Mining Online Music Listening Trajectories

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PROBLEM DEFINITION

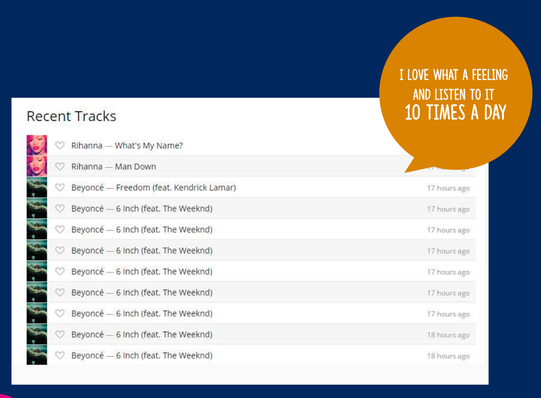
1. How can we determine which artist a given user will listen to next?
2. Is it possible to create interpretable representations of listening trajectories?

CHALLENGES FROM REAL DATA

Real datasets are highly biased (long tails)

EVERYBODY LOVES THE BEATLES

People revisit artists over and over again



Users are asynchronous

EXISTING APPROACHES

1.Latent Markov Embedding Based Models

- Very slow training
- Approaches which are fast (PRLME) sacrifice interpretability (focus on rankings)

2. Factorizing Personalized Markov Chains

- FPMC focuses on ranking, lack of interpretation
- Training is non scalable

3. Hidden Markov Models

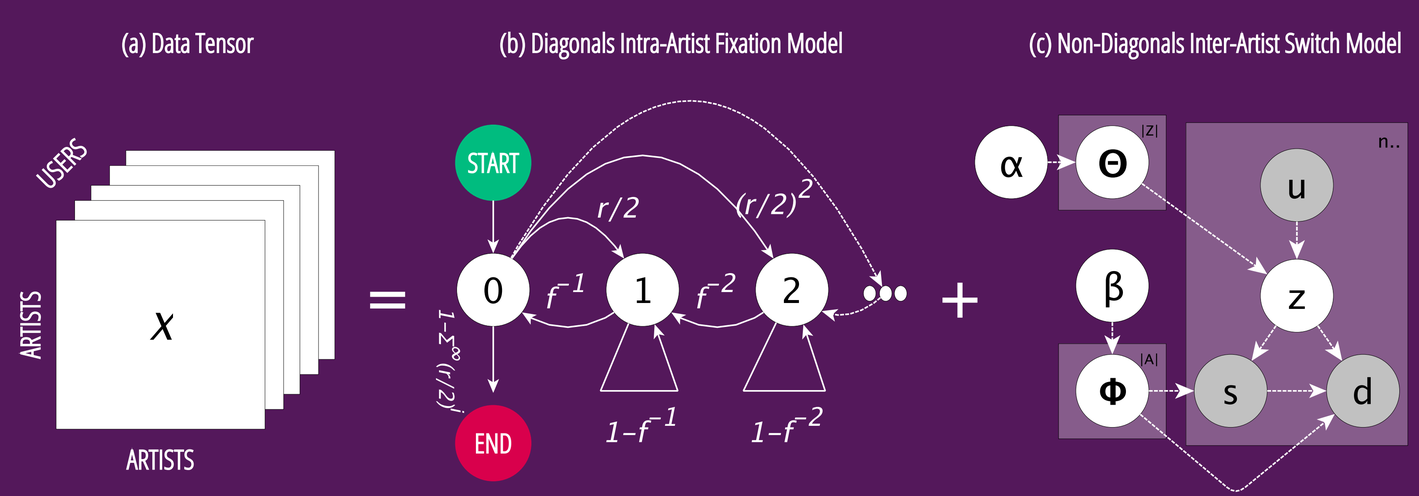
- Slow learning (quadratic in hidden states)
- Usually not personalized (does not capture latent preferences)

4. TribeFlow (Figueiredo et al. 2016)

- Scalable, Accurate and Personalized
- Does not capture revisits explicitly

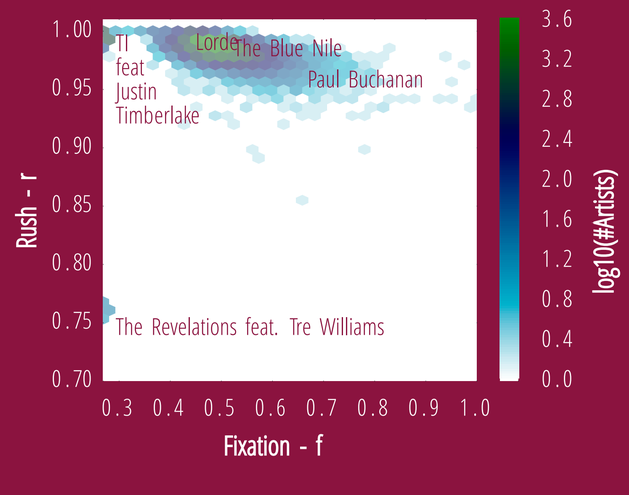
THE SWIFT-FLOWS MODEL

1. Tackles challenges stemmed from real data
2. Explicitly deals with repeated consumptions
3. Extends TribeFlow (Figueiredo et al. 2016) to explicitly deal with revisit behavior



Results

1. Repeated Consumption



Accurate data fits on listening time as shown in paper

2. Changes in Attention

	Gene=18 ("BR/US pop")	Gene=20 ("metal")	Gene=23 ("electronic")	Gene=39 ("pop"')
Source/Dest Artists	Britney Spears Wanessa Christina Aguilera t.A.T.u. Katy Perry Pitty Lady Gaga	Nightwish Within Temptation Epica Korn Disturbed Marilyn Manson Rammstein	Daft Punk David Guetta Deadmau5 Skrillex The Prodigy Tiesto Pendulum	Britney Spears Madonna Christina Aguilera Rihanna Lady Gaga Katy Perry Kesha
Users Nationality	BR=98% NL=2%	DE = 18% PL = 16% US = 12% FI = 8%	US = 18% BR = 10% PL = 10% UK = 10%	BR=78% US=10% PL=5%
Age Quartiles	1^{st} = 19 2^{nd} = 21 3^{rd} = 24	1^{st} = 21 2^{nd} = 24 3^{rd} = 29	1^{st} = 20 2^{nd} = 22 3^{rd} = 25	1^{st} = 19 2^{nd} = 22 3^{rd} = 25
e_z	e_z = 793.55	e_z = 642.15	e_z = 636.10	e_z = 886.10

3. Prediction Results MRR
(borrowed from Figueiredo et al. 2016)

	LastFM-1K	Last-FM-Groups
FPMC	0.00043	0.00048
WPRLME	0.10861	0.10354
OurApproach	**0.16735**	**0.18301**

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