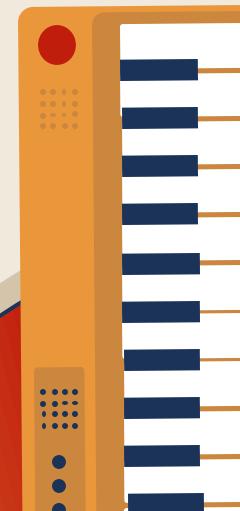


# R&B Chord Generator

DS 5030 Section 2  
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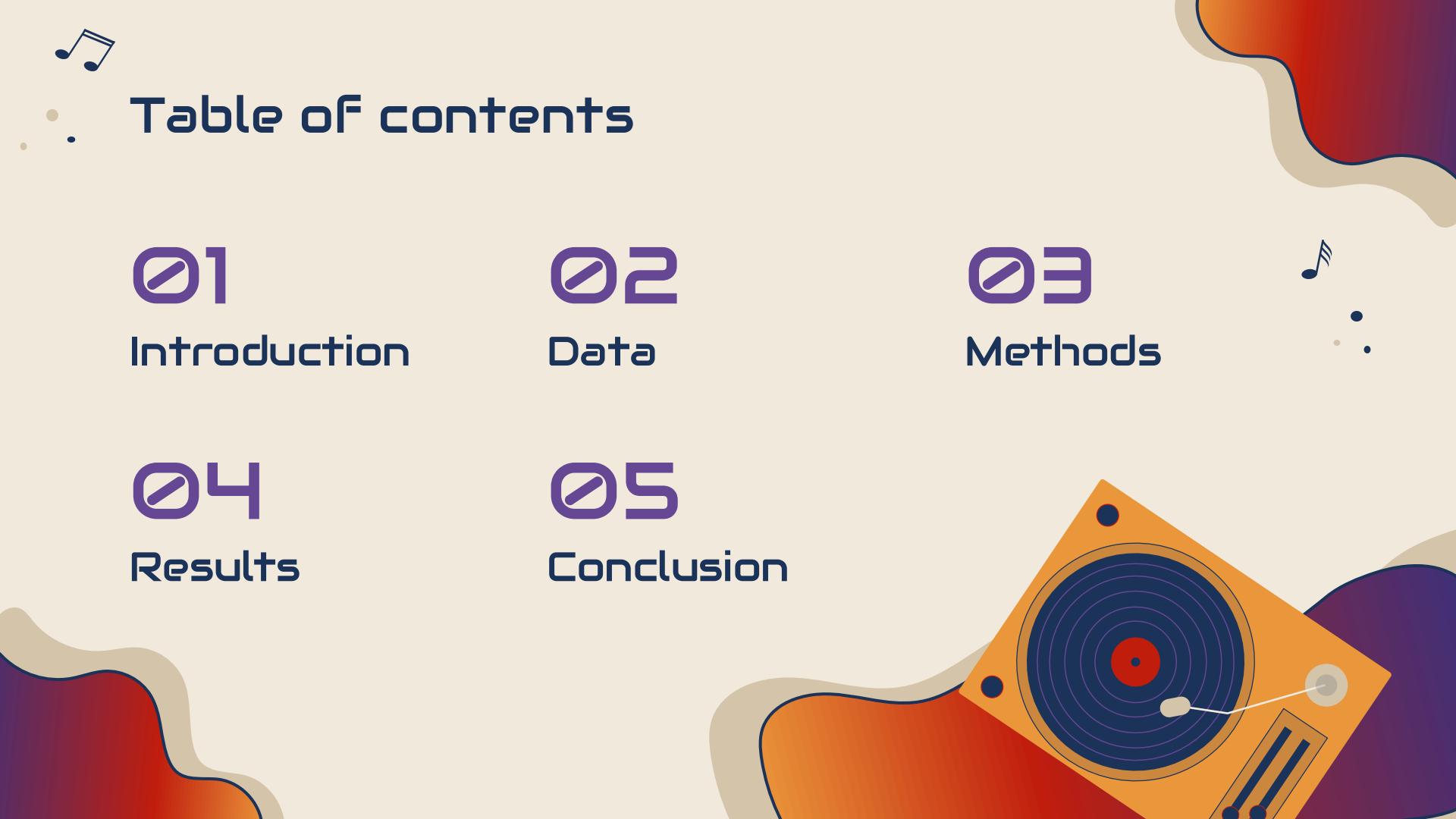
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# Introduction



## Objective: R&B Music Generator

The objective of this project was to create a music generator that could generate a snippet of an R&B song based on the chords in present in existing R&B songs from the Chordonomicon dataset



## Music & Probability

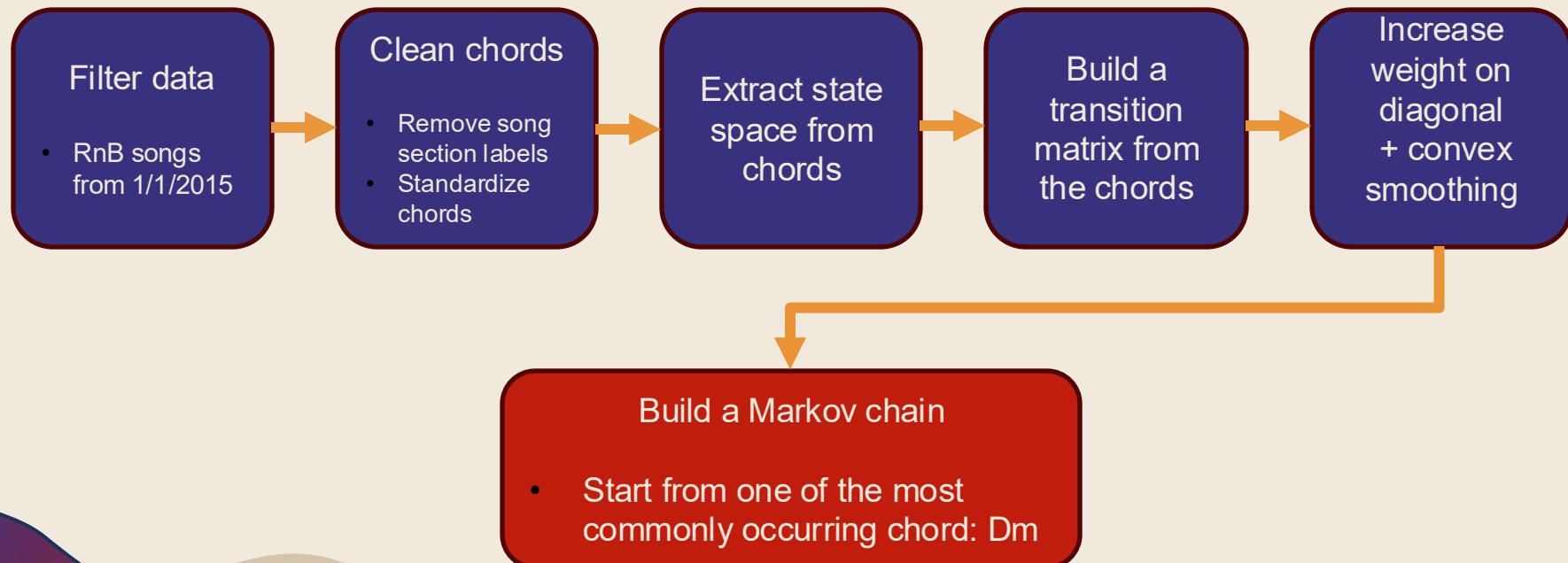
- ❖ Music piece = sequence of finite possible states
- ❖ Music generated via Markov Chains

# Data

- Collected by a group of scholars at the National Technical University of Athens, Greece
- Data was compiled from two sources:
  - Spotify API: metadata
  - Ultimate Guitar Platform: chord data
- **Focus:** chord progressions within each song
  - Column named 'chords'
- Originally 679,807 songs
- Only wanted R&B songs from the last 10 years --> 3,420 songs

		<b>id</b>	<b>chords</b>	<b>release_date</b>	<b>genres</b>	<b>duration_ms</b>
		42 2535	<intro_1> C F G G7 C F G D <verse_1> A D Gsmin...  <intro_1> Bbmaj7	1990-03-20	'contemporary r&b'	330000
		43 2566	Gmin7 C11 Fmaj7 Bbmaj7 Gmin7 ...  <intro_1> G	2019-08-30	'alternative r&b' 'la pop'	330000
		44 2580	D Bmin A G D Bmin A G D Bmin A G D...  <intro_1>	2022-01-18	'chill r&b'	330000
		45 2588	Emin C D Emin C D Emin C D Bmin C D ...  <intro_1> C	2023-01-20	'french pop' 'r&b francais'	330000
		46 2686	Cmaj7 F G F C <verse_1> Cmaj7 F Fm...  <intro_1>	1984-01-01	'boy band' 'contemporary r&b' 'new jack swing'...	330000

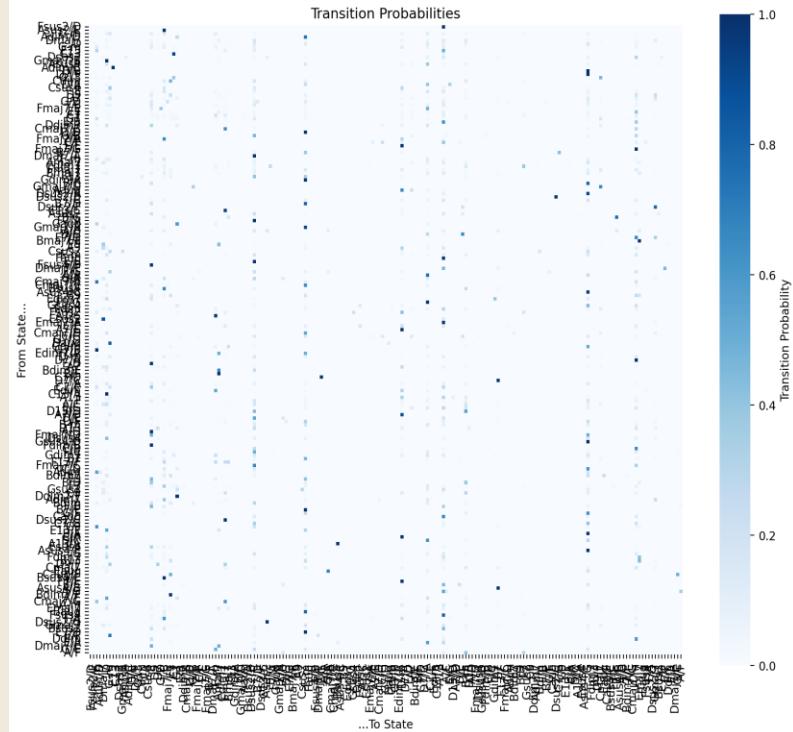
# Methods



# Results



- **High Sparsity:** The overwhelming white area confirms that the model learned a highly restrictive set of rules. Most chord transitions are zero-probability, proving the model successfully filters out musically unlikely changes.
  - **Non-Uniformity:** The visual contrast between white and dark blue demonstrates that chord movement in R&B is non-random and highly dependent on the current state.
  - **Log Likelihood Test:** This value tells us how well the model predicts unseen chord progressions based on the probabilities it learned from the training data. The value we got is -2.7, which means the model assigns about a 6% probability to the correct next chord on average, which shows the model is learning the patterns, but there is still some uncertainty due to limited data and musical variability.



# Conclusion/Next Steps

- **Model Limitations:**
  - Using a Markov state space creates predictable chord progressions that lacks nuance of a typical R&B song and results in a basic outline
- **Need additional data:**
  - Using data that contains rhythmic patterns would be more beneficial than using randomly assigned rhythms
  - Potential Solution: Get data on rhythm patterns for RnB songs, create a secondary Markov chain, and layer it with chords to give a “proper” rhythm to the song
- **Need additional filtering:**
  - Chords in the generated song don’t reflect songs from the dataset, since we filtered for all RnB songs
  - Potential Solution: We could get songs from a specific subgenre of RnB and generate songs from it.

# Thanks!

## Any Questions?

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