

Loudness

CS185C

Elton Vinh, Edward Huang

Dataset

- Million Song dataset
 - Million Song Subset
 - Loudness - Overall loudness in dB
 - Segments Loudness Max - Max dB value within the given segment
 - Segments are musically relevant portions of the song
- Echonest API
 - Generated a large dataset through playlist feature
 - API didn't provide the information we needed

Features:

- **loudness**
 - general loudness of the track
- **peak_loudness**
 - max loudness
- **avg_max_loudness**
 - segment (~ musical event, or onset)
 - segments_loudness_max - max loudness during each segment
 - average of max loudnesses during each segment
- **loudness_diff_average**
 - loudness_difference - segment_loudness_max - loudness
 - loudness_diff_average - average of all differences

X, y

- `X = loudness, peak_loudness, avg_max_loudness, loudness_diff_averages`
 - `shape=(n_samples, n_features)`
 - `n_samples = 10,000`
 - `n_features = 3`
- `y = loudness_labels`
 - `loud`
 - `medium`
 - `quiet`

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
1	title	artist	loudness	peak_lou	avg_max	loudness	loudness	labels											
2	I Didn't Mean To	Casual	-11.197	-6.384	-13.53	-2.333	medium												
3	Soul Deep	The Box Tr	-9.843	-5.349	-12.215	-2.372	medium												
4	Amor De Cabaret	Sonora Sa	-9.689	-5.564	-11.004	-1.315	medium												
5	Something Girls	Adam Ant	-9.013	-4.048	-10.526	-1.513	medium												
6	Face the Ashes	Gob	-4.501	-1.615	-6.434	-1.933	loud												
7	The Moon And I (Ordinary	Jeff And S	-9.323	-4.782	-13.514	-4.191	medium												
8	Keepin It Real (Skit)	Rated R	-17.302	-8.085	-23.227	-5.925	quiet												
9	Drop of Rain	Tweeterfr	-11.642	-5.152	-15.233	-3.591	medium												
10	Pink World	Planet P P	-13.496	-9.947	-16.181	-2.685	medium												
11	Insatiable (Instrumental V	Clp	-6.697	-1.601	-10.934	-4.237	loud												
12	Young Boy Blues	JennyAny	-10.021	-6.341	-11.822	-1.801	medium												
13	The Urgency (LP Version)	Wayne W	-7.545	-2.999	-10.385	-2.84	medium												
14	La Culpa	Andy And	-6.632	-3.014	-7.618	-0.986	loud												
15	Auguri Cha Cha	Bob Azzan	-7.75	-3.119	-9.67	-1.92	medium												
16	Tonight Will Be Alright	Lionel Ric	-8.346	-4.044	-10.211	-1.865	medium												
17	Floating	Blue Rode	-8.576	-2.494	-12.977	-4.401	medium												
18	High Tide	Richard Sc	-16.11	-10.325	-19.672	-3.562	quiet												
19	Sohna Nee Sohna Data	Faiz Ali Fa	-8.032	-2.823	-9.873	-1.841	medium												
20	Caught In A Dream	Tesla	-5.271	-1.269	-7.95	-2.679	loud												
21	Synthetic Dream	lextrical	-6.787	-2.249	-9.338	-2.551	loud												
22	Broken-Down Merry-Go-R	Jimmy Wa	-15.221	-8.507	-18.887	-3.666	quiet												
23	Kassie Jones	Alice Stua	-8.514	-2.138	-12.604	-4.09	medium												
24	Setanta matins	Elena	-8.05	-3.534	-10.954	-2.904	medium												
25	Setting Fire to Sleeping Gi	The Dillin	-4.264	-1.376	-6.08	-1.816	loud												
26	James (Hold The Ladder St	SUE THOM	-12.332	-7.371	-14.227	-1.895	medium												
27	Made Like This (Live)	Five Bolt	-5.908	-3.069	-7.682	-1.774	loud												
28	Superconfidential	Clo	-6.486	-2.644	-8.714	-2.228	loud												

Kmeans

- `n_clusters = 3`

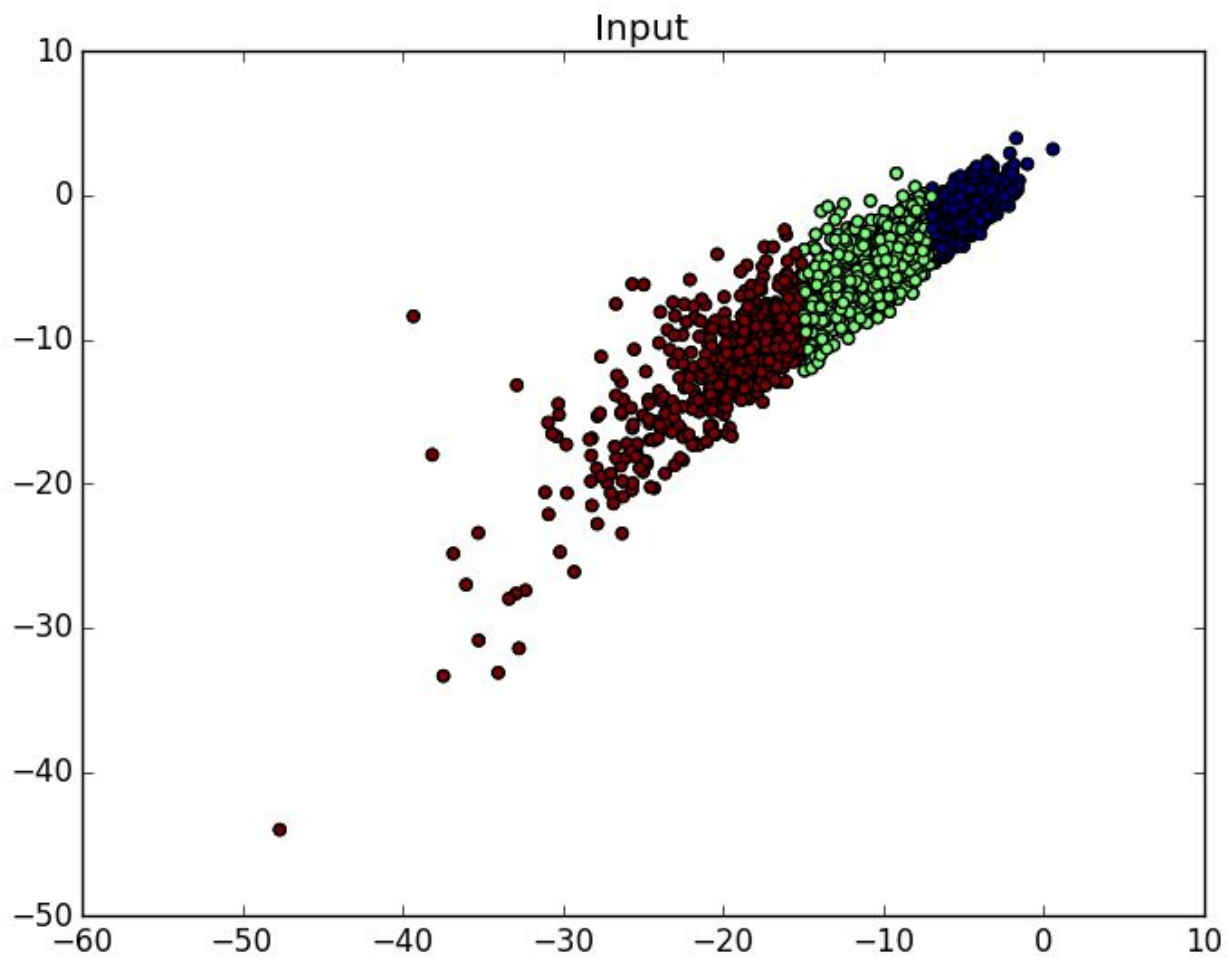
Accuracy

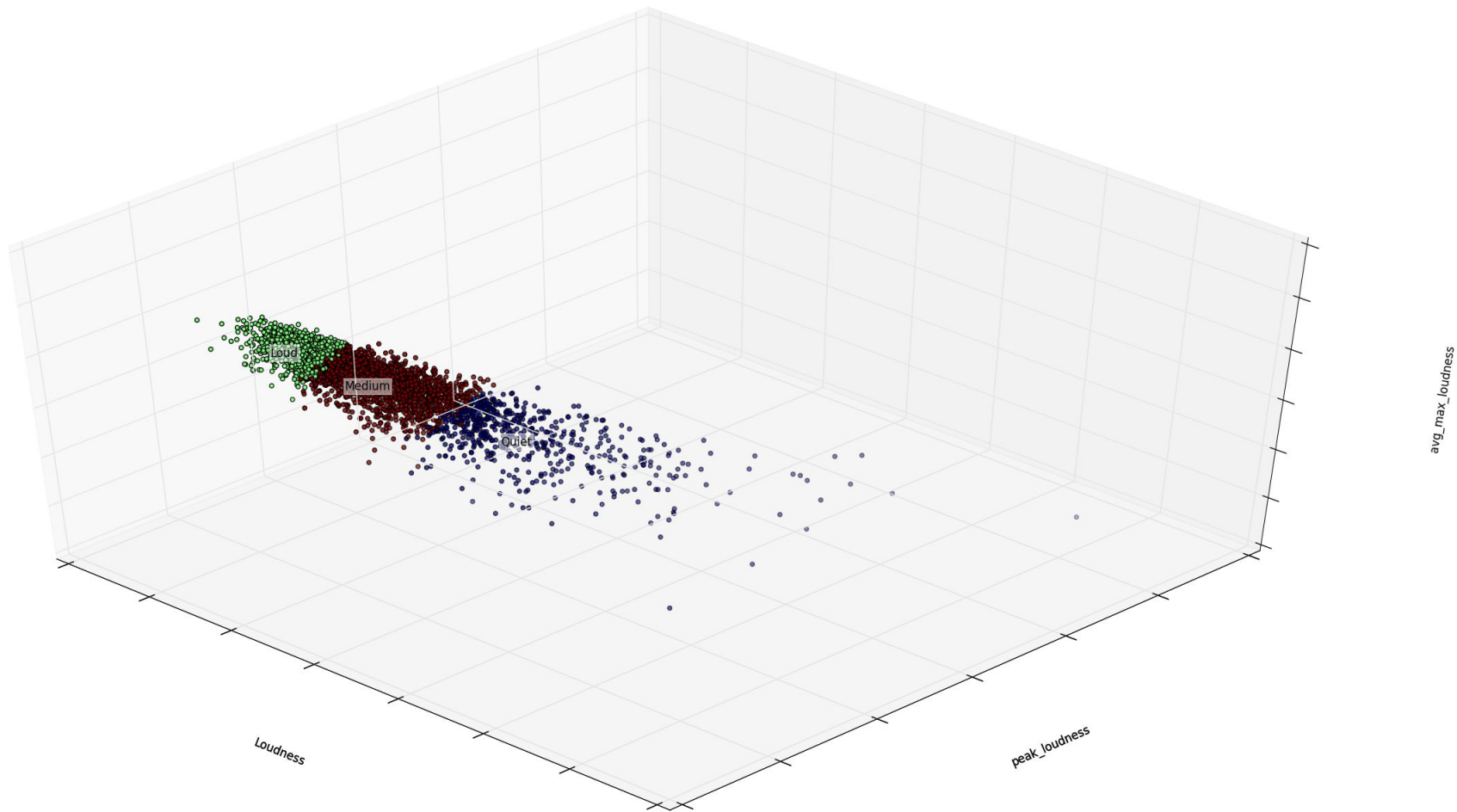
- Precision
- Recall

Matches: 2245

Accuracy: 0.6741741741741741

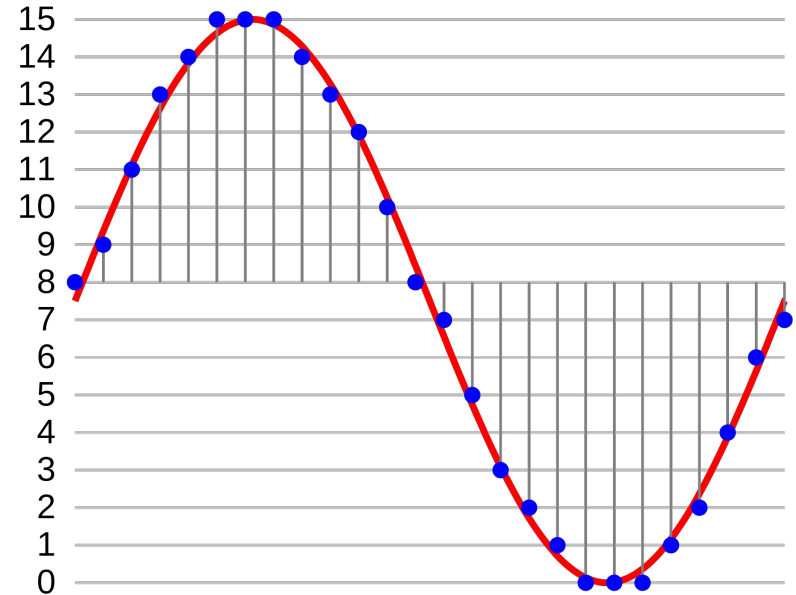
Genre/Algo	KMEANS
loud	0.55
	1.00
medium	0.78
	0.55
quiet	1.00
	0.51





Pulse Code Modulation(PCM)

- Analog signals are represented as binary in the digital domain
- Analog signal measured at regular intervals(sampling)
- Amplitude is rounded off at predetermined levels(quantization)
- 16bit depth: 65,536 levels
- 24bit depth: 16,777,216 levels



Clipping

- What is clipping?
 - A form of waveform distortion
 - Often occurs when trying to increase V_{rms}
- Brickwall Limiting
 - Artificial brickwall limit
 - Removes transients
- How do we tell?
 - Waveform analysis
 - Decibel analysis
- Model
 - Features: loudness, loudness_diff_avg, peak_loudness, avg_max_loudness
 - Unsupervised Learning: k-means with two clusters for clipped and unclipped

Clipping

