
Predicting User Rating of a Hip Hop Album



Why hip hop?



2020 BILLBOARD MIDYEAR CHARTS

Powered by Nielsen Music/MRC Data

TOP 10 ARTISTS BY TOTAL CONSUMPTION

	ARTIST	TOTAL ALBUM-EQUIVALENT CONSUMPTION	ALBUM SALES	DIGITAL SONGS	ON-DEMAND AUDIO STREAMS	ON-DEMAND VIDEO STREAMS
1	DRAKE	2.460 million	57,000	390,000	3.019 billion	369.416 million
2	THE WEEKND	2.175 million	439,000	664,000	2.134 billion	315.775 million
3	LIL UZI VERT	1.966 million	28,000	116,000	2.720 million	290.152 million
4	POST MALONE	1.886 million	93,000	586,000	2.290 billion	302.237 million
5	YOUNGBOY NEVER BROKE AGAIN	1.886 million	20,000	119,000	2.422 billion	772.237 million
6	EMINEM	1.868 million	315,000	552,000	1.854 billion	560.886 million
7	LIL BABY	1.725 million	33,000	281,000	2.123 billion	490.889 million
8	BILLIE EILISH	1.676 million	283,000	652,000	1.736 billion	405.816 million
9	RODDY RICCH	1.640 million	19,000	271,000	2.074 billion	576.671 million
10	DABABY	1.530 million	26,000	311,000	1.965 billion	369.931 million

TOP 10 ALBUMS (Album sales + TEA + on-demand SEA)

	ARTIST	TITLE	TOTAL ALBUM-EQUIVALENT CONSUMPTION	ALBUM SALES	SONG SALES	ON-DEMAND AUDIO STREAMS	ON-DEMAND VIDEO STREAMS
1	LIL BABY	<i>My Turn</i>	1.467 million	31,000	249,000	1.775 billion	402.974 million
2	THE WEEKND	<i>After Hours</i>	1.423 million	407,000	527,000	1.246 billion	105.747 million
3	LIL UZI VERT	<i>Eternal Atake</i>	1.374 million	24,000	82,000	1.896 billion	141.922 million
4	RODDY RICCH	<i>Please Excuse Me for Being Antisocial</i>	1.352 million	18,000	254,000	1.787 billion	248.535 million
5	POST MALONE	<i>Hollywood's Bleeding</i>	1.140 million	60,000	477,000	1.370 billion	127.477 million
6	BAD BUNNY	<i>YHLQMDLG</i>	927,000	59,000	79,000	1.088 billion	175.246 million
7	EMINEM	<i>Music to Be Murdered By</i>	855,000	226,000	224,000	779.543 million	121.024 million
8	JUSTIN BIEBER	<i>Changes</i>	854,000	187,000	381,000	796.529 million	86.629 million
9	BTS	<i>Map of the Soul: 7</i>	842,000	552,000	388,000	347.616 million	51.220 million
10	BILLIE EILISH	<i>When We All Fall Asleep, Where Do We Go?</i>	798,000	198,000	268,000	781.077 million	81.844 million

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2020 BILLBOARD MIDEAR CHARTS

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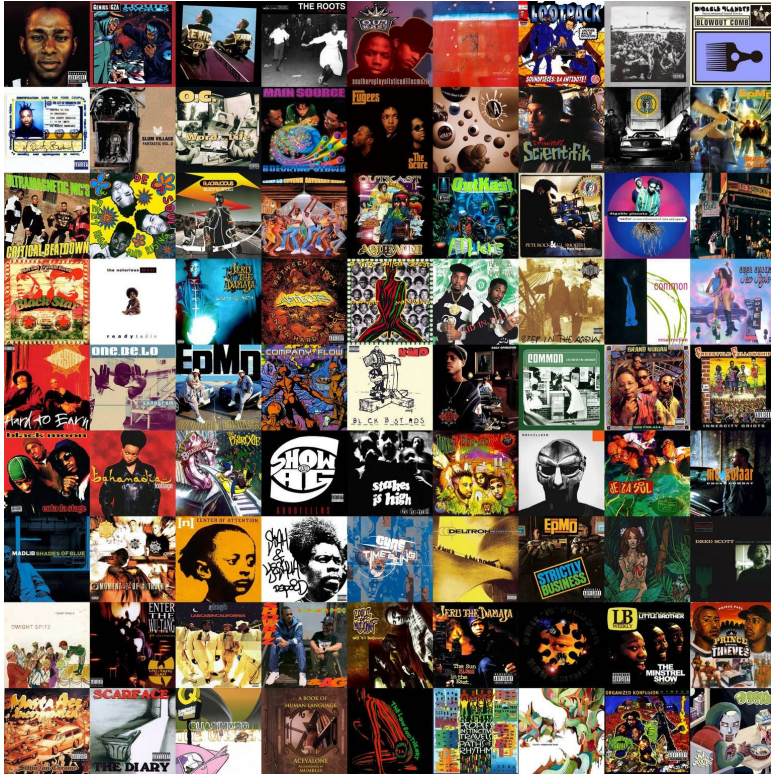
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What makes a hip hop album?



- ★ Popularity
- ★ Critical acclaim
- ★ Genre/style
- ★ Format
- ★ Date of production/release
- ★ Label
- ★ Number of tracks/duration
- ★ Explicit content
- ★ Musical characteristics
- ★ Featuring other artists
- ★ Debut album
- ★ Digital availability
- ★ The artist!

What makes a hip hop album?



- ★ Popularity
- ★ Critical acclaim
- ★ Genre/style
- ★ Region
- ★ Personal characteristics
- ★ Platform
- ★ Years active
- ★ Productivity
- ★ Other discography
- ★ Legacy

Methodology

Data:

User-rated hip hop albums on Album of the Year

1181 albums

- 1980s-2020
- 100% with user scores
- 50+ user ratings

Target: **User score** (out of 100)

AOTY

search albums, artists, genres etc.


Best Albums Discover New Releases Lists Genres News Community Sign In

OVERVIEW USER REVIEWS LISTS COMMENTS (30) DISCOGRAPHY

Kendrick Lamar

To Pimp a Butterfly

MUST HEAR ALBUM




CRITIC SCORE
95
Based on 42 reviews
2015 Ratings: #1 / 892
Year End Rank: #1

USER SCORE
93
Based on 4,528 ratings
2015 Ratings: #1
Liked by 243 people

DETAILS SUBMIT CORRECTION

March 16, 2015 / release date
LP / format
Aftermath / Interscope / label
Hip Hop / genres
tags
jazz rap hip hop masterpiece conscious hip hop
west coast hip hop 5 More Add Tag

Kendrick Lamar



CRITIC SCORE
89
Based on 126 reviews

USER SCORE
87
Based on 13,863 ratings

DETAILS

Hip Hop, R&B, Experimental Hip Hop / genres
Twitter @kendricklamar
tags
west coast hip hop compton 2nd grammy award winner
10000 or more user ratings 2000 or more user ratings users top artists
goat Add Tag

Sort Release Date

Type Clear Albums

Featured
Compilation (1)
EP (2)
LP (5)
Mixtape (5)
Reissue (2)
Single (42)
Unofficial (5)
Video (1)
ADD A RELEASE

2020
LP5 LP

2017
DAMN. LP
93 critic score (40)

2015
To Pimp a Butterfly LP
95 critic score (42)

2012
good kid, m.A.A.d. city LP
90 critic score (31)

2011
Section.80 LP
80 critic score (8)

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Model

Album critic score
Years since release
Trap rap
Artist Spotify popularity
Number of user ratings
Pop rap

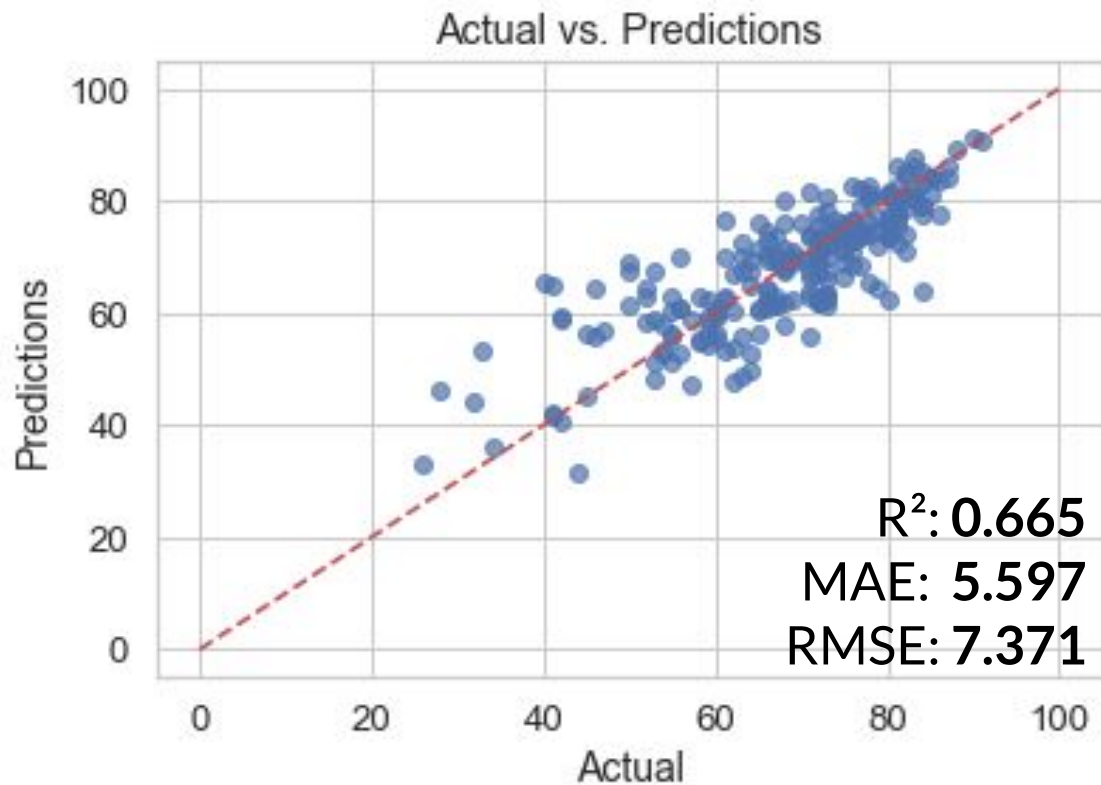
**Polynomial
regression**

User score

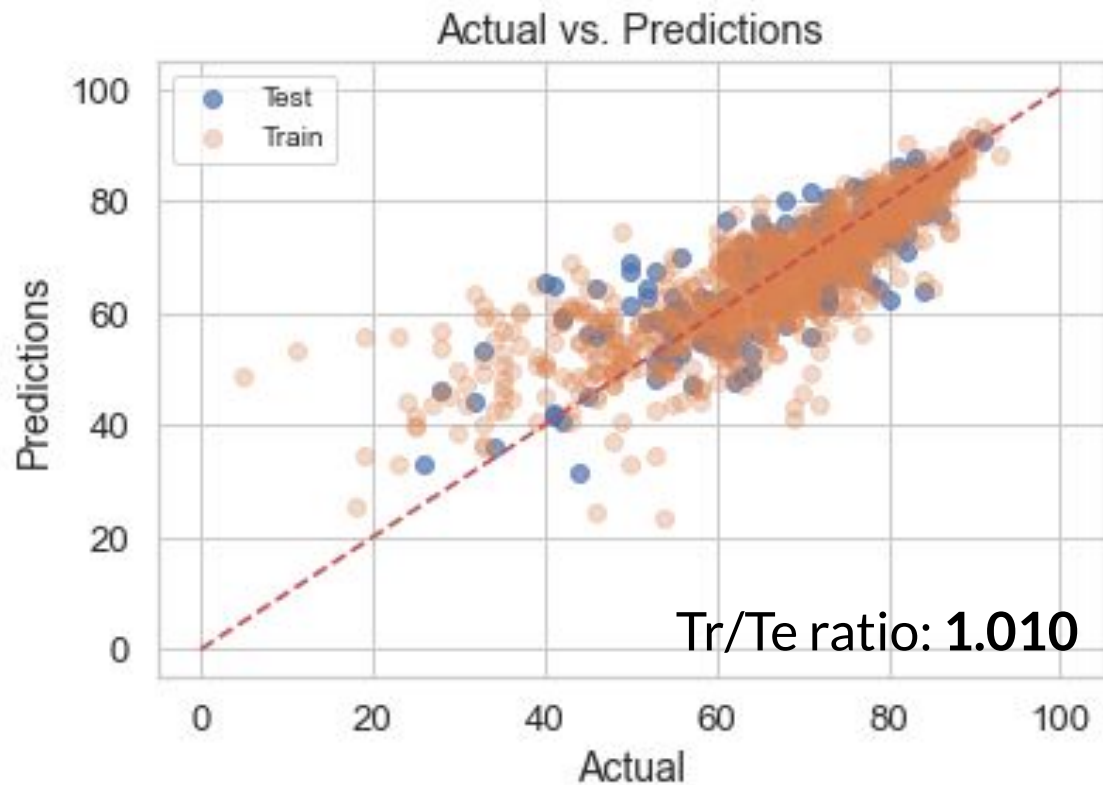


The diagram illustrates a polynomial regression model. On the left, a green rectangular box contains a list of input features: 'Album critic score', 'Years since release', 'Trap rap', 'Artist Spotify popularity', 'Number of user ratings', and 'Pop rap'. A large orange arrow points from this box to the right, with the text 'Polynomial regression' written across it. The arrow points to a target variable, 'User score', which is centered within a large red circular ring.

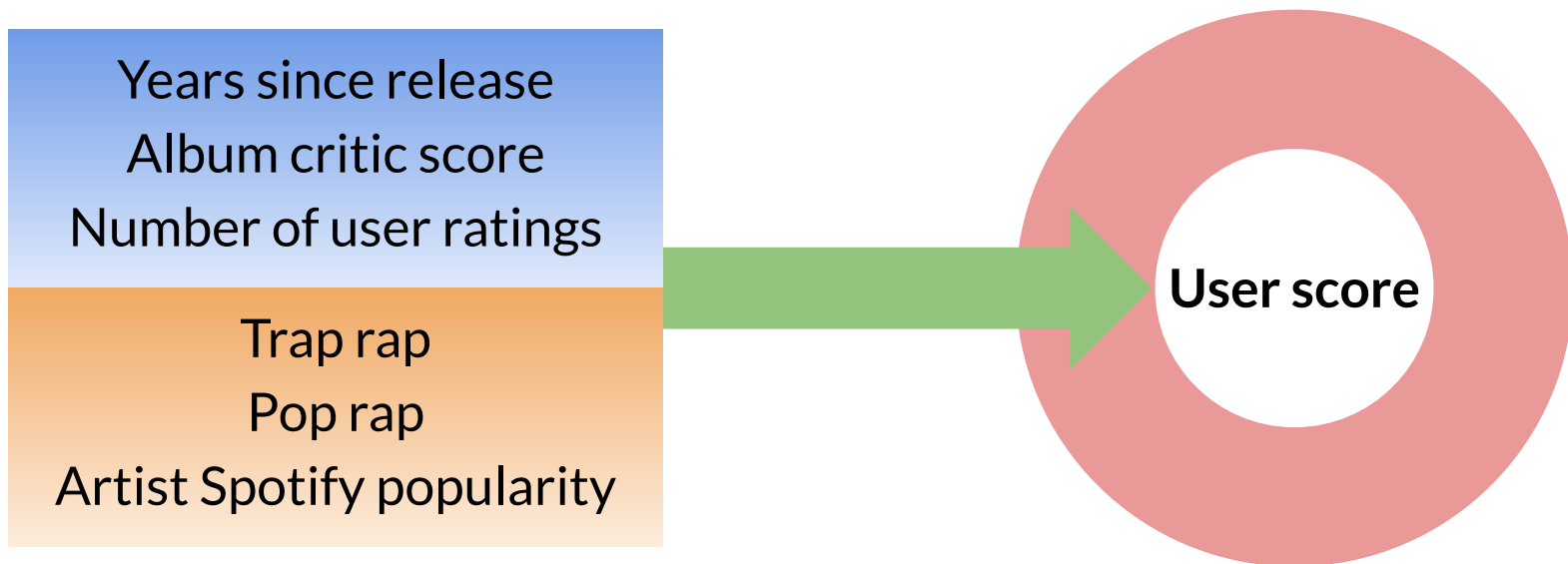
Model



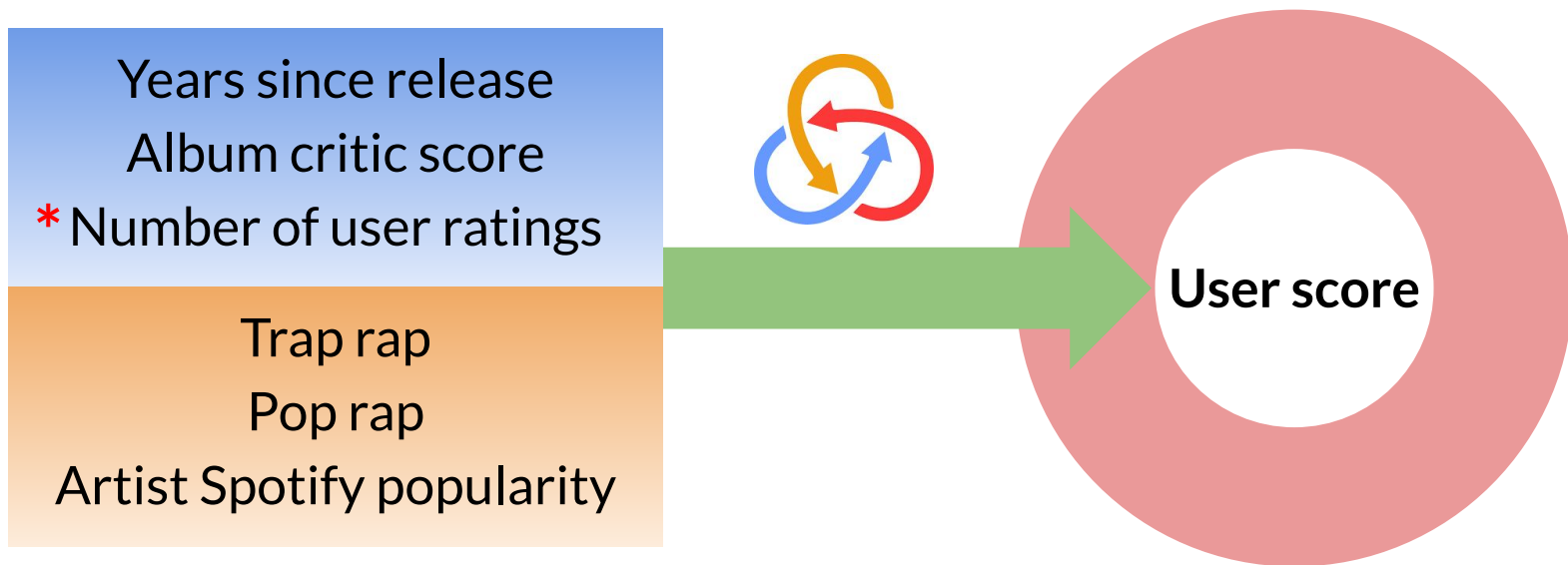
Model



Conclusions



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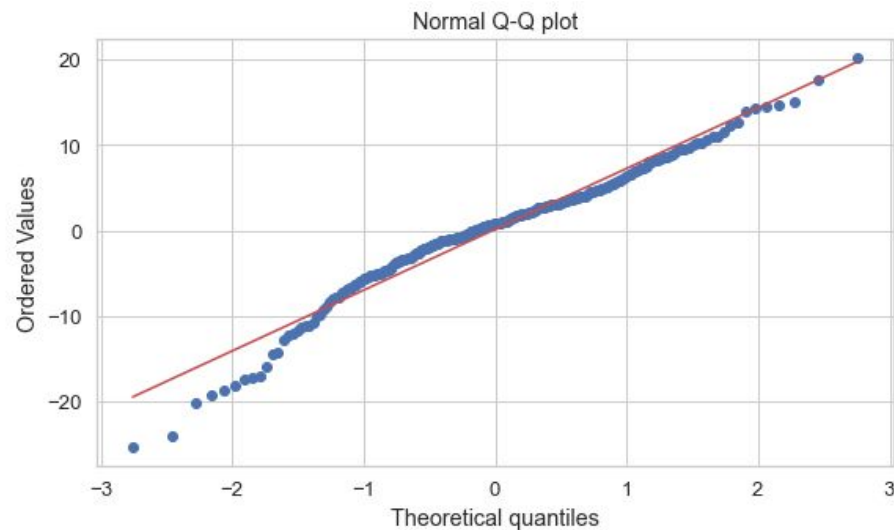
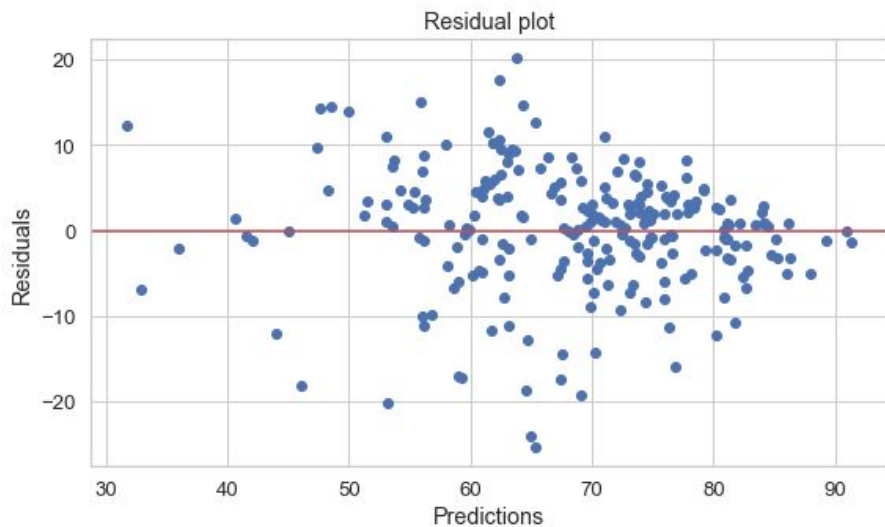


Future Work

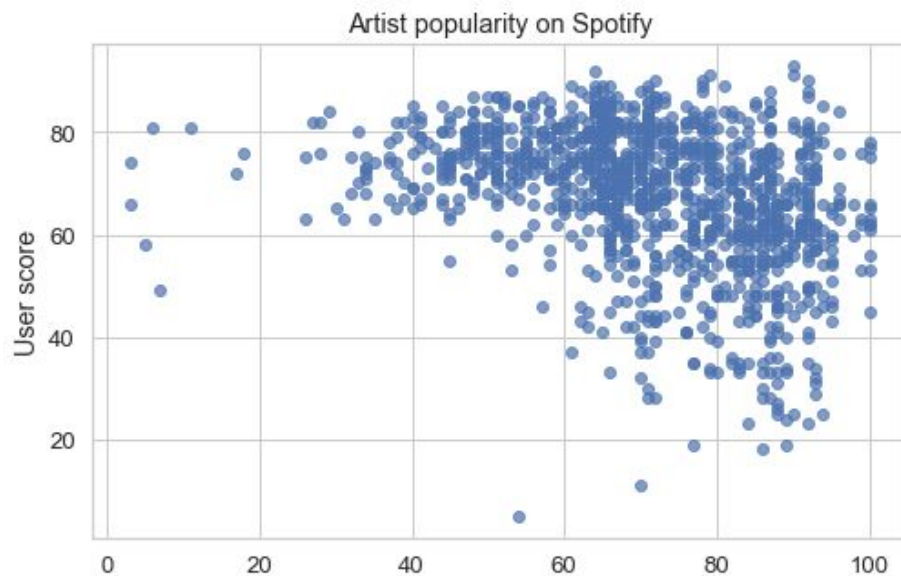
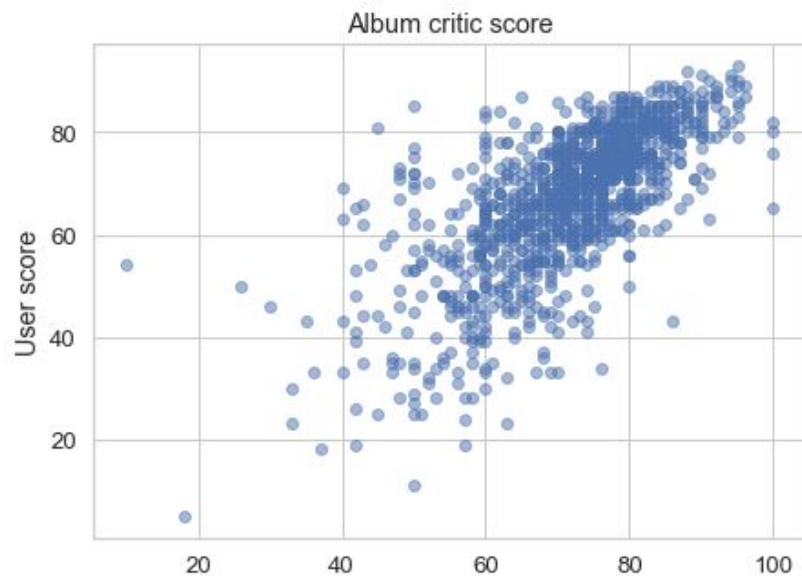
- Explore correlations
- Explore interaction terms
- Further analysis of outliers
- Expand to other databases
- Other data:
 - Artist features
 - “Sophomore slump”
 - Posthumous
 - Trends

Thank you!

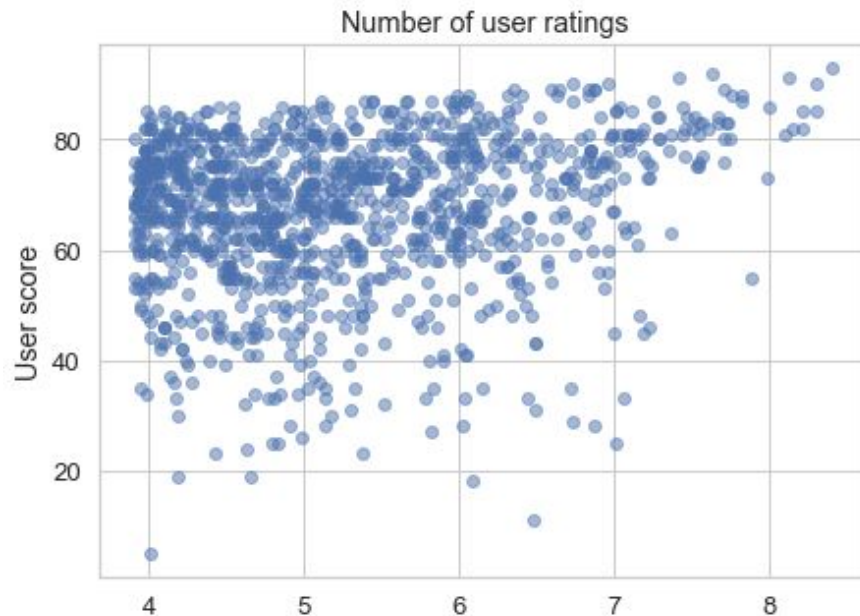
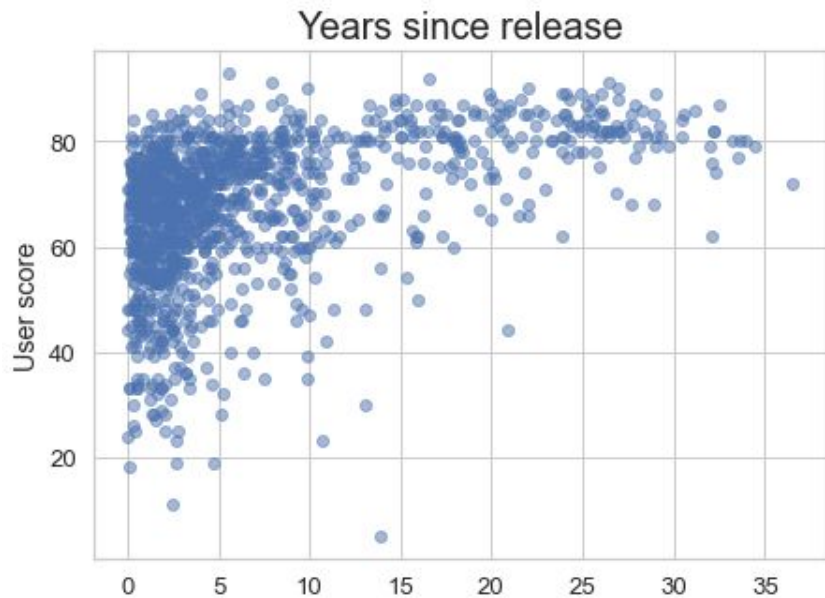
Appendix: Residual Analysis



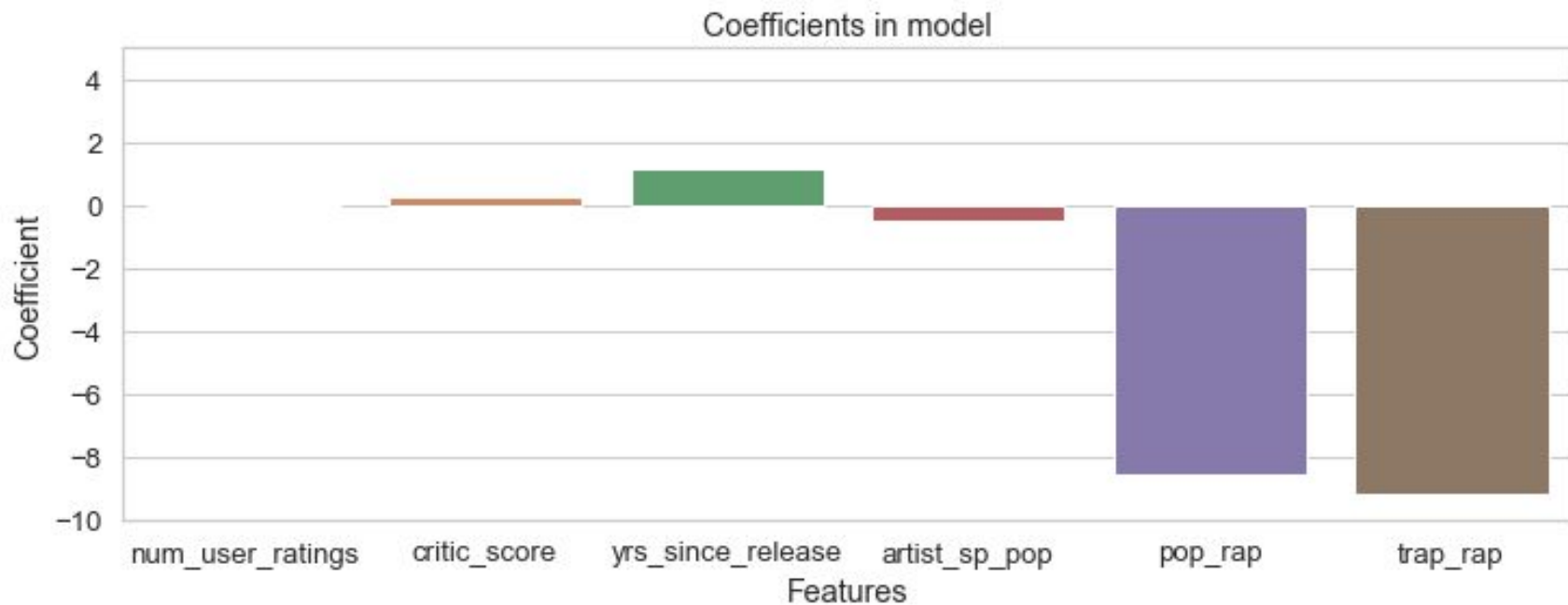
Appendix: Correlations



Appendix: Correlations



Appendix: Coefficients



Appendix: OLS

Dep. Variable:	user_score	R-squared:	0.622
Model:	OLS	Adj. R-squared:	0.620
Method:	Least Squares	F-statistic:	257.3
Date:	Thu, 08 Oct 2020	Prob (F-statistic):	3.39e-194
Time:	21:41:55	Log-Likelihood:	-3370.0
No. Observations:	944	AIC:	6754.
Df Residuals:	937	BIC:	6788.
Df Model:	6		
Covariance Type:	nonrobust		

	coef	std err	t	P> t	[0.025	0.975]
const	33.9590	2.647	12.830	0.000	28.764	39.154
num_user_ratings	0.0051	0.001	8.590	0.000	0.004	0.006
artist_sp_pop	-0.1663	0.020	-8.413	0.000	-0.205	-0.127
yrs_since_release	0.3618	0.041	8.780	0.000	0.281	0.443
critic_score	0.5919	0.028	20.834	0.000	0.536	0.648
trap_rap	-5.2341	0.826	-6.334	0.000	-6.856	-3.612
pop_rap	-6.5152	1.163	-5.601	0.000	-8.798	-4.232

Omnibus:	144.447	Durbin-Watson:	2.035
Prob(Omnibus):	0.000	Jarque-Bera (JB):	327.566
Skew:	-0.851	Prob(JB):	7.41e-72
Kurtosis:	5.331	Cond. No.	5.89e+03