Why a Markov Model?

- Disengagement doesn't care from the whole song, but the current perceptual state. Which fit Markov properties

$E(S_{t+1} | S_t)$ where E is engagement probability
S_t is engagement state.

From our python code we have,

$$T = \begin{array}{c} \\ B \\ E \\ O \end{array} \begin{bmatrix} B & E & O \\ 0.948 & 0.043 & 0.009 \\ 0.025 & 0.969 & 0.007 \\ 0.111 & 0.333 & 0.556 \end{bmatrix}$$

this is a Markov Chain from 950 lines of data

over 950 lines of data. We'll incorporate an emission probability matrix for each second of a song, E. Then

- T governs how engagement evolves
- E shows how the current music supports or contradicts each state.

Using Markov Probabilities, we will identify zones of disengagement with a risk scalar

$$risk = P(B_t) + P(O_t)$$

Then we will run simulations in these zones with agents to get detailed feedback to why these sections are disengaging to listeners. Which saves a lot of computational load, (simulating in zones rather than a whole song)