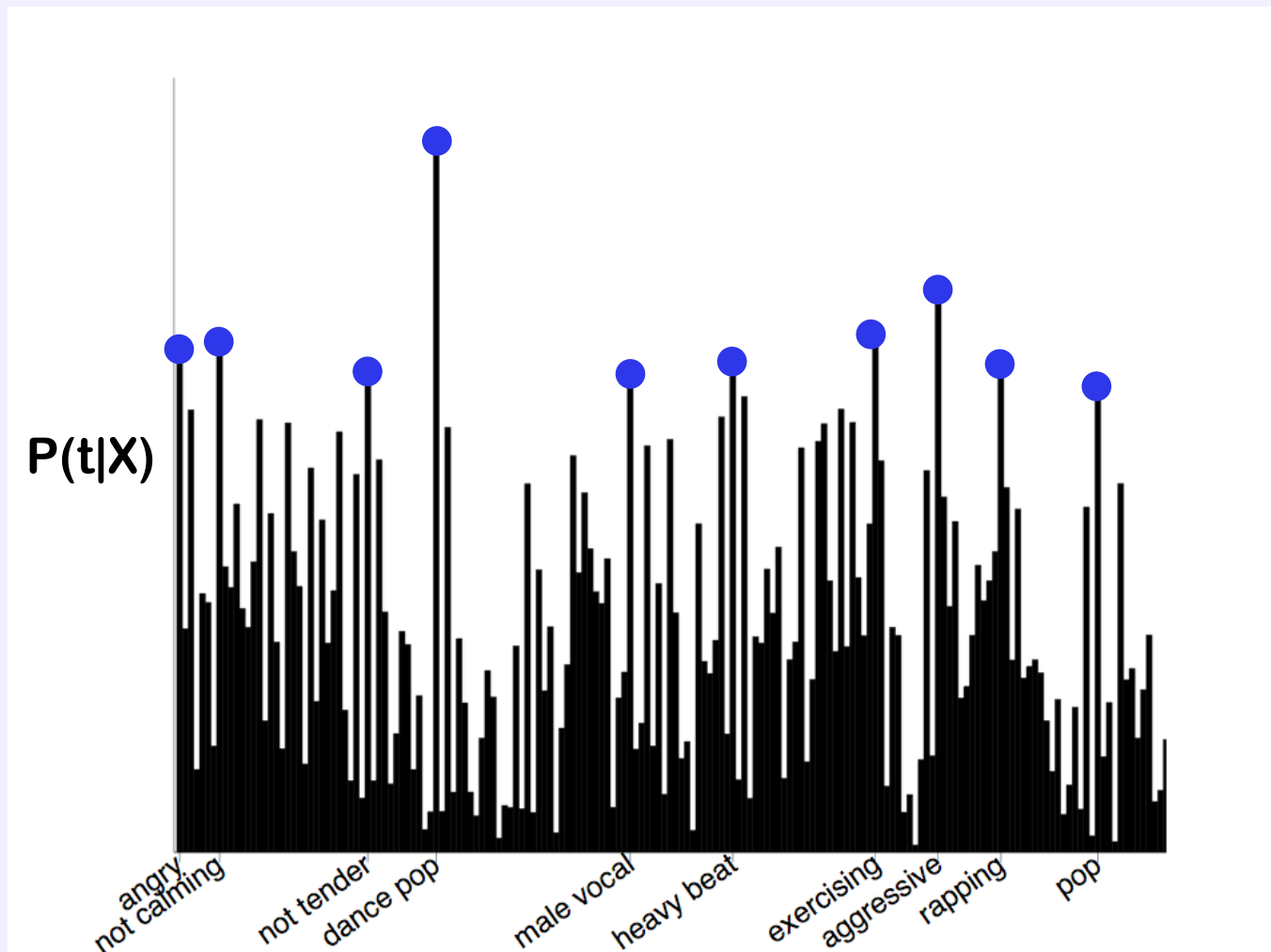
• $P(t|X)$'s \rightarrow multinomial distribution over the tag vocabulary

Annotation: peaks of multinomial

Annotation



Semantic Multinomial for "Give it Away" by the Red Hot Chili



Retrieval

1. Annotate each song in corpus with a **semantic multinomial \mathbf{p}**

- $\mathbf{p} = \{P(t_1|X), \dots, P(t_{|V|}|X)\}$

2. Given a text-based query, construct a **query multinomial \mathbf{q}**

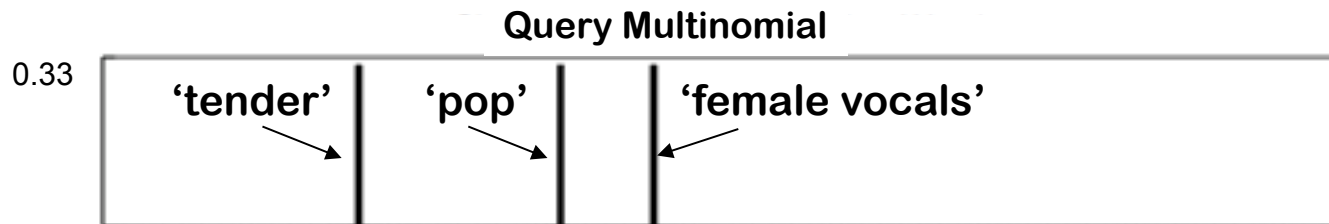
- $q_i = 1/|t|$, if tag t appears in the query string
- $q_i = 0$, otherwise

3. Rank all songs

$$KL(\mathbf{q}||\mathbf{p}) = \sum_{i=1}^{|V|} q_i \log \frac{q_i}{p_i} \quad \text{(KL) divergence}$$

Retrieval

Query: 'a tender pop song with female vocals'



Retrieval

Query	Retrieved Songs
'Tender'	Crosby, Stills and Nash - Guinevere Jewel - Enter from the East Art Tatum - Willow Weep for Me
'Female Vocals'	Alicia Keys - Fallin' Shakira - The One Junior Murvin - Police and Thieves
'Tender' AND 'Female Vocals'	Jewel - Enter from the East Evanescence - My Immortal Cowboy Junkies - Postcard Blues

The Age of Music Proliferation

Production:

- 5M artist pages  **myspace.com**
a place for friends
- 150M distinct songs  **last.fm**
the social music revolution

Distribution

- 1.5M simultaneous P2P users (Fe  1) -
- 27K record labels  **eMusic**
- 4B songs to 50M customers  -

Consumption

- 11M Internet radio users  **PANDORA**
created by the Music Genome Project™
- 110M iPods sold 

Comparing Tags

Approach	Songs	Density	AROC
Ground Truth CAL500	All	0.15	1.00
	Long-Tail	0.15	1.00
Social Tags Last.fm	All	0.23	0.62
	Long-Tail	0.03	0.54
Game Listen Game	All	0.37	0.65
	Long-Tail	*	*
Web Autotags	All	0.67	0.66
	Long-Tail	0.25	0.56
Audio Autotags	All	1.00	0.69
	Long-Tail	1.00	0.70

Text-mining System

Relevance Scoring [Knees 08]

Step 1: Collect Corpus

For each song, use a **search engine** to **retrieve web pages**:

- site:<website> "<artist>" music
- site:<website> "<artist>" "<album>" music review
- site:<website> "<artist>" "<song>" music review

Maintain $M_{s,d}$ = mapping of **songs** to **documents**

Text-mining System

Step 2: Autotag songs

For each tag t :

1. Query corpus with tag t to find relevant documents
 - $w_{t,d} \rightarrow$ relevance score for document d
2. For each song s , sum relevance scores for documents that are related to song s

$$w_{s,t} = \sum_d M_{s,d} w_{t,d}$$



CAL Music Discovery Engine



Metadata Search

Semantic Search

[Combo Search](#)

Metadata Filter: pick songs by song title, artist name, and album title


Song Title contains	<input type="text"/>	does not contain	<input type="text"/>
Artist Name contains	beatles	does not contain	<input type="text"/>
Album Title contains	<input type="text"/>	does not contain	<input type="text"/>
Song, Artist, or Album contains	<input type="text"/>	does not contain	<input type="text"/>

Semantic Ranking: order songs by musical characteristics

Musical Genre	Instrumentation	Emotional Content
Alternative <input type="checkbox"/> yes	Acoustic Guitar <input checked="" type="checkbox"/> yes	Aggressive <input type="checkbox"/> yes
Bebop <input type="checkbox"/> yes	Ambient Sounds <input type="checkbox"/> yes	Annoying <input type="checkbox"/> yes
Bluegrass <input type="checkbox"/> yes	Backing vocals <input type="checkbox"/> yes	Arousing <input type="checkbox"/> yes
Blues <input type="checkbox"/> yes	Bass <input type="checkbox"/> yes	Bizarre <input type="checkbox"/> yes
Brit Pop <input type="checkbox"/> yes	Distorted Electric Guitar <input type="checkbox"/> yes	Boring <input type="checkbox"/> yes
Classic Rock <input type="checkbox"/> yes	Electric Guitar <input type="checkbox"/> yes	Calming <input checked="" type="checkbox"/> yes
Cool Jazz <input type="checkbox"/> yes	Female Lead Vocals <input type="checkbox"/> yes	Carefree <input type="checkbox"/> yes
Country <input type="checkbox"/> yes	Hand Drums <input type="checkbox"/> yes	Cheerful <input type="checkbox"/> yes
Dance Pop <input type="checkbox"/> yes	Harmonica <input type="checkbox"/> yes	Emotionless <input type="checkbox"/> yes
Electronica <input type="checkbox"/> yes	Horn Section <input type="checkbox"/> yes	Gloomy <input type="checkbox"/> yes
Folk <input checked="" type="checkbox"/> yes	Male Lead Vocals <input type="checkbox"/> yes	Happy <input type="checkbox"/> yes



CAL Music Discovery Engine



Metadata Search

Go

Semantic Search

Go

[Combo Search](#)

Combo Search:

Metadata Filtering - 'beatles',

Semantic Ranking -'Folk', 'Acoustic Guitar', 'Calming',





Songs Found: 77 (Top 10 shown)





'Julia' by [The Beatles](#) on [The Beatles \(The White Album\) \(disc 1\)](#) (1968)

This is a **folk** song that also has a **country** feel. It is **calming** and **tender**. It features **acoustic guitar**, **piano** and **female lead vocals**. The vocals are **emotional** and **high-pitched**. It is a song with **soft beat** and **low energy** that you might like to listen to while **romancing**.

Similar Songs:


'Ice' by [Sarah McLachlan](#) on [Fumbling Towards Ecstasy](#)

'Dead of Winter' by [Fels](#) on [Electro-Shock Blues](#)





'Ribbons Undone' by [Tori Amos](#) on [The Beekeeper](#) (2005)

'Yesterday' by [The Beatles](#) on [Help!](#)

This is a **singer/songwriter** song that also has a **country** feel. It is **calming** and **boring**. It features **acoustic guitar**, **saxophone** and **female lead vocals**. The vocals are **emotional** and **high-pitched**. It is a song with **low energy** and **soft beat** that you might like to listen to while **romancing**.



Similar Songs:




'Rose of Aberdeen' by [Simon & Garfunkel](#) on [Sounds of Silence](#)




'Moonshiner' by [Uncle Tupelo](#) on [89/93: An Anthology](#) (2002)

'Where Is the Highway Tonight%' by [Neil Young](#) on [Lucky Thirteen](#)

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Music & Technology

Technology is changing how **music** is **produced, distributed, promoted** and **consumed**.

Thanks

Gert, Charles, Lawrence, Shlomo, Serge,
Sanjoy

- Advice and perspective

Gary Cottrell, Virginia de Sa, IGERT

- Enabling creative and interdisciplinary pursuits

Damien O'malley, Aron Tremble, VLC

- Thinking beyond the walls of academia

Luke Barrington, Antoni Chan, David
Torres

- Friends and collaborators

Red Hot Chili Peppers

Send to Friend



Photo by Gus Van Sant

Picture Browser

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Next >

Formed

1983

Years Active

1910 20 30 40 50 60 70 80 90 2000

Genre

Rock

Styles

Alternative
Pop/ Rock
Funk Metal
College Rock
Dance-Rock
Adult
Alternative
Pop/ Rock
Rap-Rock

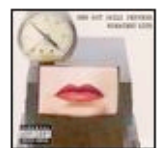
Moods

Carefree
Confident
Provocative
Brash
Freewheeling
Organic

Biography

by Greg Prato

Few rock groups of the '80s broke down as many musical barriers and were as original as the Red Hot Chili Peppers. Creating an intoxicating new musical style by combining funk and punk rock together (with an explosive stage show, to boot), the Chili Peppers spawned a slew of imitators in their wake, but still managed to be the leaders of the pack by the dawn of the 21st century. The roots of the band lay in a friendship forged by three school chums, [Anthony Kiedis](#), [Michael Balzary](#), and [Hillel Slovak](#), while they attended Fairfax High School in California back in the late '70s/early '80s. While [Balzary](#) and [Slovak](#) showed great musical promise (on trumpet and guitar, respectively), [Kiedis](#)... [Read More...](#)



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buy listen



buy



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Other Entries

[Movie Entry](#)

Group Members

[Flea](#)
[John Frusciante](#)
[Jack Irons](#)
[Anthony Kiedis](#)
[Arik Marshall](#)

Influenced By

[Sylvester "Sly Stone" Stewart](#)
[George Clinton](#)
[Bootsy Collins](#)
[Led Zeppelin](#)
[Gang of Four](#)
[Funkadelic](#)
[Bad Brains](#)