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      song_name  song_popularity  song_duration_ms \
0 Boulevard of Broken Dreams      73      262333
1           In The End          66      216933
2       Seven Nation Army          76      231733
3           By The Way          74      216933
4       How You Remind Me          56      223826

acousticness  danceability  energy  instrumentalness  key  liveness \
0    0.005520      0.496  0.682      0.000029  8    0.0589
1    0.010300      0.542  0.853      0.000000  3    0.1080
2    0.008170      0.737  0.463      0.447000  0    0.2550
3    0.026400      0.451  0.970      0.003550  0    0.1020
4    0.000954      0.447  0.766      0.000000  10   0.1130

loudness  audio_mode  speechiness  tempo  time_signature  audio_valence
0    -4.095          1      0.0294  167.060          4      0.474
1    -6.407          0      0.0498  105.256          4      0.370
2    -7.828          1      0.0792  123.881          4      0.324
3    -4.938          1      0.1070  122.444          4      0.198
4    -5.065          1      0.0313  172.011          4      0.574
Index(['song_name', 'song_popularity', 'song_duration_ms', 'acousticness',
      'danceability', 'energy', 'instrumentalness', 'key', 'liveness',
      'loudness', 'audio_mode', 'speechiness', 'tempo', 'time_signature',
      'audio_valence'],
      dtype='object')

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                        OLS Regression Results
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Dep. Variable:          song_popularity      R-squared:                0.011
Model:                  OLS                Adj. R-squared:            0.011
Method:                 Least Squares       F-statistic:                 69.47
Date:                  Mon, 27 May 2024     Prob (F-statistic):          1.13e-44
Time:                  08:15:36             Log-Likelihood:              -84760.
No. Observations:      18835               AIC:                        1.695e+05
Df Residuals:          18831               BIC:                        1.696e+05
Df Model:               3
Covariance Type:       nonrobust

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              coef      std err          t      P>|t|      [0.025      0.975]
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const          44.6097      1.005      44.401      0.000      42.640      46.579
song_duration_ms -2.85e-06      2.68e-06     -1.064      0.287     -8.1e-06      2.4e-06
danceability     14.4782      1.020     14.193      0.000     12.479     16.478
energy          -0.2567      0.746     -0.344      0.731     -1.719      1.205
=====
Omnibus:                 808.213      Durbin-Watson:              1.291
Prob(Omnibus):           0.000      Jarque-Bera (JB):            905.179
Skew:                    -0.530      Prob(JB):                    2.77e-197
Kurtosis:                2.830      Cond. No.                     1.88e+06
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Notes:

[1] Standard Errors assume that the covariance matrix of the errors is correctly specified.

[2] The condition number is large, 1.88e+06. This might indicate that there are strong multicollinearity or other numerical problems.

Коэффициент детерминации R<sup>2</sup>: 0.010946570823343604

Коэффициент при energy: -0.2567102836254611

P-value для energy: 0.7307007094235959

Гипотеза о влиянии энергичности на популярность не подтверждается.

Коэффициент при danceability: 14.47819918900999

P-value для danceability: 1.748065690258184e-45

Гипотеза о влиянии танцевальности на популярность подтверждается.

F-статистика: 104.19042016462434

P-value для F-теста: 9.981701583364582e-46

Гипотеза о влиянии продолжительности и танцевальности на популярность подтверждается.