

AWESOME LIFE HACK TO MAKE IT INTO BILLBOARD 100

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SECRET REVEAL

Do you like to listen to...

- ▶ Dancing songs?
- ▶ Energetic?
- ▶ Acoustic?

SECRET REVEAL

I think I've just found the secret recipe . . .

STATISTICS + DATA

It was when I was digging into some billboard 100 data...

What defines a 'good' song?













So, recipe?

You might notice you like chord progressions, lyrics, song structure, emotions or special hooks (Reina (n.d.))

- ▶ Rather, I took a more statistical approach. . .

I used the Billboard 100 data set (Mock (2021)).

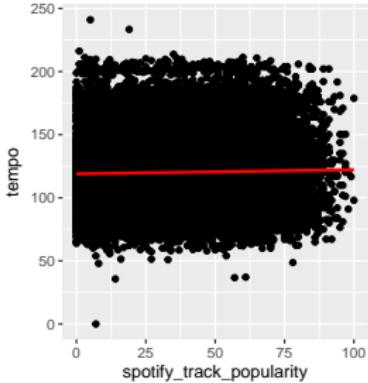
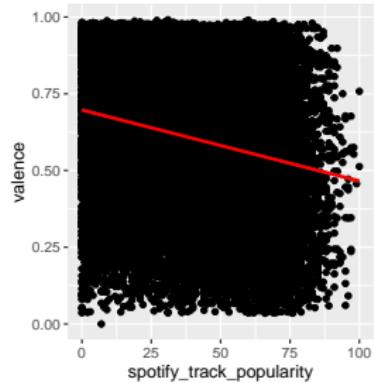
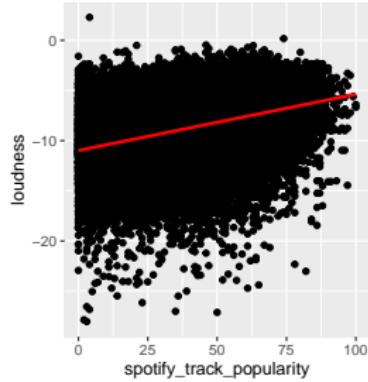
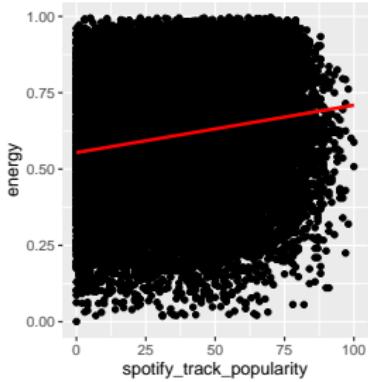
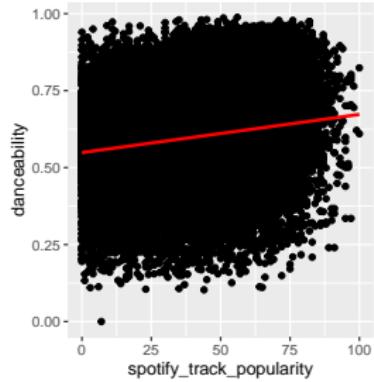
Audio features:

- ▶ Danceability
- ▶ Energy
- ▶ Key
- ▶ Loudness
- ▶ Mode
- ▶ Speechiness
- ▶ Acousticness
- ▶ Instrumentalness
- ▶ Liveness
- ▶ Valence
- ▶ Tempo
- ▶ Time signature

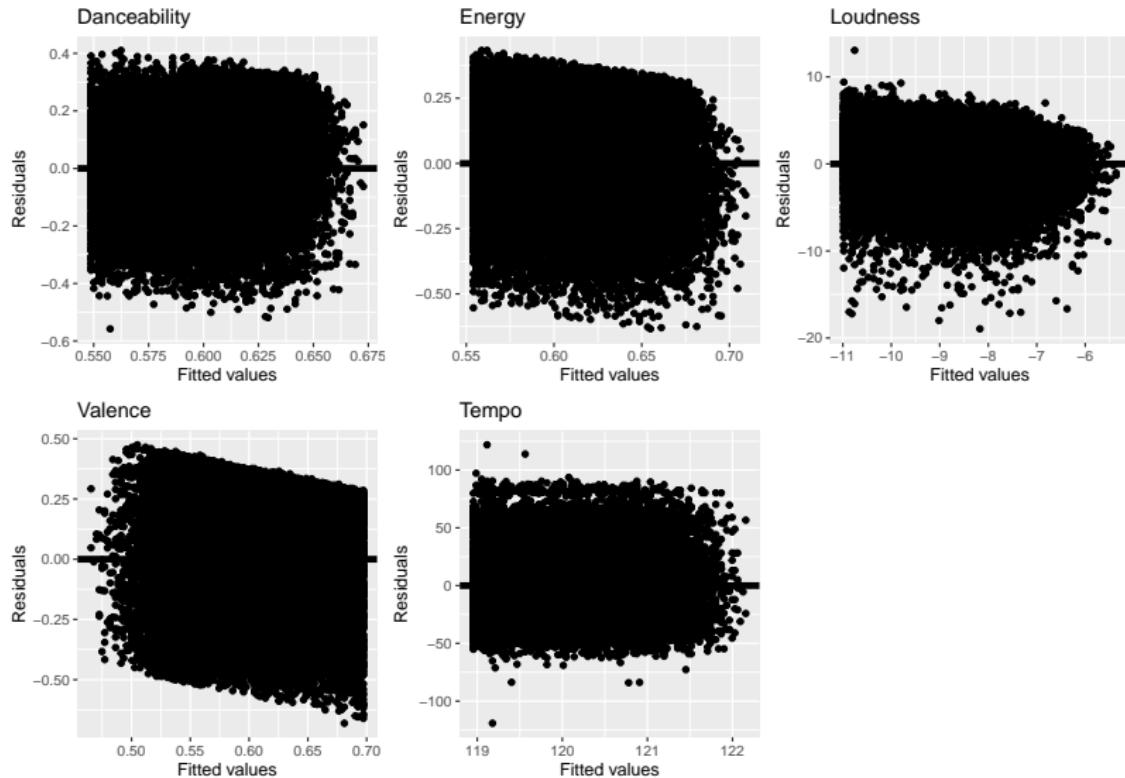
Selection

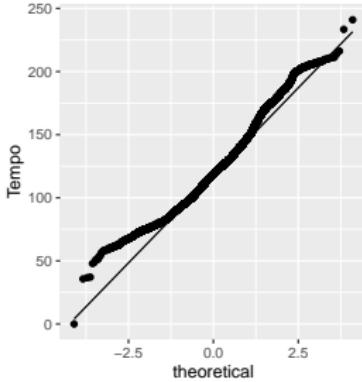
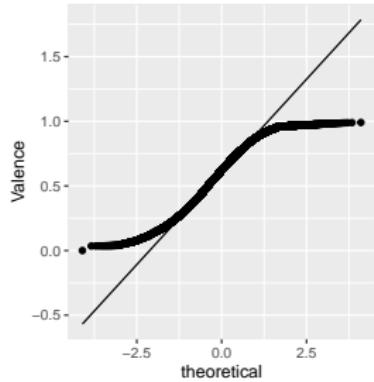
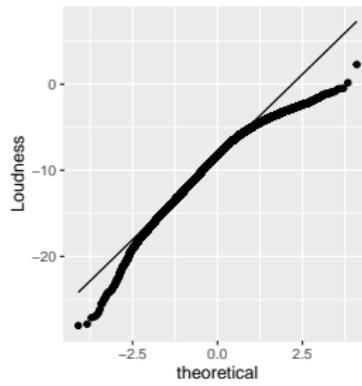
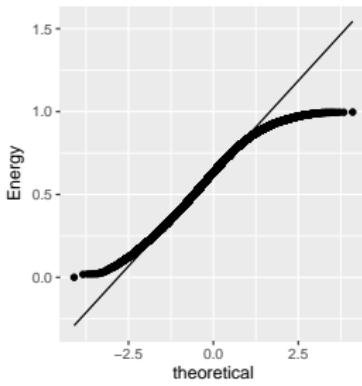
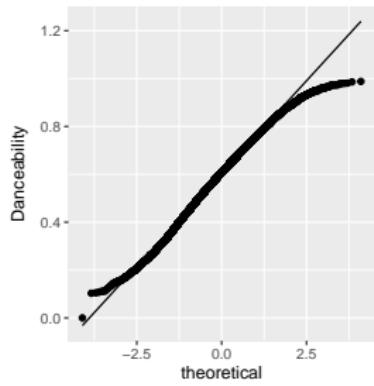
Linear Regression

- ▶ Linearity
- ▶ Constant variance (residuals)
- ▶ Normal distribution (residuals)



- ▶ Danceability
- ▶ Energy
- ▶ Loudness
- ▶ Valence
- ▶ Tempo





After all...

Simple Linear Regression:

$$Y_i = \alpha + \beta X_i + \epsilon_i$$

Testing: $H_0 : \beta = 0$ against $H_1 : \beta \neq 0$.

Sampling distribution:

$$\hat{\beta} \sim N\left(\beta, \frac{\sigma^2}{S_{xx}}\right)$$

Test statistic: $\tau = \frac{\hat{\beta}}{s_{Y|X}/\sqrt{S_{xx}}} \sim t_{24328}$ under H_0

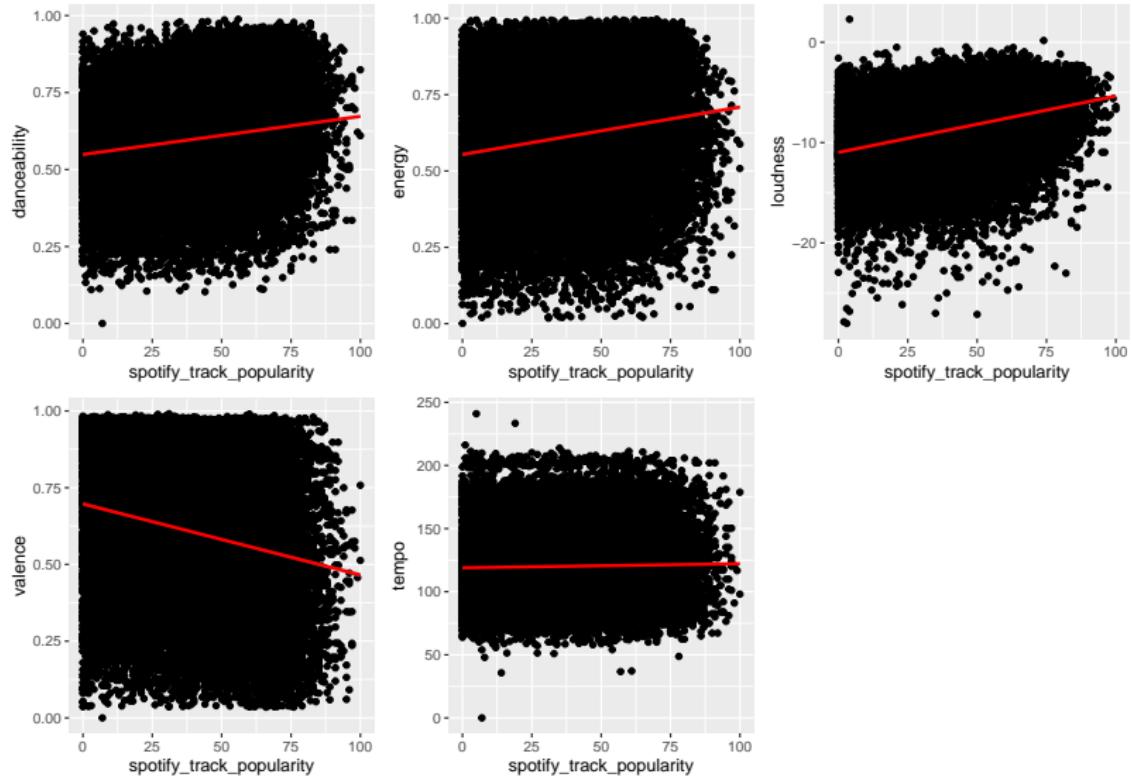
P values

- ▶ Danceability: $5.8022378 \times 10^{-180} < 0.05$
- ▶ Energy: $6.9785822 \times 10^{-167} < 0.05$
- ▶ Loudness: $< 2.2 \times 10^{-16}$
- ▶ Valence: $5.6418247 \times 10^{-260} < 0.05$
- ▶ Tempo: $6.3332033 \times 10^{-5} < 0.05$

REJECT H_0 .

“There is a relationship between popularity and these audio features: As the P-value is very small, we have very strong evidence to reject H_0 . I.E. very strong evidence that the slope parameter is significant and there is a relationship between the popularity and the audio features of the songs.”

Finale



THE SECRET RECIPE

?

References

- Mock, Thomas. 2021. “Tidy Tuesday: A Weekly Data Project Aimed at the r Ecosystem.”
<https://github.com/rfordatascience/tidytuesday>.
- Reina, Vincent. n.d. “What Makes a Song a Good Song?” Available at <https://www.musictoyourhome.com/blog/what-makes-a-song-a-good-song/> (2020/09/24).