

Is pop music getting more repetitive?

Doug Compton – Alcoholic Graduate Talk

Newfangled Pop Music

- Quantifiably test theory: '**New Music Sucks**'
- Music is getting more simplistic
 - “The advent of modern drugs has led to demands for still less memory,” - Donald Knuth, author of *The Complexity of Song* (and *The Art of Computer Programming*)
- Repetition on lyrics
 - Analysis done by Colin Morris, *The Pudding*
- Repetition of sound
 - Temporal segmentation on song time series



"Everything popular is wrong"
- Oscar Wilde

ThePudding



AN EXERCISE IN LANGUAGE COMPRESSION

Are Pop Lyrics Getting More Repetitive?

By Colin Morris

Defining Repetitiveness

- Uniqueness ratio = number of unique words / total number of words ?

baby I don't need dollar bills to have fun tonight
I love cheap thrills
baby I don't need dollar bills to have fun tonight
I love cheap thrills
I don't need no money
as long as I can feel the beat
I don't need no money
as long as I keep dancing

~ Sia, Cheap Thrills

tonight I need dollar bills
I don't keep fun
cheap thrills long to feel money
the bills don't need the dancing baby
fun dollar dancing thrills the baby I need
don't have fun
no no don't have dancing fun tonight
beat the can as I don't feel thrills
love the dancing money

~ Colin Morris, Original composition

- Left paragraph is more repetitive
 - Both 52 words long, with 23 unique words

Repetitiveness \approx compressibility?

- **Compression directly related to the number and length of the repeated sections in that text**

- Lempel-Ziv (LZ) **lossless** compression algorithm
 - Works by exploiting repeated sequences
 - Efficiency related to number and length of repeated sections
- Used in:
 - Images (gif, png)
 - Archive formats (zip, gzip, rar)



- Data: 15,000 songs that charted on the Billboard Hot 100, 1958 – 2017
 - record chart for singles
 - based on sales, radio play, and online streaming

Compression Algorithm

- Scans text looking for chunks that exactly match earlier parts
- Each ● corresponds to 3 bytes (characters), includes spaces

```

baby I don't need dollar bills to have fun tonight
I love cheap thrills!
baby I don't need dollar bills to have fun tonight
I love cheap thrills!
I don't need no money
as long as I can feel the beat
I don't need no money
as long as I keep dancing
```

46.2% Size Reduction

Original size: 247 bytes/characters

Compressed size: 133 bytes (121 characters + 4 × ●)

Compression Algorithm

- Each ● corresponds to 3 bytes (characters), includes spaces

tonight I need dollar bills
I don't keep fun
cheap thrills long to feel money
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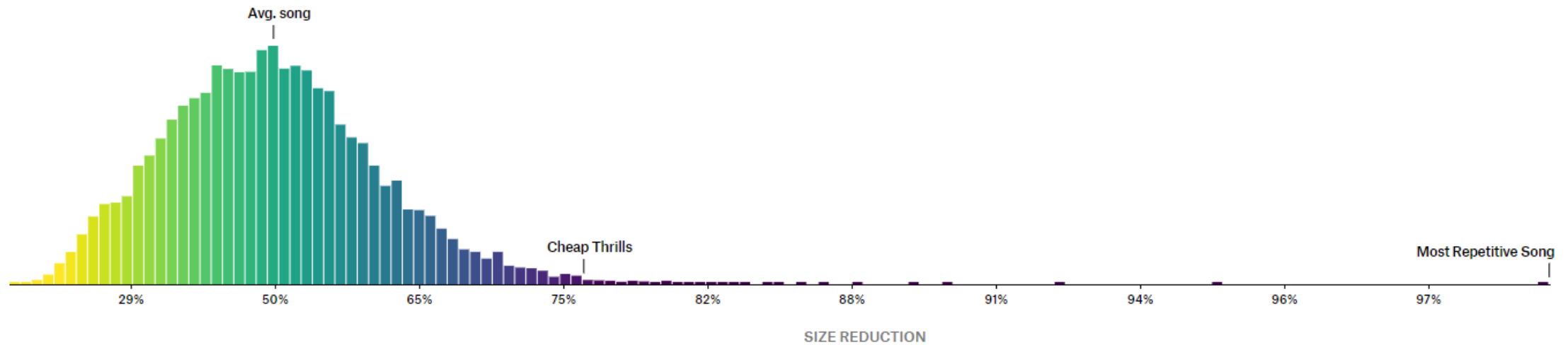
29.5% Size Reduction

Original size: 271 bytes/characters

Compressed size: 191 bytes (122 characters + $23 \times \bullet$)

The Repetition of Pop Music

- Typical prose ~5-10% compression

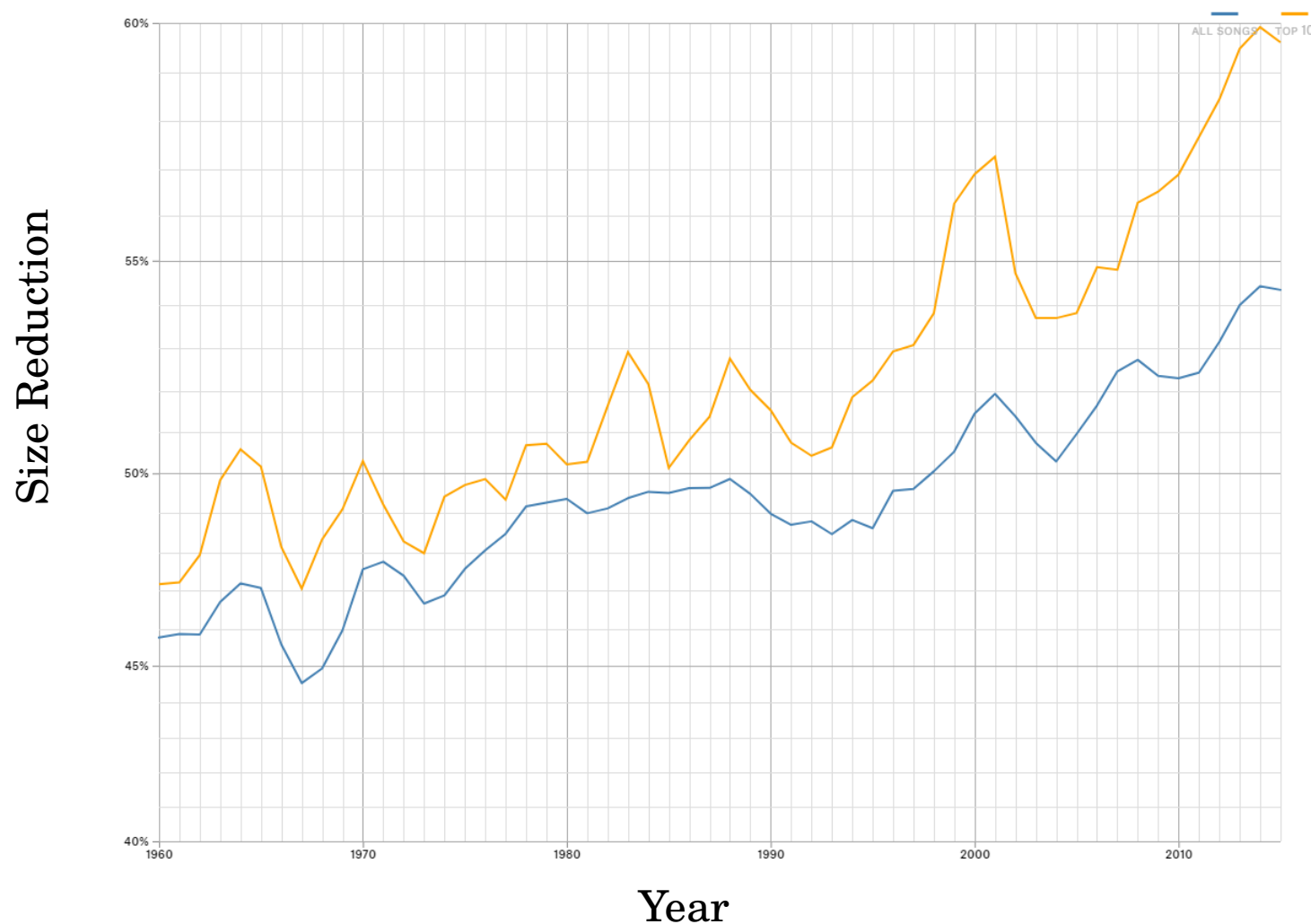


The Most Repetitive Songs

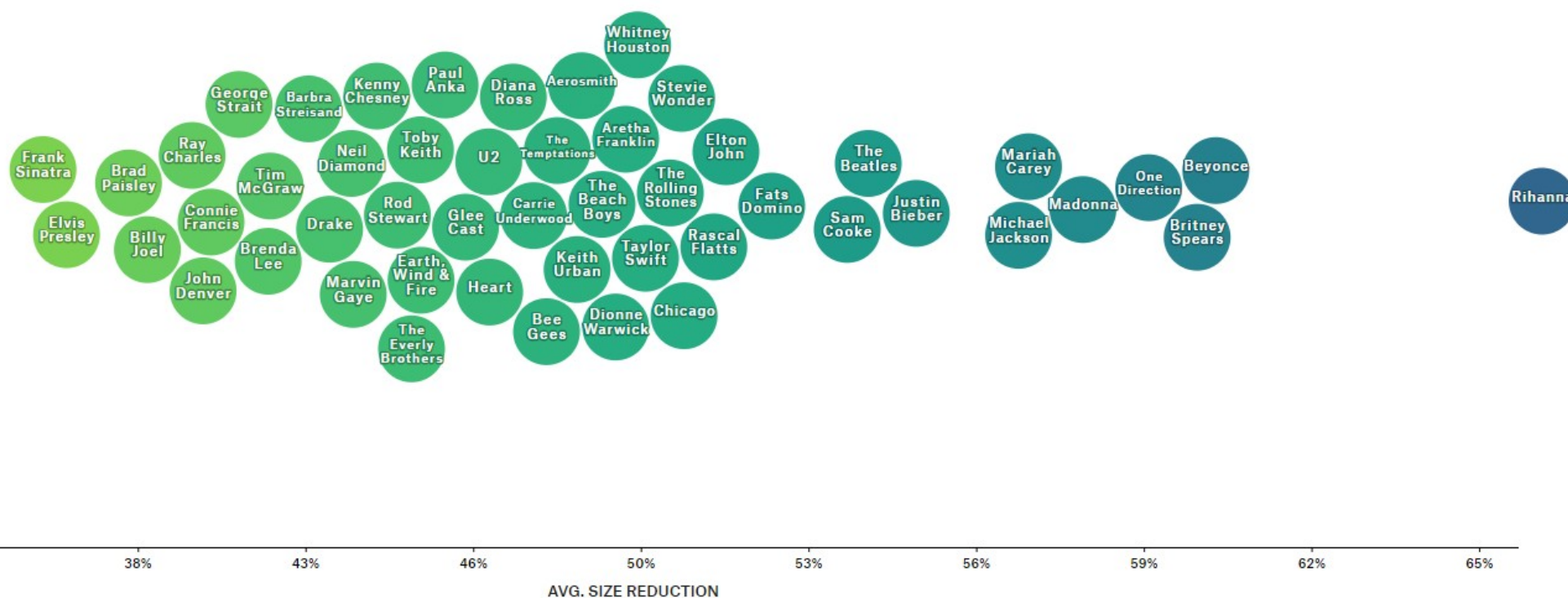
Of 15,000 songs from the Billboard Hot 100

Track	Size Reduction
1. Around The World - Daft Punk, 1997	98%
2. The Rockafeller Skank - Fatboy Slim, 1998	95%
3. Chain Of Fools (Part 1) - Jimmy Smith, 1968	92%
4. Get Low - Dillon Francis & DJ Snake, 2015	90%
5. Barbra Streisand - Duck Sauce, 2011	89%
6. Let's All Chant - The Michael Zager Band, 1978	88%
7. Keep It Comin' Love - KC And The Sunshine Band, 1977	87%
8. Turn Down For What - DJ Snake & Lil Jon, 2014	87%
9. Who'd She Coo? - Ohio Players, 1976	86%
10. Watch Me - Silento, 2015	86%
11. Pump Up The Jam - Technotronic, 1989	85%
12. Jingo - Santana, 1969	85%
13. Funkytown - Lipps, Inc., 1980	85%
14. Send Me On My Way - Rusted Root, 1995	85%
15. Better Off Alone - Alice DeeJay, 2000	84%
16. Any Way You Want It - The Dave Clark Five, 1964	83%
17. Going Down Slowly - The Pointer Sisters, 1975	83%
18. Hello Goodbye - Glee Cast Featuring Lea Michele, Cory Monteith & Amber Riley, 2010	83%
19. Macarena (Bayside Boys Mix) - Los Del Rio, 1995	82%
20. Macarena - Los Del Rio, 1996	82%
21. I'm A Train - Albert Hammond, 1974	82%
22. A Little Bit Of Ecstasy - Jocelyn Enriquez, 1997	82%
23. That's The Way (I Like It) - KC And The Sunshine Band, 1975	82%
24. Memories - David Guetta Featuring Kid Cudi, 2010	82%
25. You Make Me - Avicii, 2013	82%
26. After Midnight - Eric Clapton, 1970	81%
27. Star Love - Cheryl Lynn, 1979	81%
28. Neanderthal Man - Hotlegs, 1970	81%
29. Jesus Is Just Alright - The Doobie Brothers, 1972	81%
30. Thong Song - Sisqo, 2000	81%

Repetition of Popular Music, by Year



Repetitiveness Per Artist



Concluding Anecdotes – Part 1

- Compression increased ~20% over 50 years
- Songs that don't rhyme compress less... counter intuitive?
- Compression strongly related to genre
 - Country, hip-hop, rap more varied than pop and rock
- Taylor Swift's 1989 (2014), went full popstar
 - Contains 4 of her 5 most repetitive songs
- Madonna known for repetitive music. Least repetitive songs not pop songs
 - From musical Evita (written by Tim Rice and Andrew Lloyd Weber)
- Rihanna, world champ most repetitive artist
 - Including, *Pon de Replay*...

Listen to the music

- Reading lyrics sheets not full story
- Listen to the songs... quantitatively
- ~1200 songs, Billboard Hot 100, 1960 – 2015, sampling 5 years
 - Analysis takes longer, file size: mp3 > txt

ANALYZING SONG STRUCTURE WITH SPECTRAL CLUSTERING

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Daniel P.W. Ellis

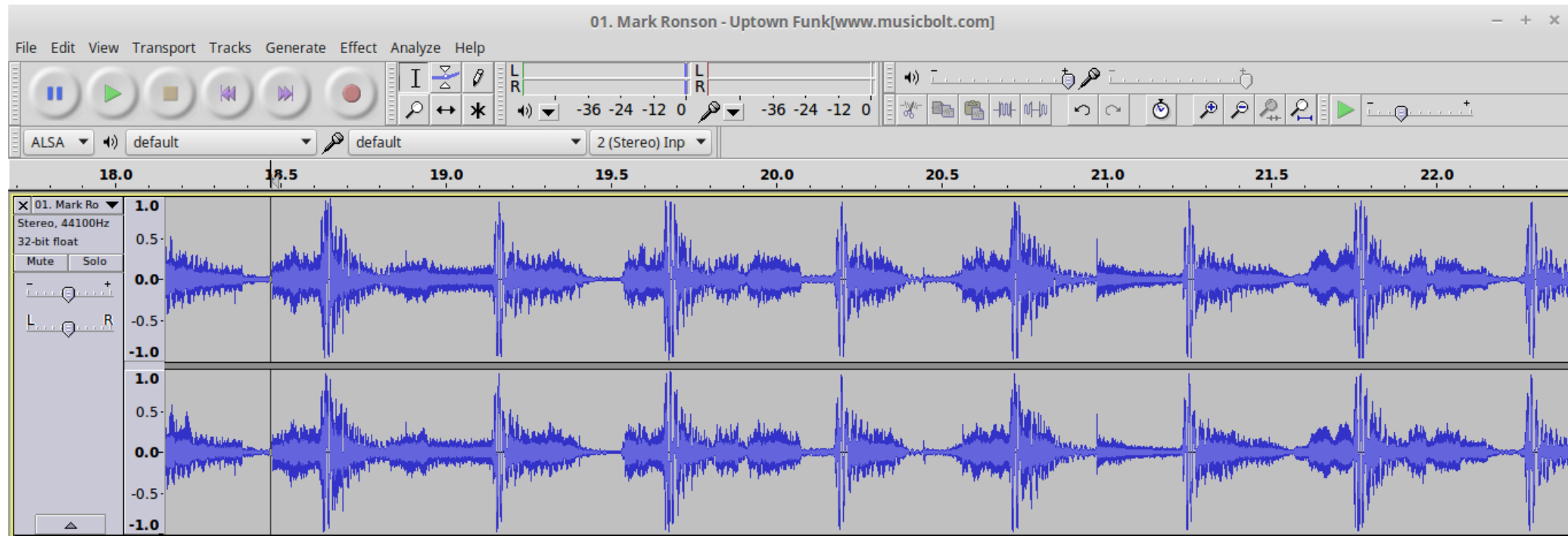
LabROSA

Columbia University

`dpwe@ee.columbia.edu`

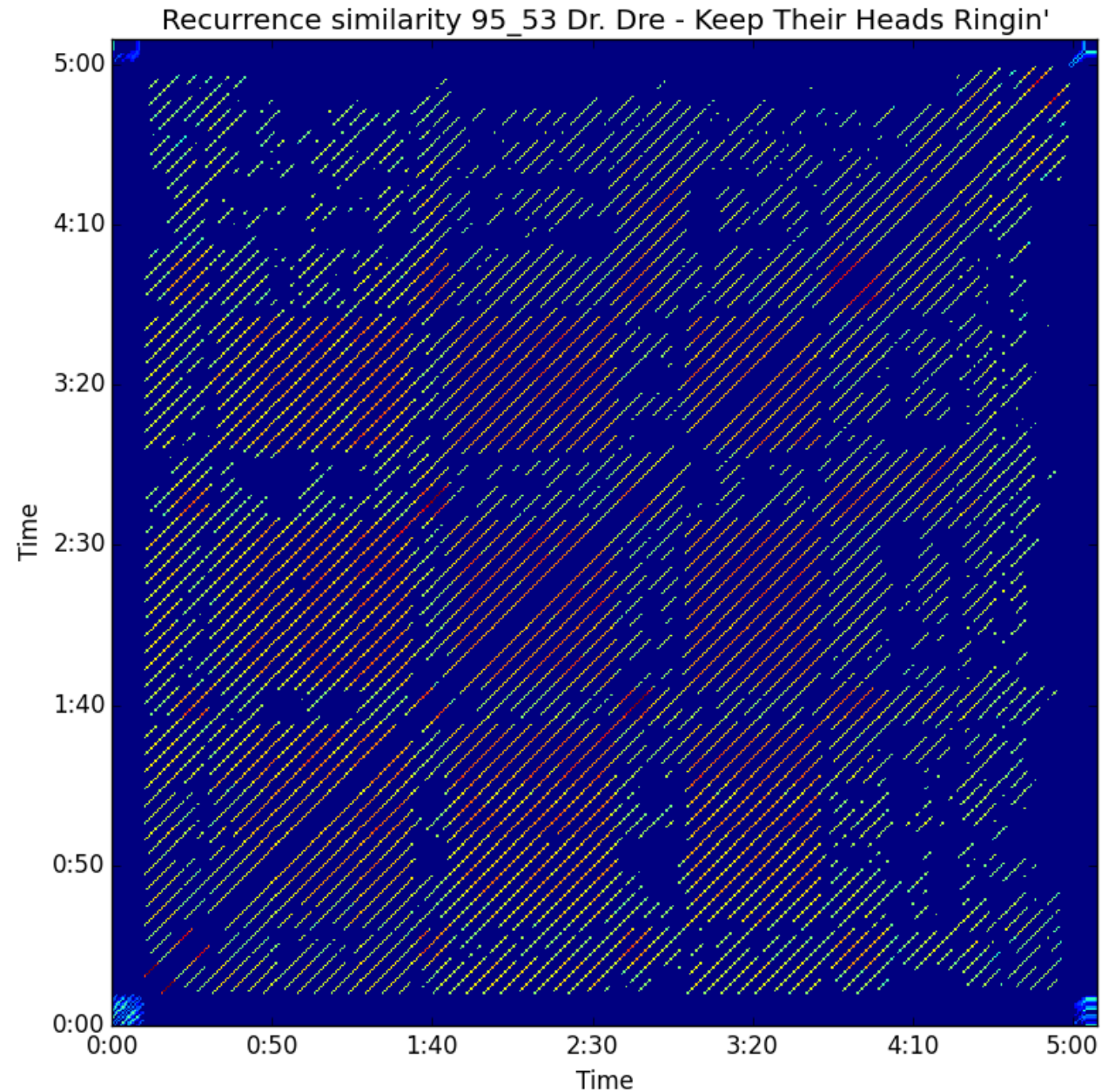
Temporal Segmentation

- Python module, librosa (librosa.github.io)
- Segment song into beats
- See how often every beat is used in a song (k-nearest neighbour algorithm)

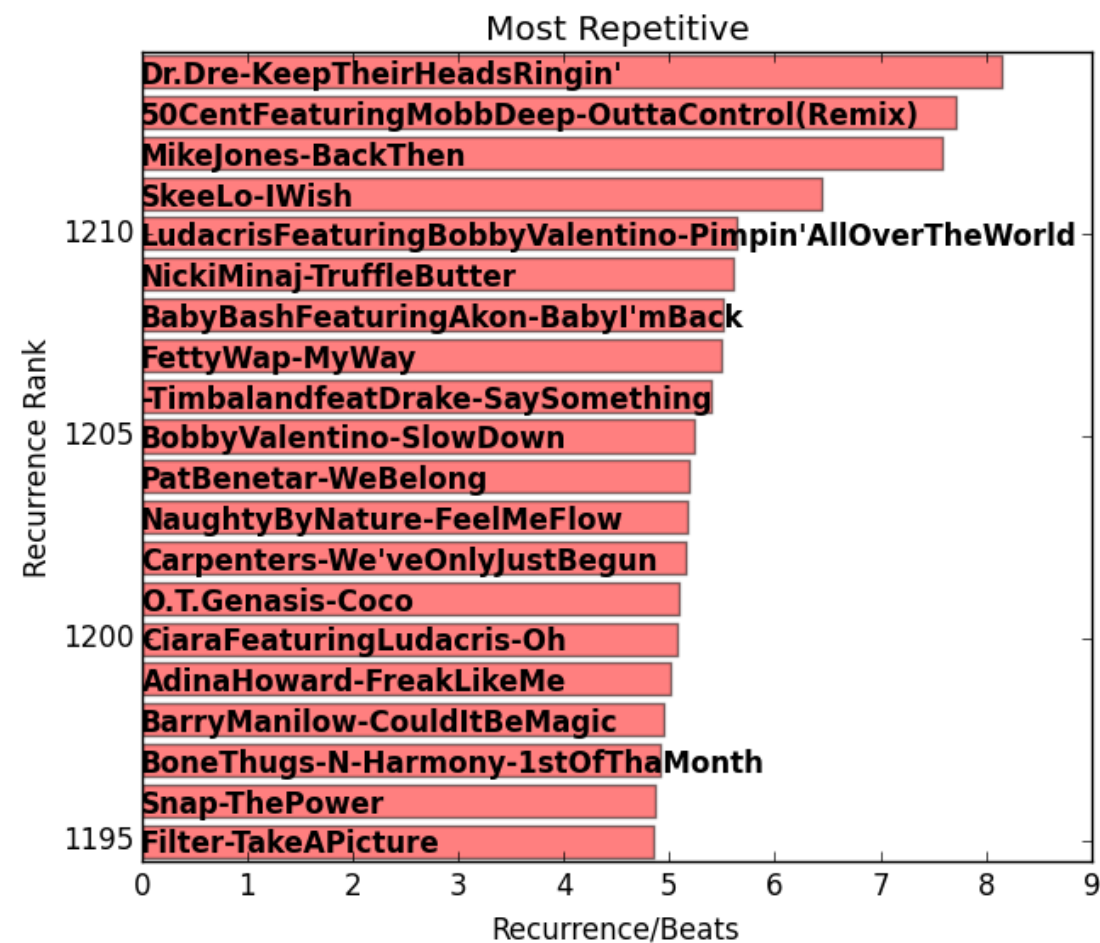
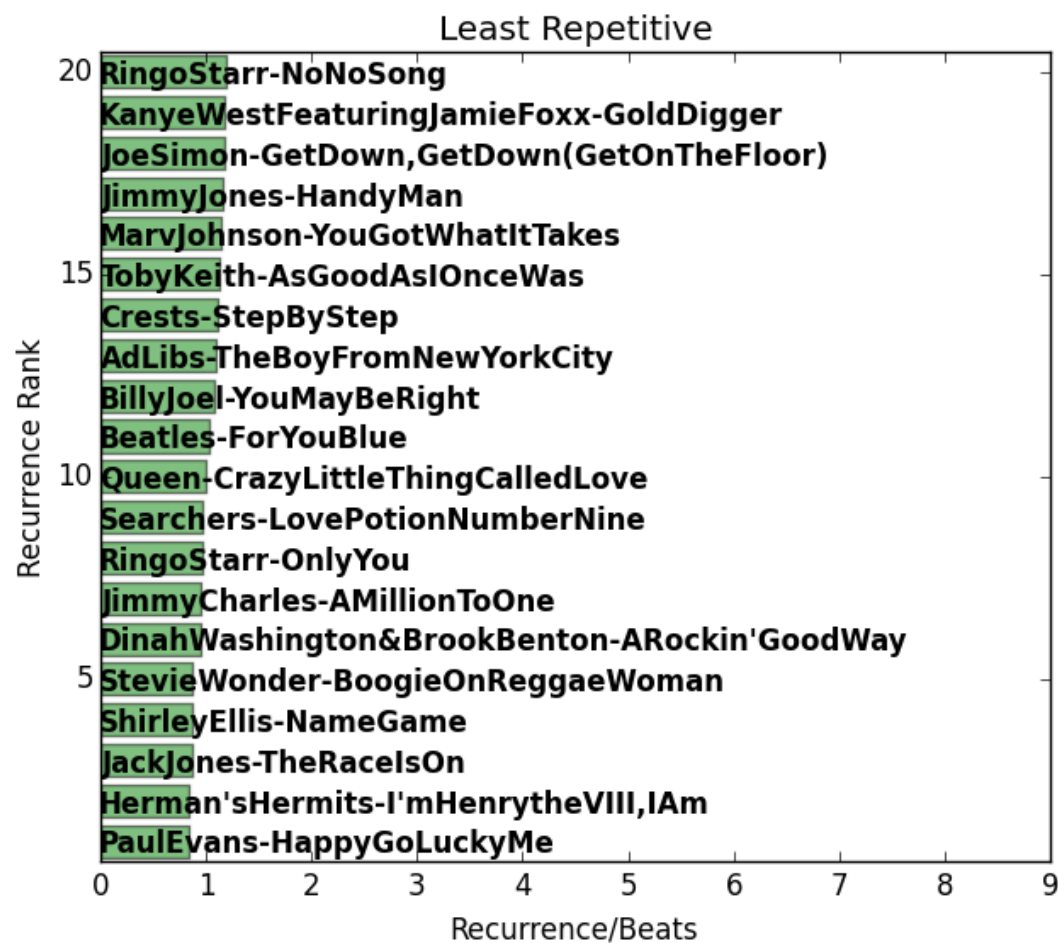


Recurrence Diagram

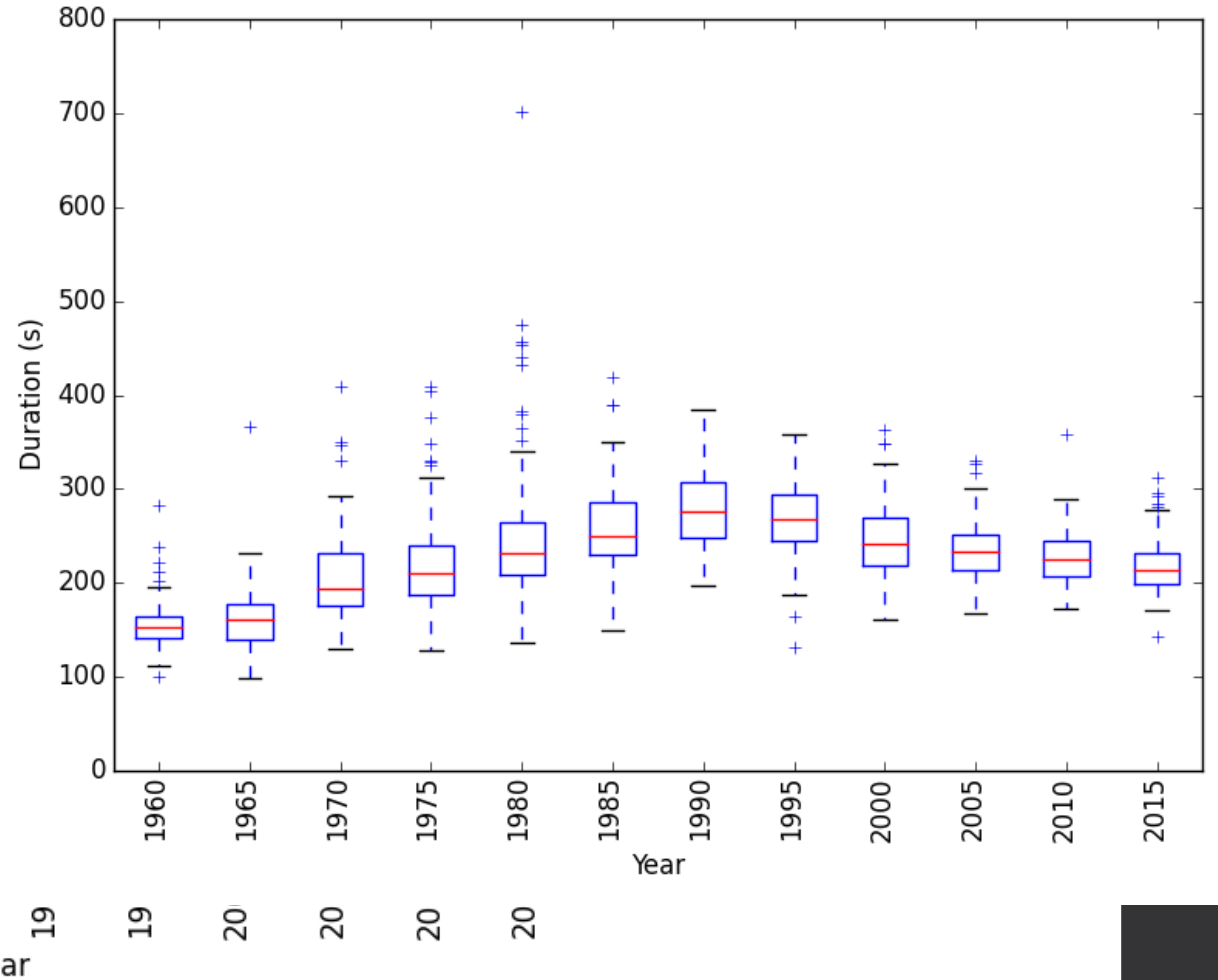
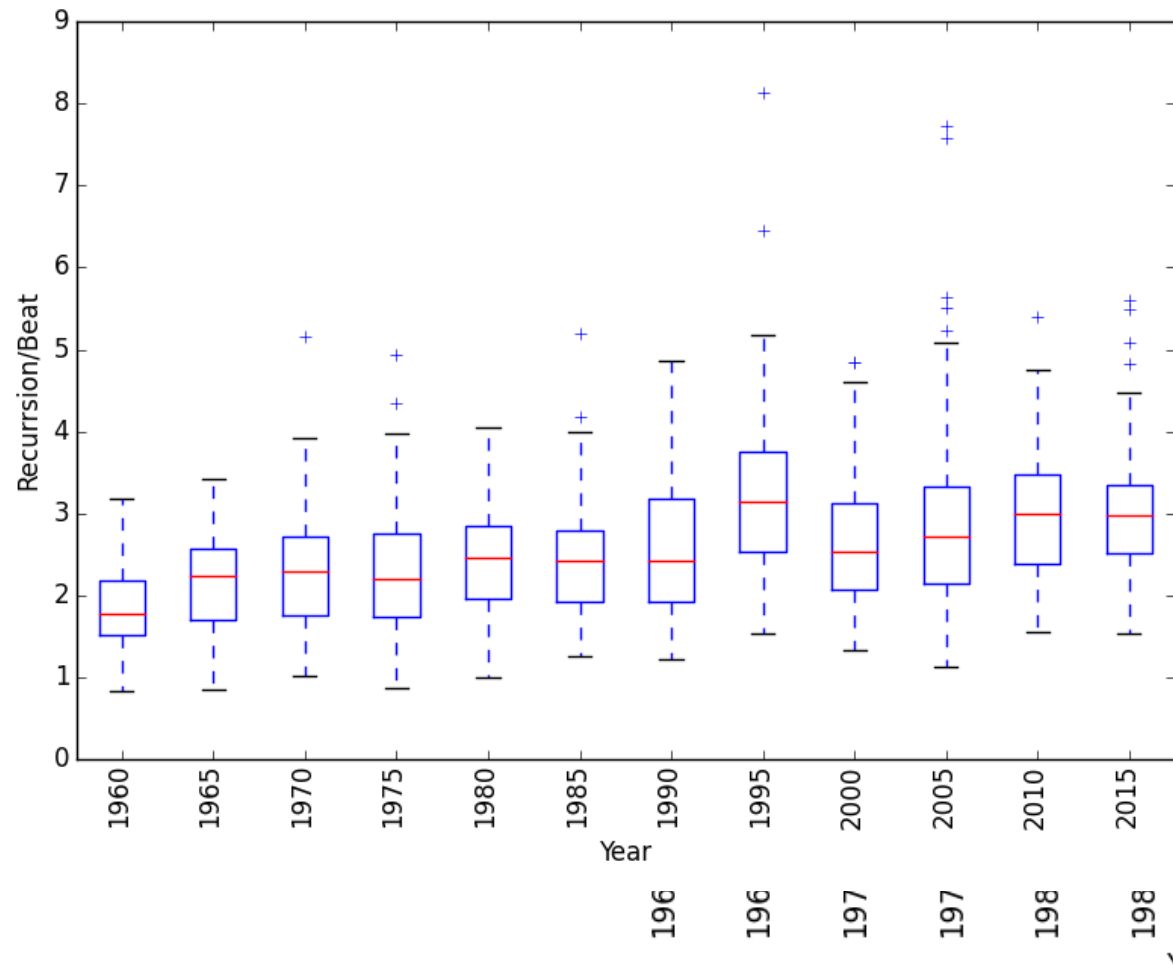
- Lines, aspect of song is similar
- Squares, whole segment of song is similar
- Diagnostic metric: sum of recurrence per beat
 - Not exactly... filtering, smoothing, other black magic



The Winners... and Losers



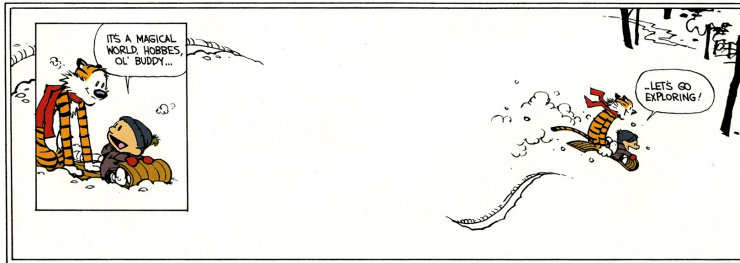
Yearly Trend? (avg each year)



1995?



A photograph of a man in a suit and tie, speaking at a podium with a microphone.



95
grade
WS



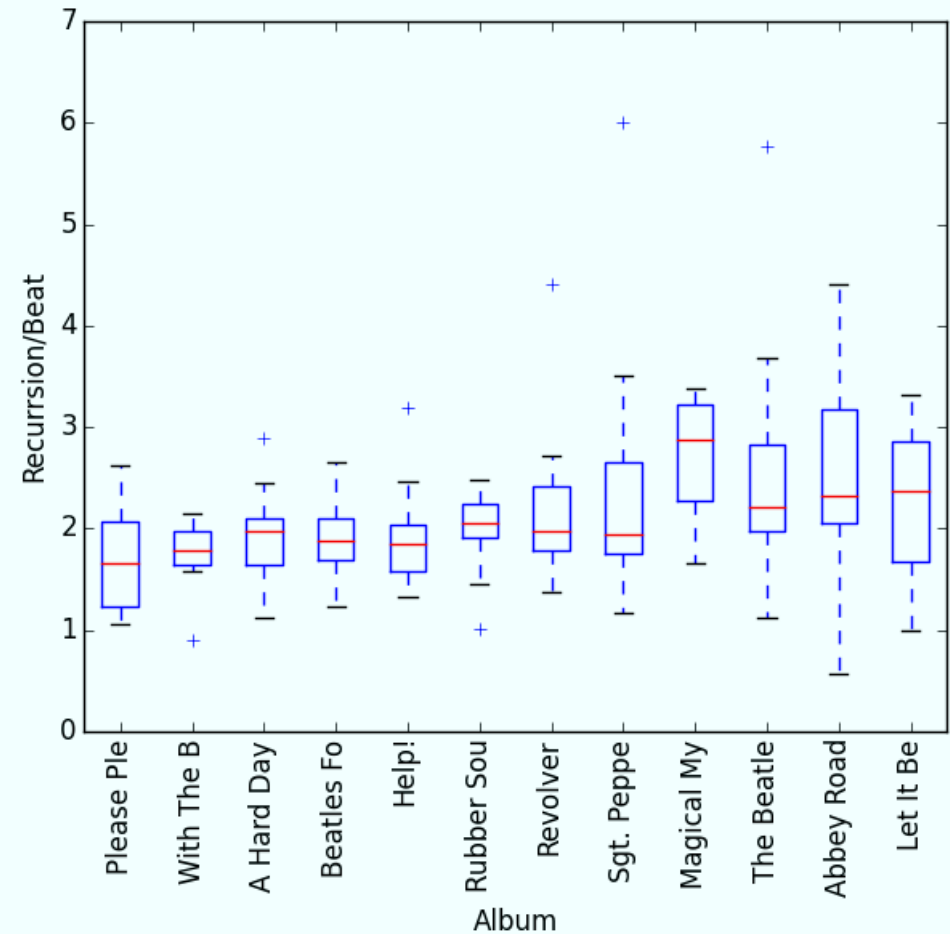
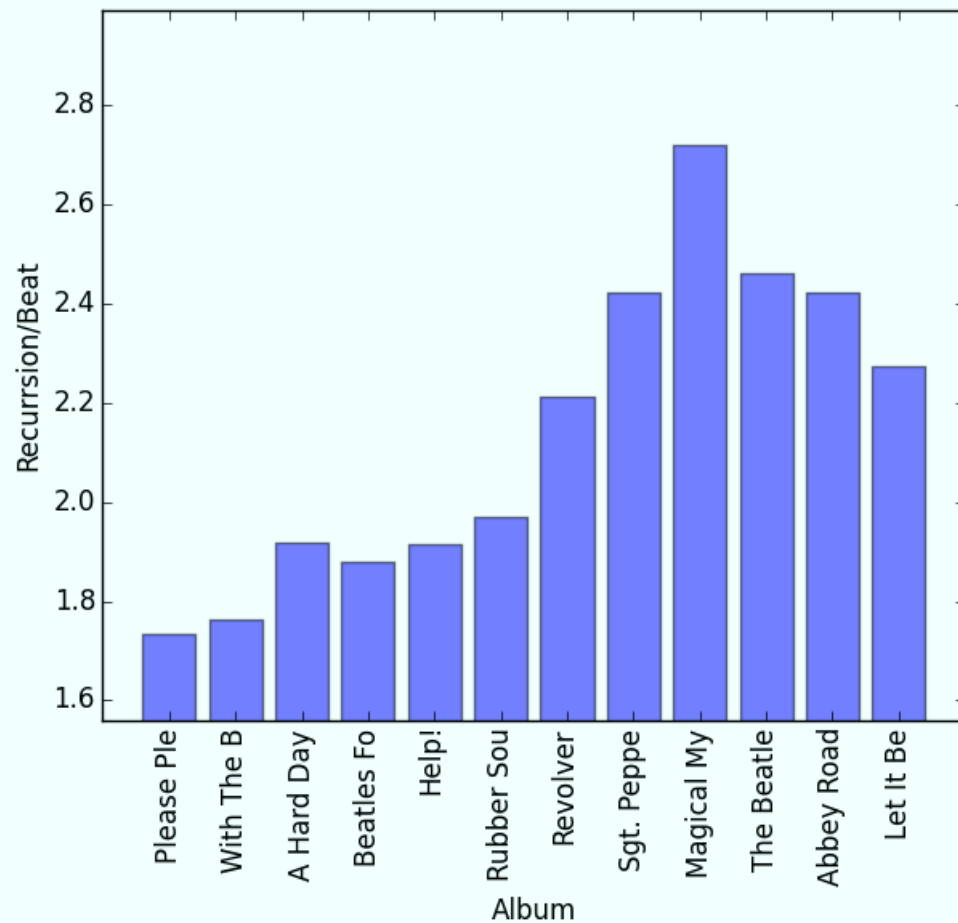
The Beatles

- Critically acclaimed and 'more popular than Jesus' - John Lennon
- Short span, but evolved tremendously
- Test Donald Knuth's theory, drugs = simplistic songs

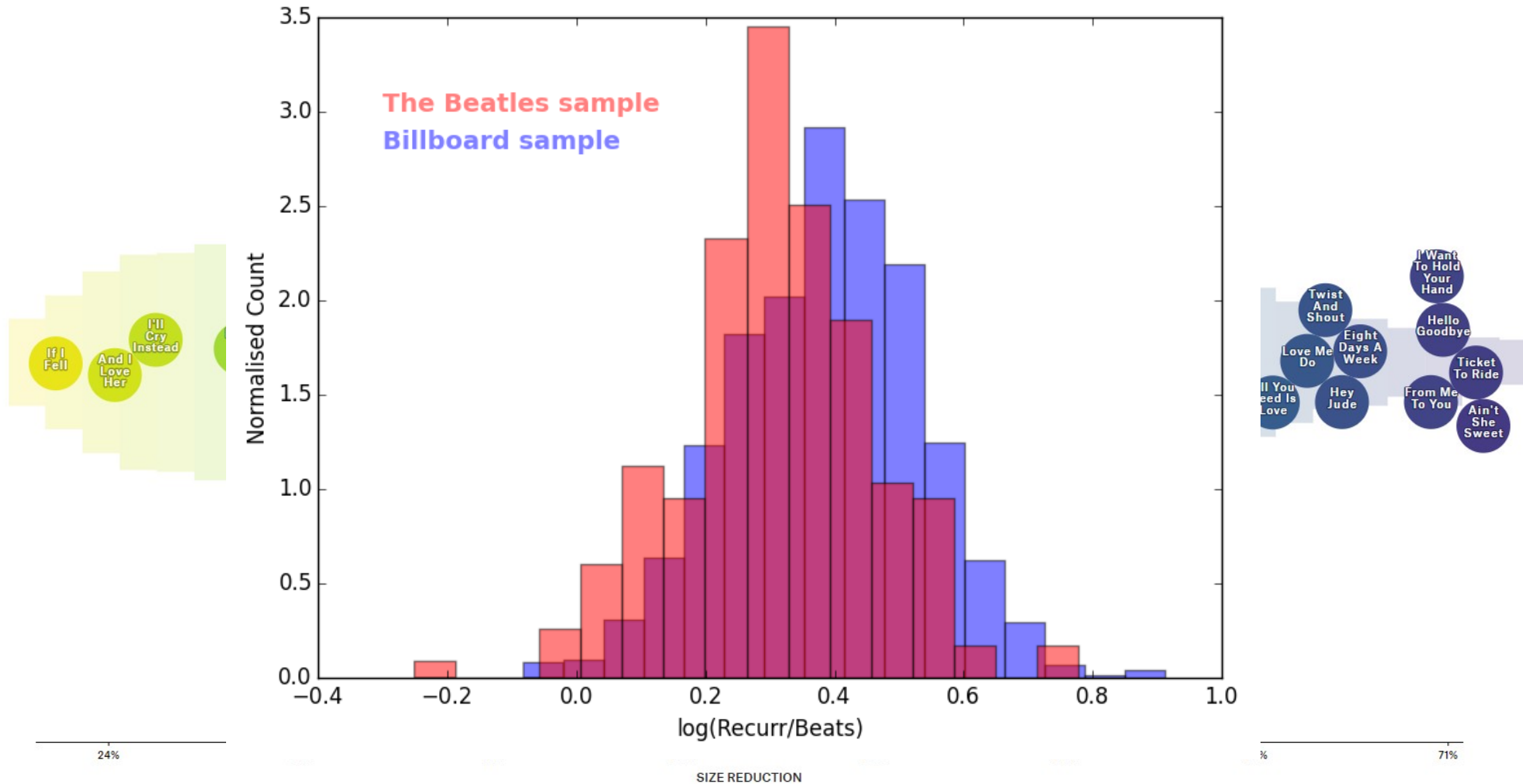


Acid... not even once

The Beatles – Winners, Loser, Albums

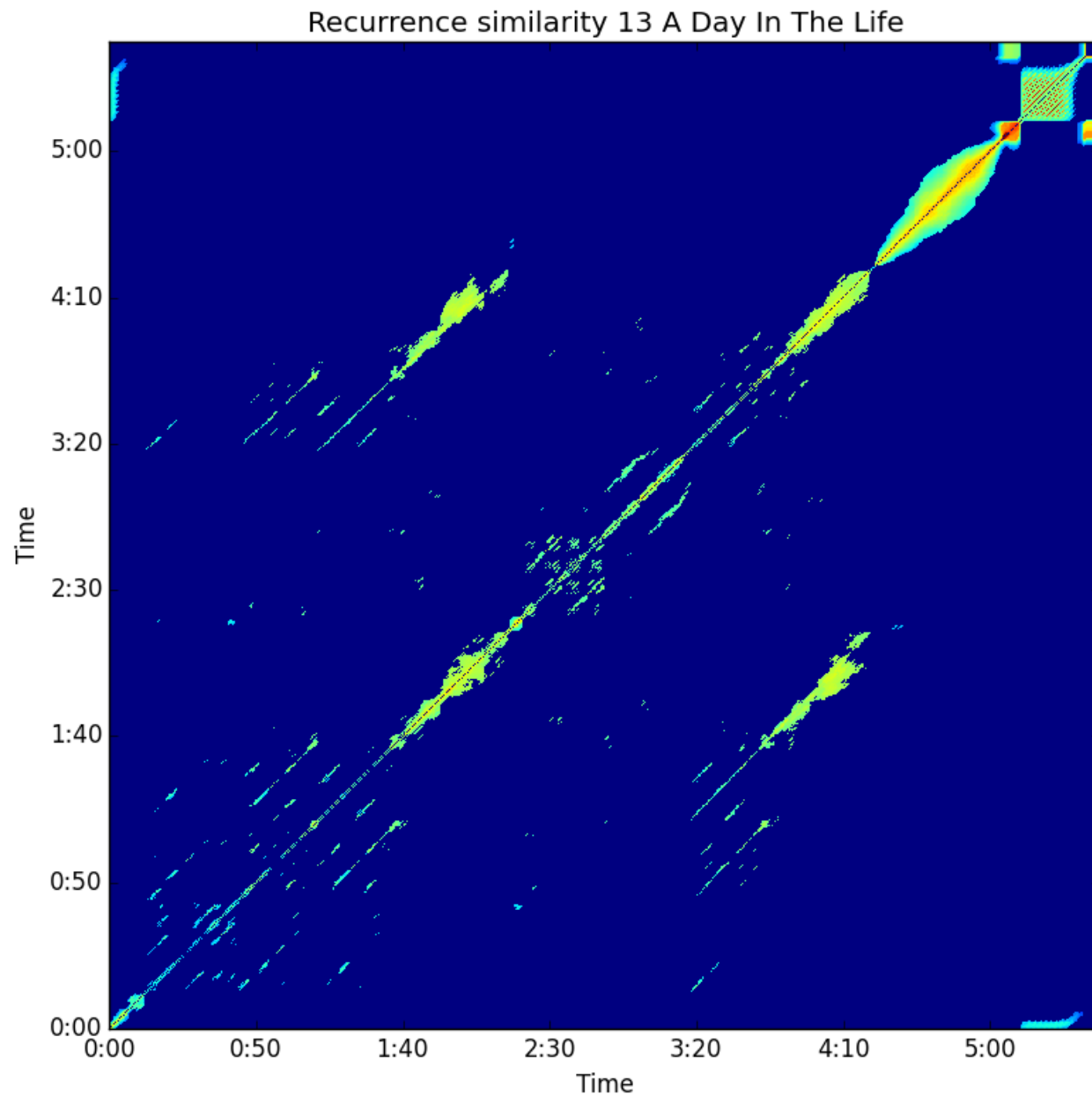


The Beatles – Lyrics Flashback



Shortcomings?

- Longer songs = more repetition
 - Punish a song for being longer?
- Overestimates recurrence when tempo changes, high white noise
 - Uncommon occurrence



Other things to consider

- Repetition between songs
 - Covers, remixes, live versions
- Repetition of lyrics vs. sound – correlation?
- Genre better indicator of repetitiveness
 - Loosely decade related
- Different sets of music
 - JJJ Hottest 100
 - Jazz, classical, non-charting music

Conclusion

- Songs in 2070:
 - Lyrics: 'Yo' repeated ad nauseum
 - Music: single generated 440Hz sine-wave
- Repetitiveness != bad song != good song... within limits
- Year correlated to repetitiveness
- Variance between songs greater than variance between groups of songs
- "... people tend to look at the music ... topping the charts and being like 'Whoa this music's terrible', and then they look at the popular music of the past, but only in a vacuum because they completely ignore all the terrible stuff that came out back then..." – Anthony Fantano

