Can artists ensure success?

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FNCE 237
Final Project

Background

Question: What factors (length of song, release date, danceability, etc.), other than the baseline level of popularity of the artist, have the biggest impact on the success of a song, defined as track popularity?

Null Hypothesis: The only factor that truly affects the success of a song is the level of popularity of an artist

Previous Findings: It is evident that "differentiation is a key component of cultural/marketing success", but the song can't be too different that it doesn't fit the genre

Our Goal: We would like to transfer these findings into numbers

Data Sources & Methodology

Data	The dataset includes 3000+ songs from spotify and provides a variety of data for each song. Spotify was used due to the greater accessibility of the app all around the world. It gives the date the song/album was released, the genre the song falls under, and a multitude of other variables that we used for our analysis.
Methodology	1. Ingest & clean data 2. Explore data to determine what we should further focus on during modeling 3. Perform linear regression on all of the data then control for genre 4. Fit decision tree 5. Fit classification model

Initial Exploration of Data
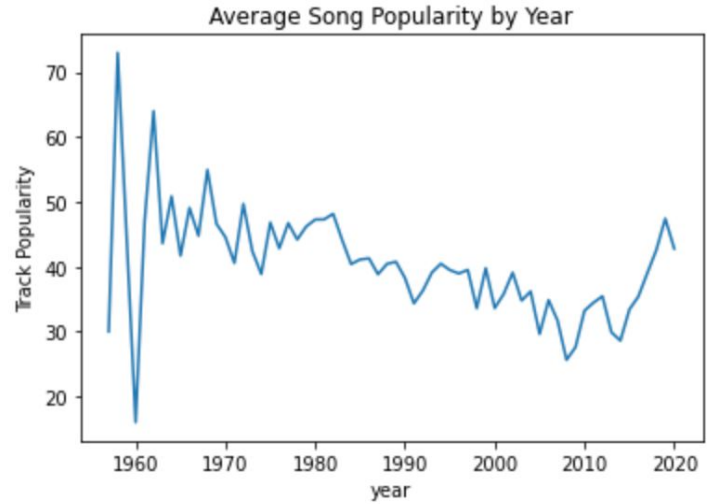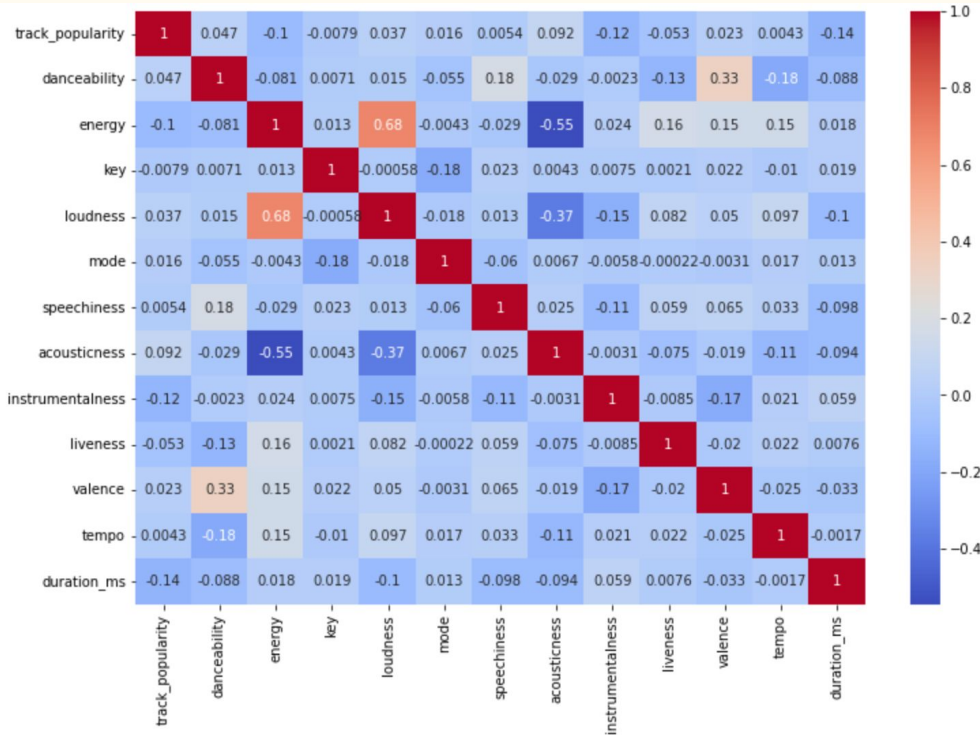
Factors to consider:
- Covid's impact on the music industry
- Change over time in song popularity

Selected Regression Model

OLS Regression Results

Dep. Variable:	track_popularity	R-squared:	0.561
Model:	OLS	Adj. R-squared:	0.560
Method:	Least Squares	F-statistic:	732.9
Date:	Mon, 06 Dec 2021	Prob (F-statistic):	0.00
Time:	02:36:46	Log-Likelihood:	-88784.
No. Observations:	21264	AIC:	1.776e+05
Df Residuals:	21226	BIC:	1.779e+05
Df Model:	37		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
track_album_release_date	-0.0002	3.69e-05	-6.195	0.000	-0.000	-0.000
danceability	3.8334	0.948	4.042	0.000	1.975	5.692
energy	-4.1581	1.025	-4.055	0.000	-6.168	-2.148
key	0.0165	0.030	0.542	0.588	-0.043	0.076
loudness	0.2085	0.055	3.768	0.000	0.100	0.317
mode	0.1390	0.224	0.619	0.536	-0.301	0.579
speechiness	0.9262	1.240	0.747	0.455	-1.504	3.357
acousticness	-0.8761	0.605	-1.448	0.148	-2.062	0.310
instrumentalness	-1.0509	0.536	-1.961	0.050	-2.101	-0.000
liveness	-1.0131	0.719	-1.408	0.159	-2.423	0.397
valence	-1.2788	0.568	-2.253	0.024	-2.391	-0.166
tempo	0.0032	0.004	0.769	0.442	-0.005	0.011
duration_ms	-5.279e-06	1.96e-06	-2.688	0.007	-9.13e-06	-1.43e-06
artist_popularity	0.9468	0.007	139.062	0.000	0.933	0.960

Key Takeaway 1: danceability, energy, valence, and loudness have the most impact on a song's popularity

Key Takeaway 2: artist popularity had the same coefficient value regardless of genre

Focusing on Genre and Dates

	coef	std err	t	P>|t|	[0.025	0.975]
i_playlist_genre_edm	22.2991	3.830	5.822	0.000	14.792	29.806
i_playlist_genre_latin	23.8776	3.826	6.240	0.000	16.378	31.378
i_playlist_genre_pop	26.4962	3.816	6.944	0.000	19.017	33.976
i_playlist_genre_r&b	23.3032	3.776	6.171	0.000	15.902	30.704
i_playlist_genre_rap	23.5338	3.800	6.193	0.000	16.085	30.983
i_playlist_genre_rock	24.2679	3.678	6.598	0.000	17.059	31.477

Key Takeaway 1: the genre of a song doesn't have an influence on a song's popularity
Key Takeaway 2: there is not much of an impact with when the song is being released

Average Song Popularity by Day of Year