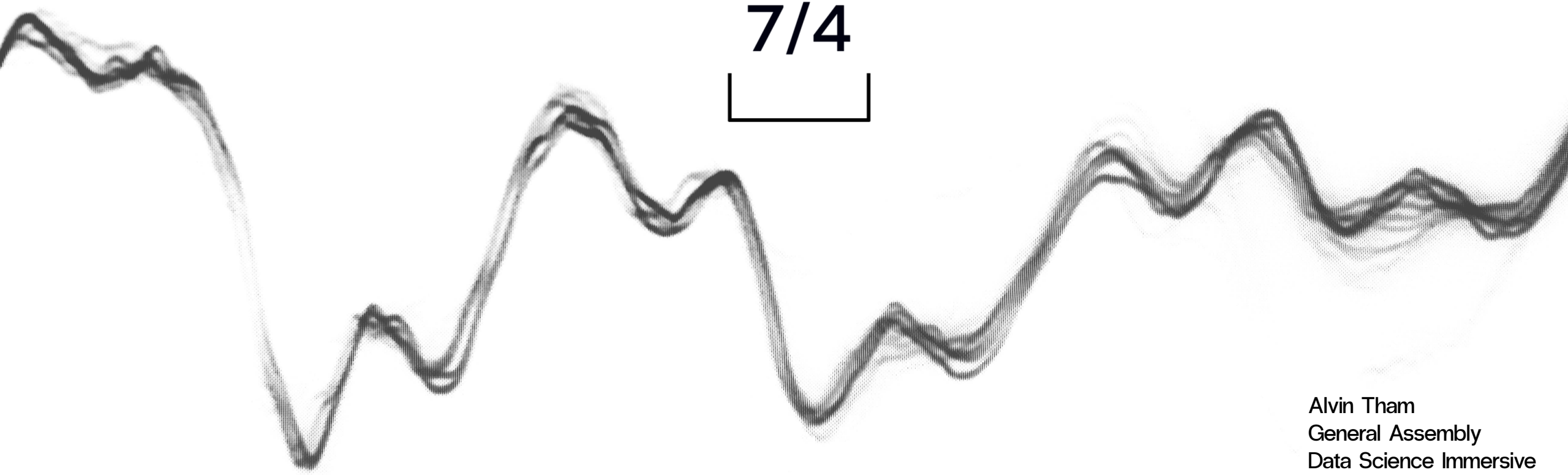
seven/four

7/4



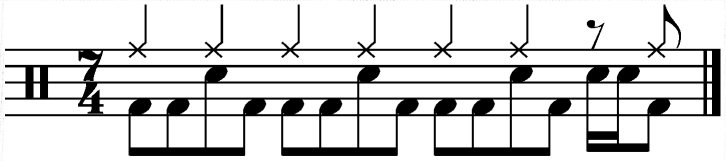
Alvin Tham
General Assembly
Data Science Immersive

WHAT IS SEVEN/FOUR ?

Seven/Four is a music genre prediction & sample recommendation system.

Its aim is to provide musicians an all-in-one method to obtain royalty-free audio samples related to the genre of a track selected. The samples can then be used in a digital audio workstation.

Seven/Four (stylised as 7/4) is an uncommon and unique time signature notation that indicates having 7 beats in a bar, instead of the common 4/4 time signature.



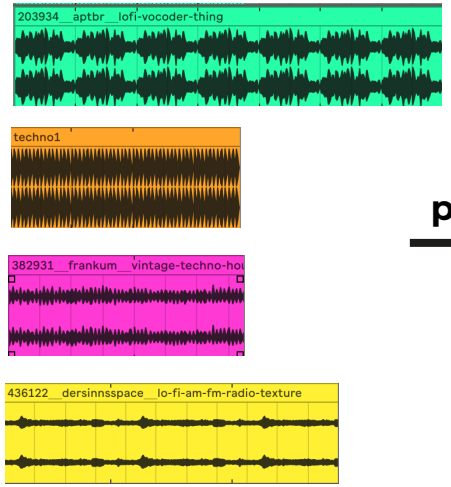
TERMINOLOGY / USAGE

AUDIO SAMPLE

Sound file that can be used in digital audio workstations for creating music.

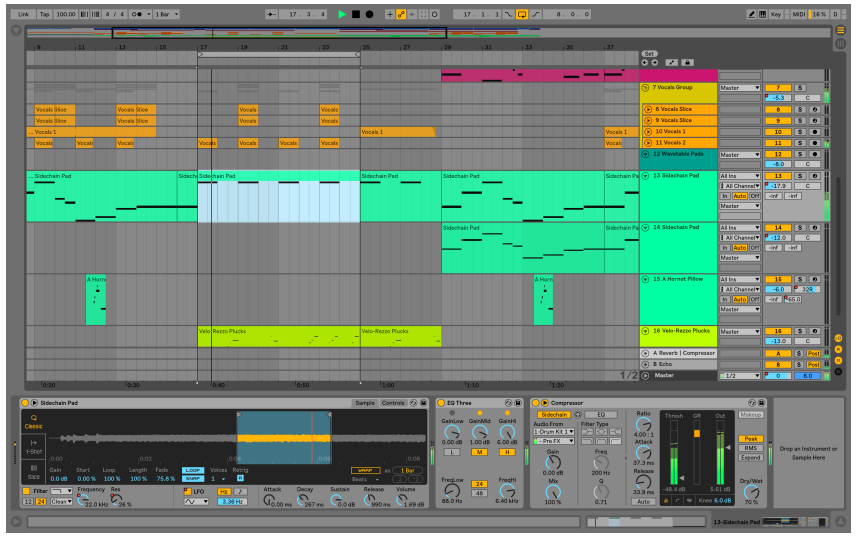
DIGITAL AUDIO WORKSTATION

Music production software that allows musicians to put sounds together into a creative work, such as a song or sound design.



audio samples

plug & play



Digital Audio Workstation

render & export

song

GETTING AUDIO SAMPLES

SUBSCRIPTION-BASED

PAY A MONTHLY SUBSCRIPTION TO OBTAIN CREDITS TO UNLOCK SAMPLES

splice

DIRECT PURCHASE

FULL PAYMENT FOR SAMPLE PACKS

beatport

Loopmasters

THE PATCHBAY

FREE

Personal project websites

Freesound

freesound

SUBSCRIPTION-BASED

splice

HIGH RUNNING COST

- $ 7.99/mth - 100 credits
- $13.99/mth - 300 credits
- 1 sample = 1 credit
- 30 samples pack = 30 credits
- Lose access to all samples upon cancellation (unless downloaded prior)
- Difficult for independent musicians to sustain

COPYRIGHT/OWNERSHIP

- Sounds are licensed to you, not sold
- License is non-transferable
- Cannot use sounds in sole isolation for forming samples
- Company/licensors dictate if your sound used is competitive to them

MANDATORY APP

- Must use Splice desktop app
- Proprietary software
- Intrusive

DIRECT PURCHASE

beatport

HIGH COST PER PACK

- Ranging from $18.99 to $29.99 per pack
- Difficult for independent musicians to sustain

$19.99

COPYRIGHT/OWNERSHIP

- Sounds are licensed to you, not sold
- License is non-transferable

MUST BUY IN BULK

- No way to buy individual sample
- Pay for samples that you might not use at all

TOO MANY PLATFORMS

- Splintered platforms across the web

PROHIBITIVE COST

- Difficult for independent artists to obtain samples due to costs

FREE SAMPLES

NAVIGATION DIFFICULTY

- Unorganised
- Large mass of sounds
- Potential quality-issues

COPYRIGHT/OWNERSHIP

- Various creative licenses
- Difficult to navigate through
- Sounds may end up being licensed and not owned

TOO MANY SOURCES

- Scattered all over the web
- Can be difficult to verify if samples are authentic or illegally distributed

CREATIVITY FLOW PROBLEM

BROWSING NIGHTMARE

- Constant browsing through all sounds/packs
- Packs have so many sounds that you need to listen to lots of samples to make your purchase worthwhile
- Time-consuming

NO CONNECTION TO MUSIC

- Static method in obtaining samples
- No connection to a track that inspired or grabbed your attention
- Ideas get lost in the myriad of sounds available

seven/four

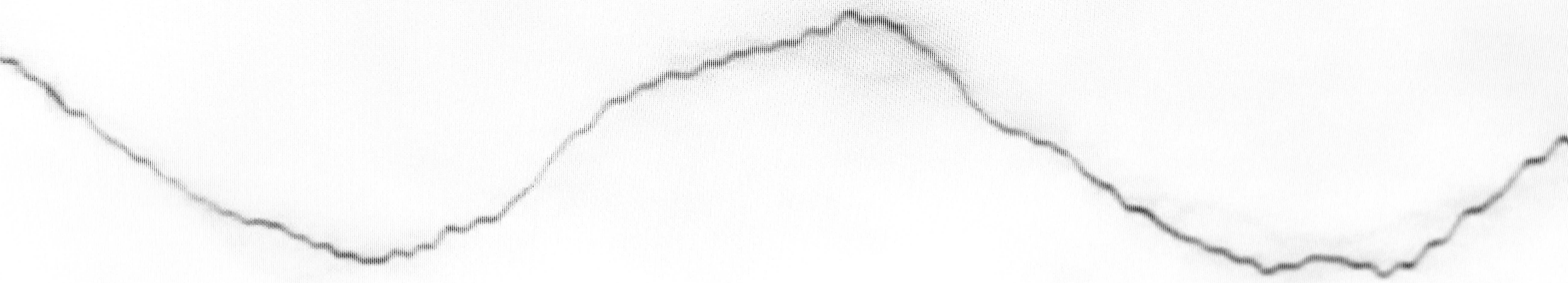
Making it organic

We want musicians to spend more time discovering music and focus on getting the right sounds for their inspiration, instead of spending time sifting through pages in hopes of finding a fitting sample.

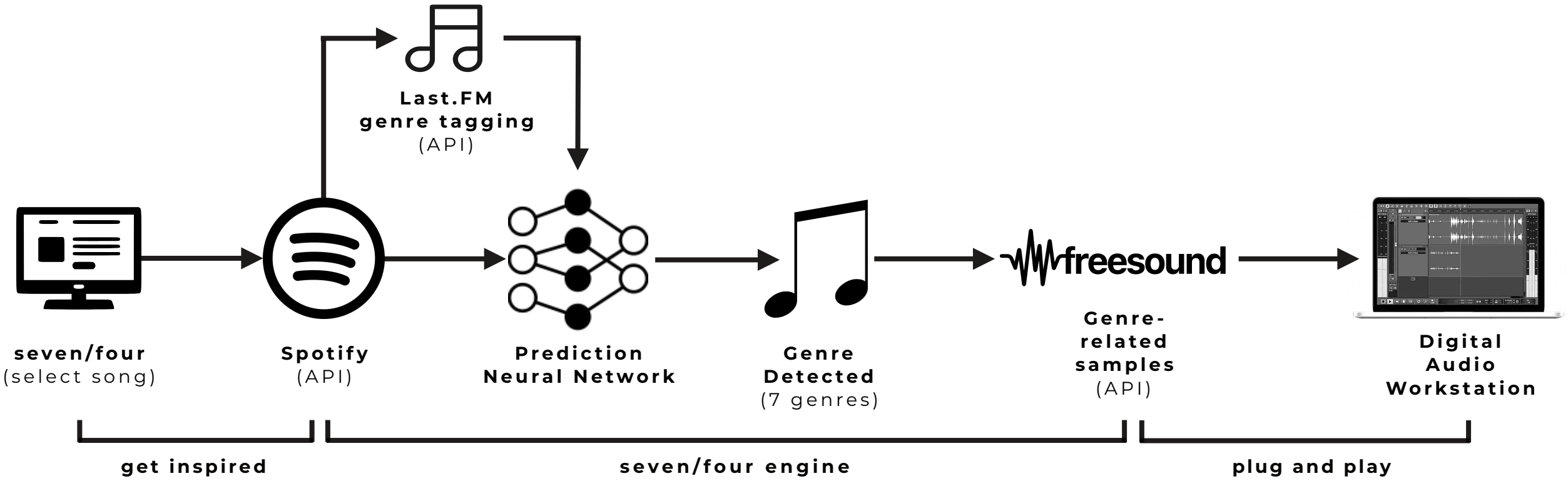
We believe creativity should be allowed to flow freely, unconstrained by unnecessary costs.

Let’s make the process organic once again.

HOW DOES SEVEN/FOUR WORK?

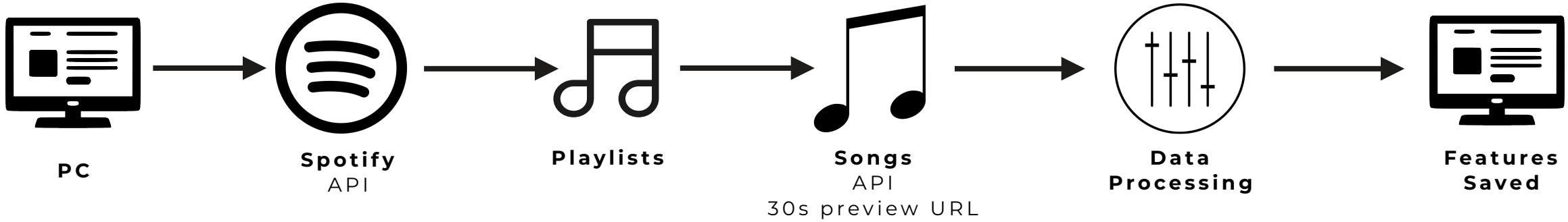


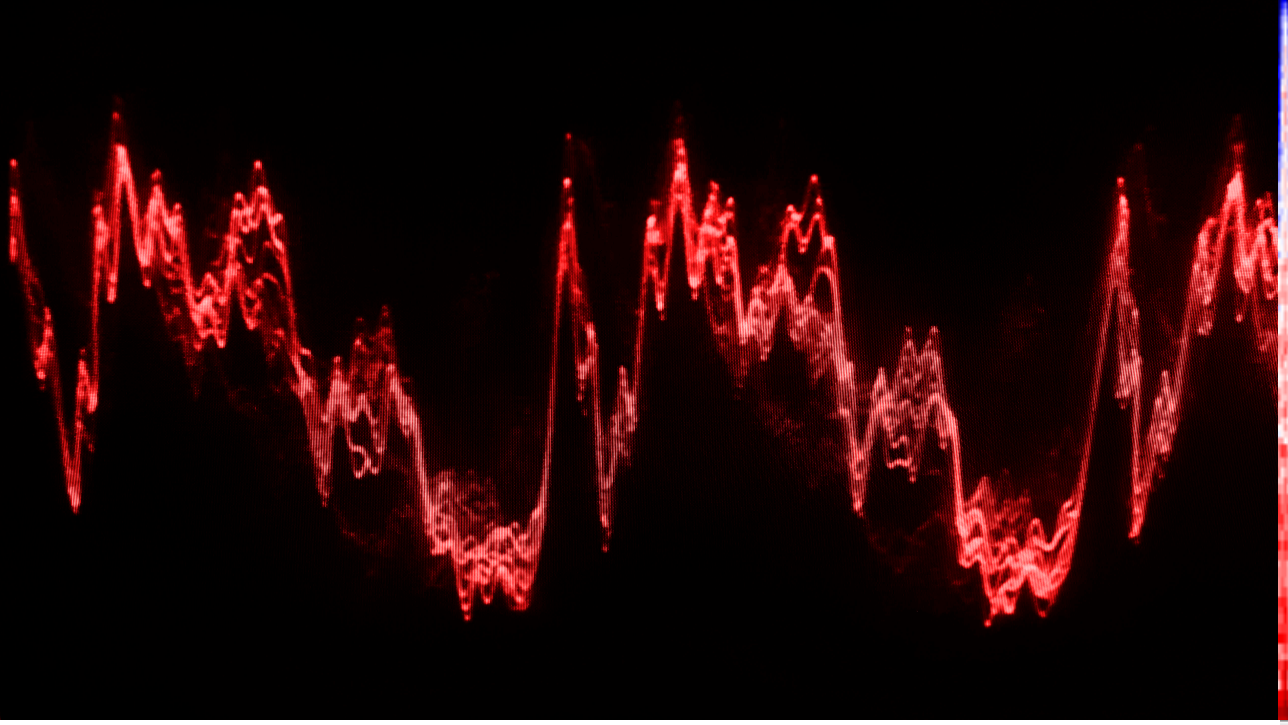
HOW SEVEN/FOUR WORKS

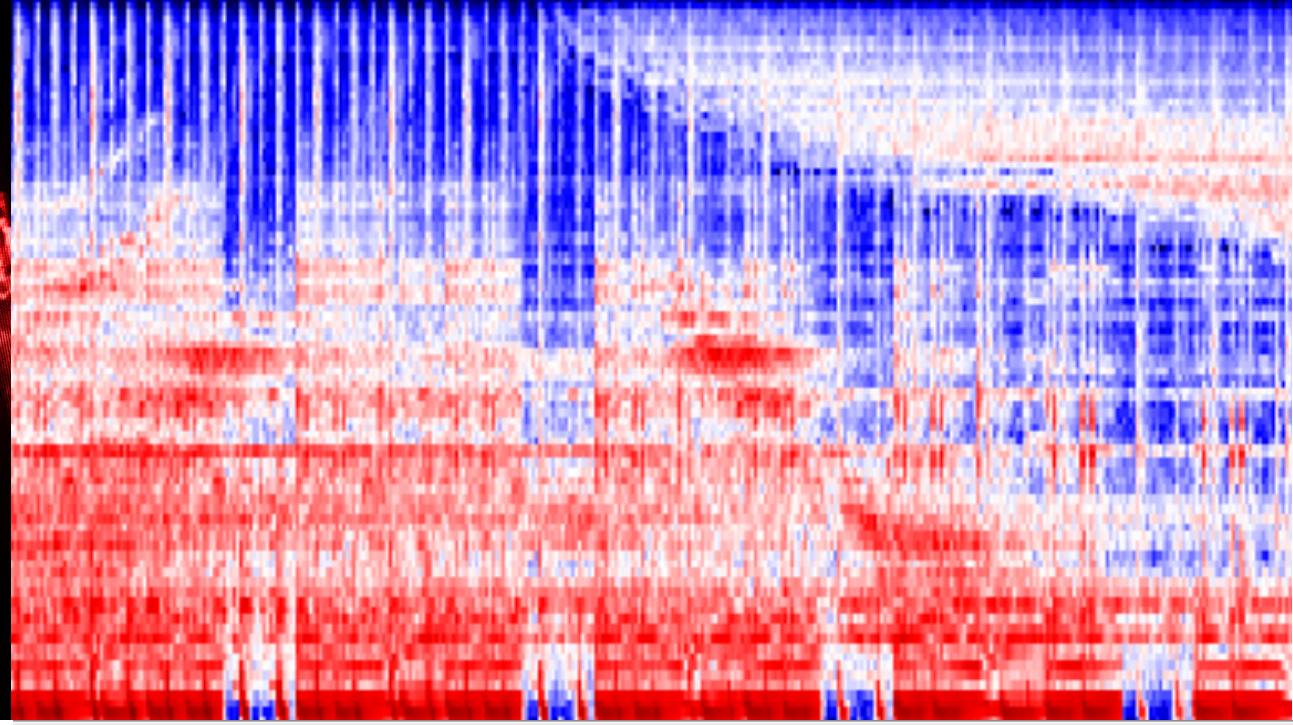


OUR PREDICTION ENGINE

DATA COLLECTION & PROCESSING FLOW







DATA PROCESSING

(going clockwise)

- Capture of raw audio from song
- Conversion of audio to Mel-spectrograms
- Conversion of Mel-spectrograms to arrays

0	18	238	255	248	134	21	76	248	255	255	162	0	0	0	0	0	0	0	0	0	0	0
0	87	255	255	255	255	255	255	254	253	255	87	0	0	0	0	0	0	0	0	0	0	0
0	75	255	255	249	253	255	254	253	255	255	132	50	41	0	0	0	0	79	143	27	0	0
0	39	255	255	255	245	200	186	187	192	222	255	255	255	51	0	43	202	255	255	75	0	0
0	67	255	255	239	162	154	174	179	172	155	197	227	236	164	166	255	255	255	255	39	0	0
0	146	255	255	173	159	206	196	194	200	184	155	241	253	255	255	240	217	250	255	44	0	0
54	255	255	242	167	193	192	193	192	205	172	150	247	255	248	186	163	166	163	255	178	0	0
167	255	250	255	189	157	196	207	199	167	141	186	219	248	185	156	195	204	171	165	255	207	92
193	255	251	255	245	179	153	138	144	190	241	255	227	175	169	202	193	192	193	168	239	255	255 1
154	255	247	207	214	233	198	190	235	255	255	255	219	160	178	197	193	197	177	168	252	255	236
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0	0	104	255	255	206	159	203	192	197	190	152	235	255	240	195	241	255	251	255	255	251	118
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95	255	255	249	251	254	200	153	167	171	215	254	252	255	183	234	255	255	170	0	0	0	0
103	255	252	253	255	255	255	233	221	245	255	250	250	255	193	164	254	150	0	0	0	0	0
0	206	255	255	172	175	255	255	255	253	249	249	253	255	255	62	0	0	0	0	0	0	0
0	26	144	70	0	0	106	255	255	250	250	255	255	240	172	18	0	0	0	0	0	0	0
0	0	0	0	0	0	8	230	255	250	255	239	77	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	198	255	255	242	37	0	0	0	0	0	0	0	0	0	0	0
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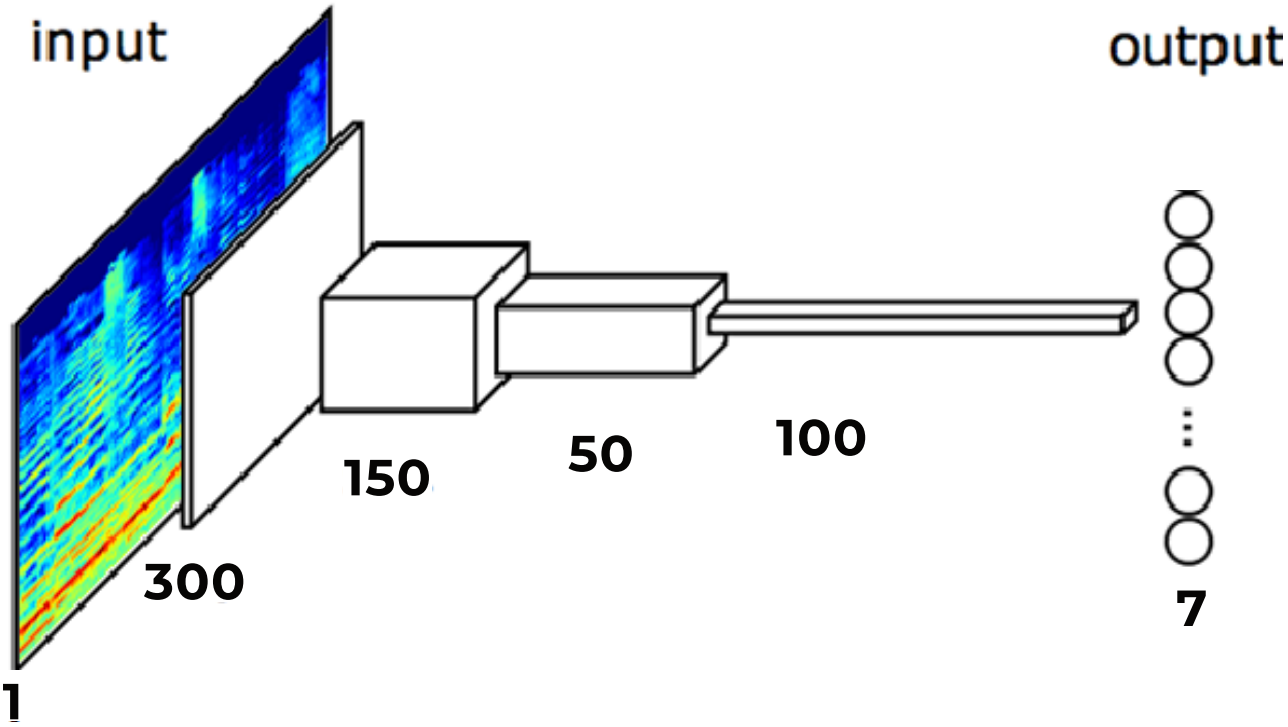
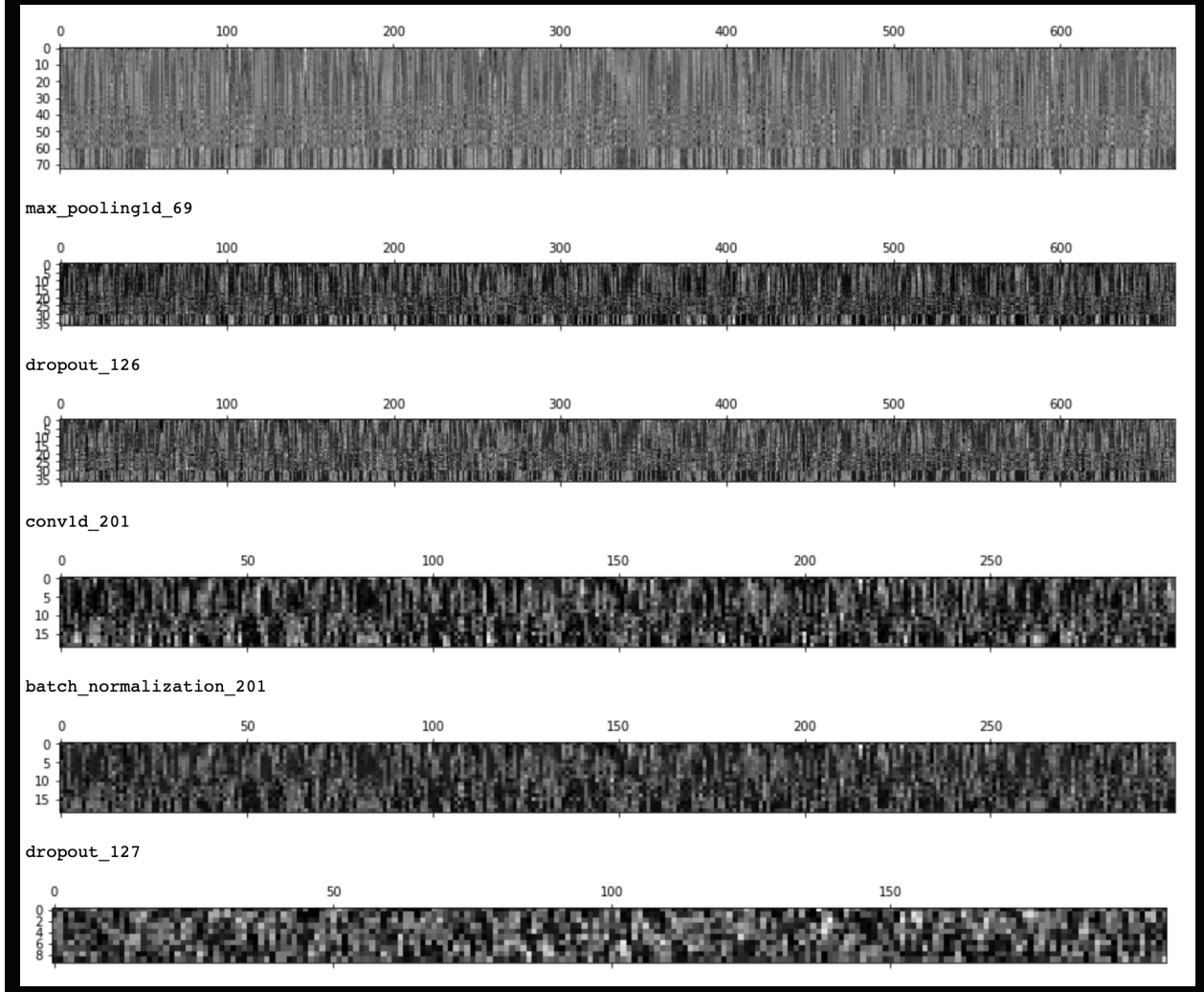


Convolution Neural Network

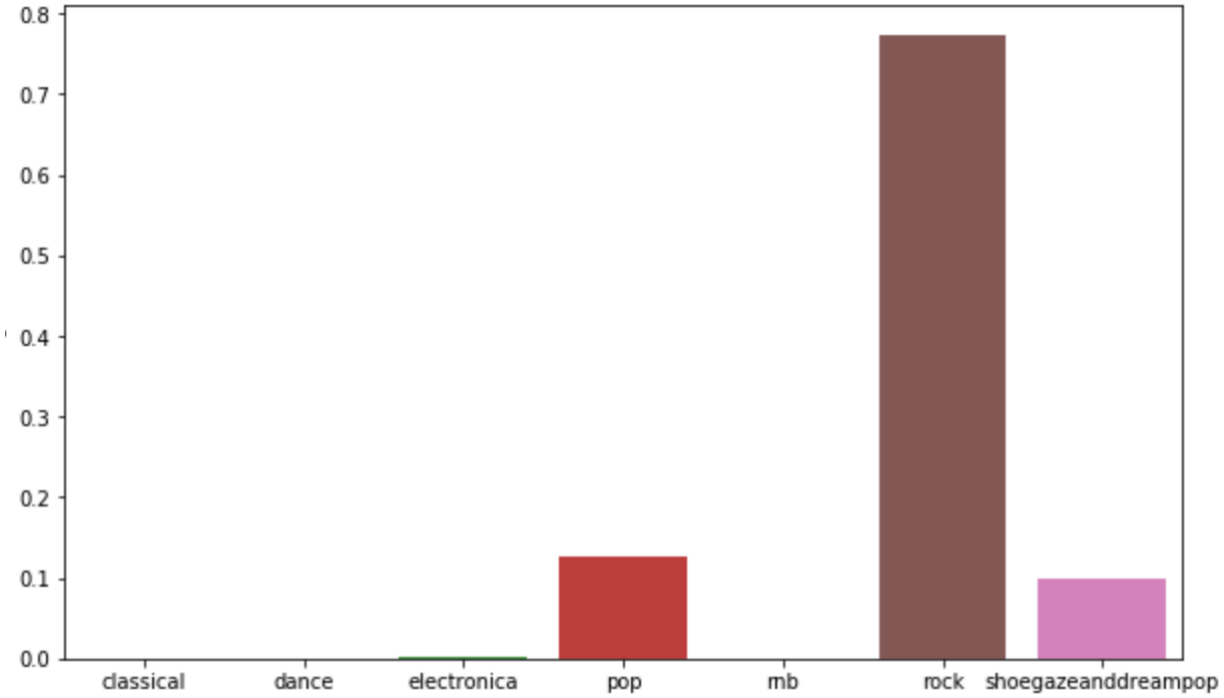
- In-house designed and trained neural network
- Model uses 4 layers to generate predictions for 7 genres
- 3 convolution, 1 dense
- Each convolution layer aggregates our data
- Final output contains probabilities of each of the 7 genres

Layer Outputs



seven/four

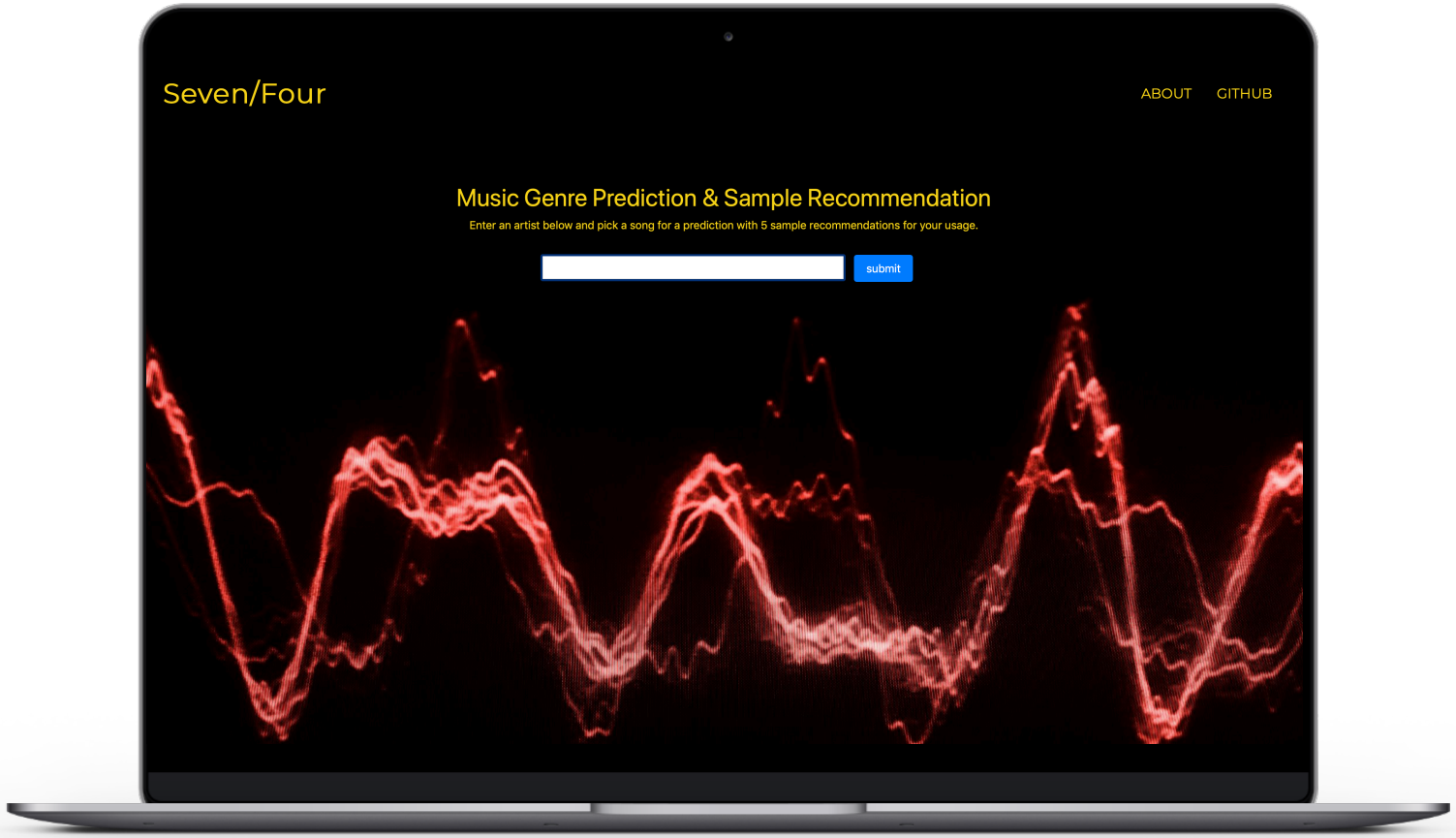
EXAMPLE MODEL OUTPUT



Model outputs predicted probabilities of each genre. Probabilities reflect the likeness of the track to genres.

Current model selects genre with the highest probability as the final output.

PROTOTYPE (ALPHA STAGE)



CURRENT LIMITATIONS

BLURRED BOUNDARIES BETWEEN GENRES

- Similar musical elements (Pop, R&B, Electronica) can be difficult to differentiate.
- Widespread usage of electronic-generated sounds
- Music structures and sound designs constantly evolving, genres continuously being redefined.

DATA COLLECTION

- Data collection relies on Spotify's 30-second preview url.
- Model is reliant on the portion of audio that is captured
- Audio data not representative of its genre will lead to the model being unable to be trained properly.

AUDIO SAMPLE POOL

- Audio sample pool relies on Freesound's collection.
- Constantly growing, but we're reliant on a single source of audio samples without any form of backup.

FUTURE WORK

EXPANSION OF GENRE COVERAGE

- Include sub-genres for wider coverage
- Enables better segregation between close sounding broad genres, such as modern day Pop and R&B.

BUILD A COMMUNITY

- Invite Spotify users to contribute by allowing us access to their playlists
- Playlists often are arranged by a particular genre
- Use user's playlists to contribute to the project

SOUNDCLOUD AS ADDITIONAL DATA

- Soundcloud is a platform that hosts user-created songs.
- Use genre tags by users to form clustering model
- Allow subjectiveness of genres to flow through from these tags
- Better representation of what humans think of a song's genre

You can help us build towards a new open creative solution for musicians everywhere.

Music is love, music is life.

Support us at our Patreon site:

www.patreon.com/seven_four

THANK YOU