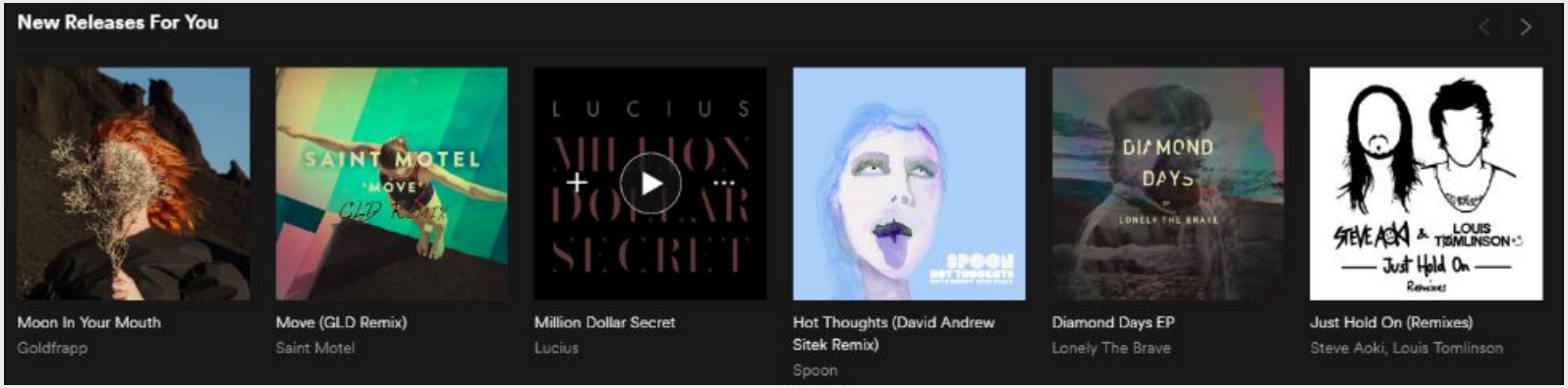
Spotify Recommender



Background

Spotify Sequential Skip Prediction Challenge^ was a challenge on AI Crowd.

The dataset has a set of listening sessions, and features regarding the tracks.

Traditional statistical methods does not perform quite well with extremely sparse datasets.

Spotify Sequential Skip Prediction Challengel Challenges

^My project does not address the challenge objective, but uses the dataset to recommend tracks for a given listening session.

Methodology

Sampled sessions for a few days from the large dataset, ~1TB.

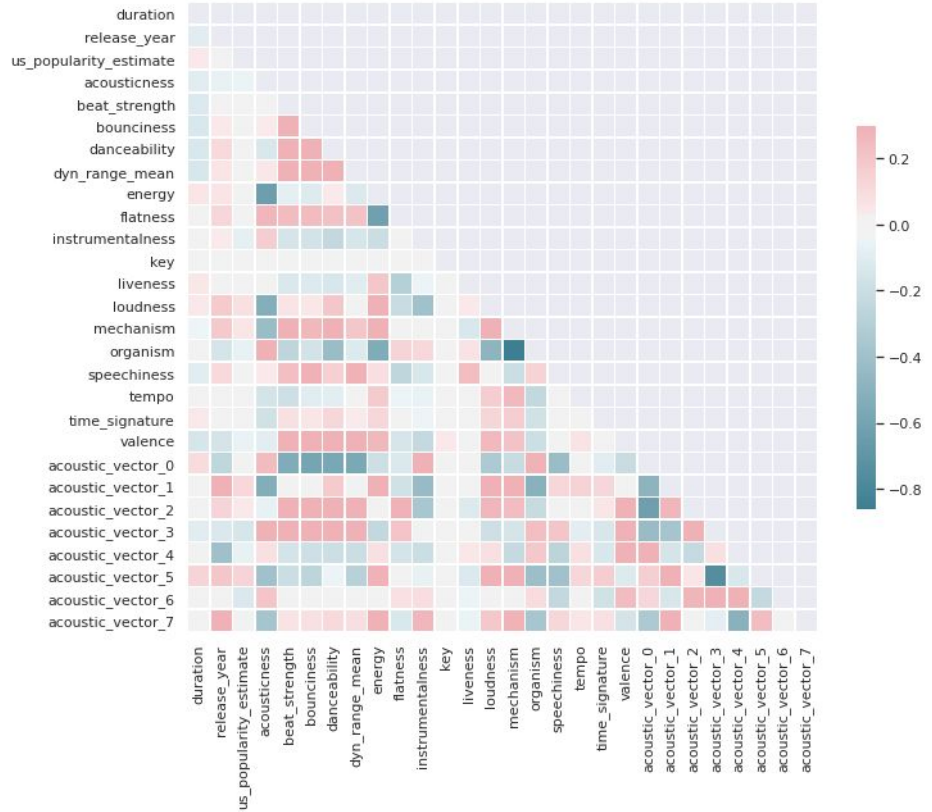
Build and evaluate performance using a set of collaborative and content filters using autoencoders (regular & variational).

Collaborative filters simply uses session_id, track_id; and content filters use the features regarding the music tracks too.

Preprocessing

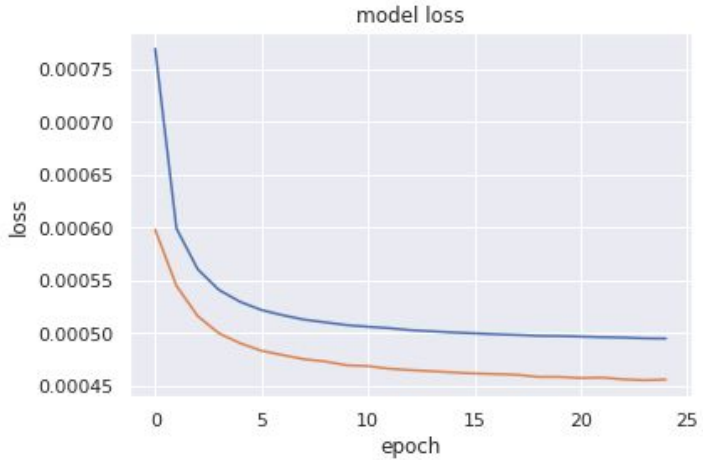
Interaction matrix of sessions and tracks; heavily sparse even after thresholding: 99.94%! (this is extremely challenging for conventional matrix factorization/nearest neighbor techniques)

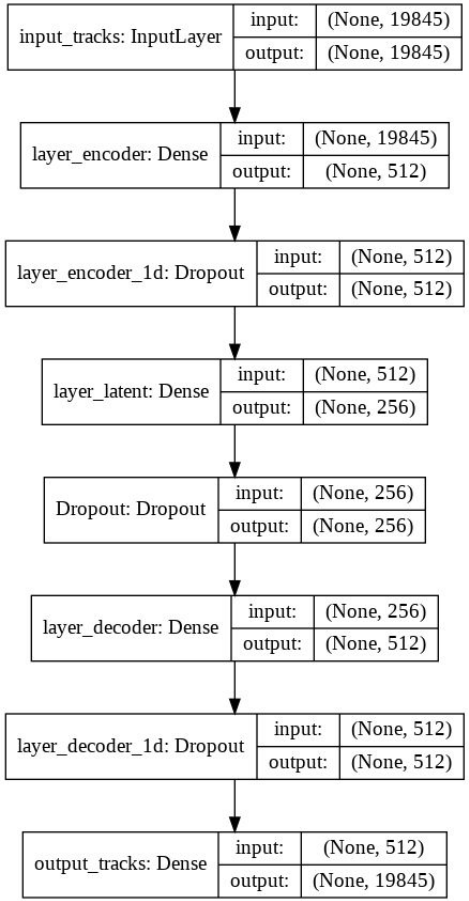
Music features >



1. Auto Encoder

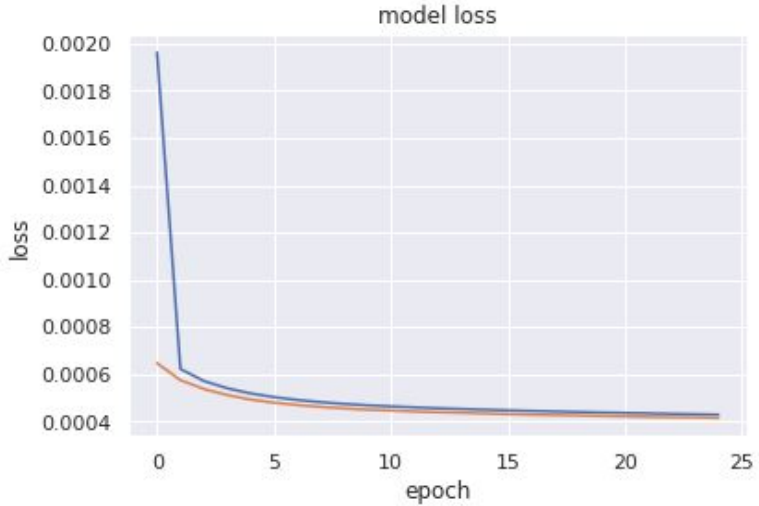
Collaborative filter

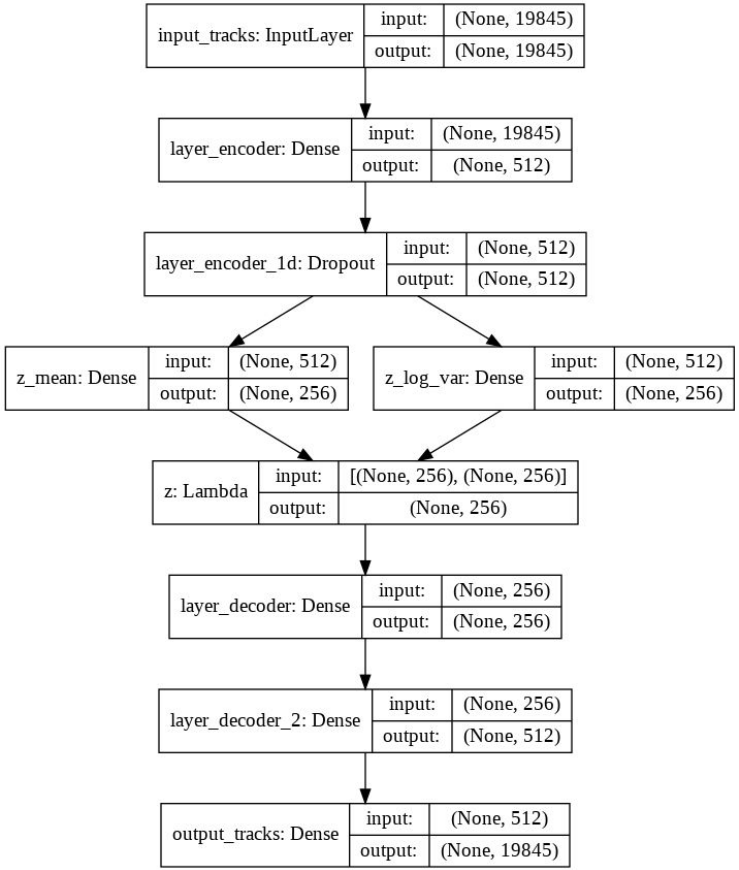




2. Variational Auto Encoder

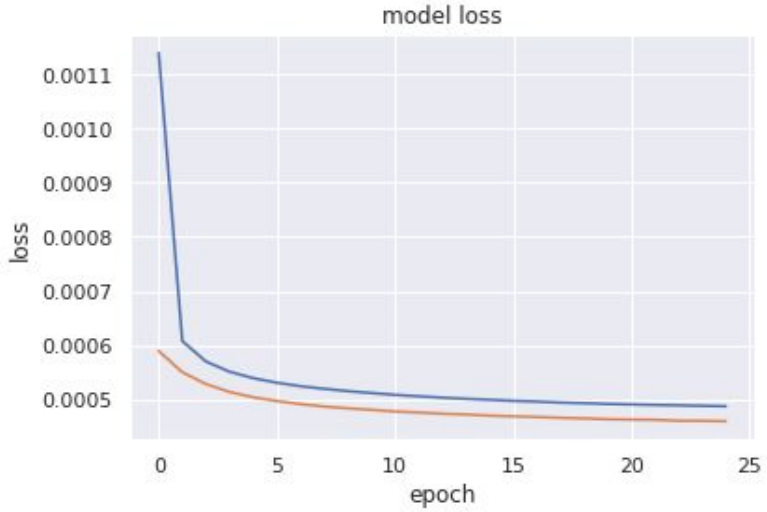
Collaborative Filter

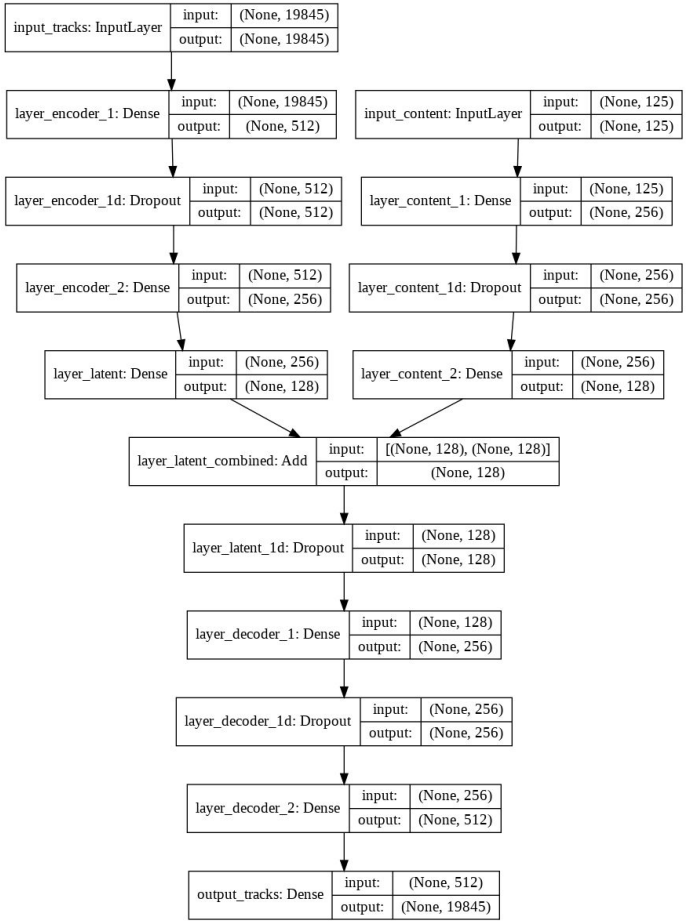




3. Hybrid Auto Encoder

including Content features

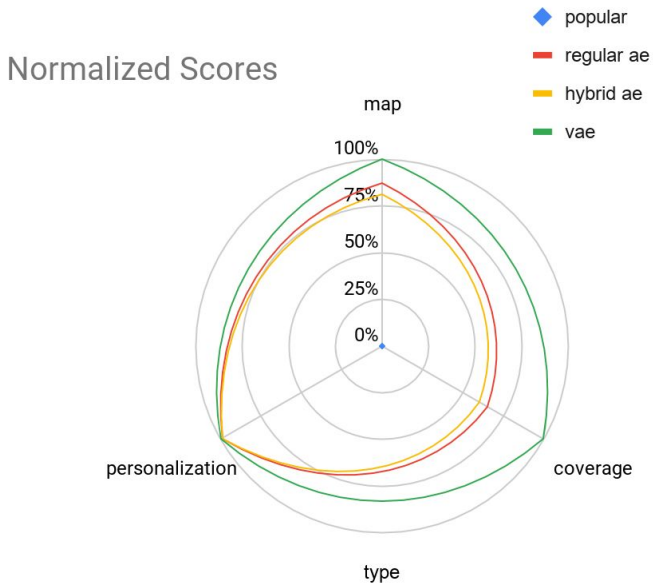




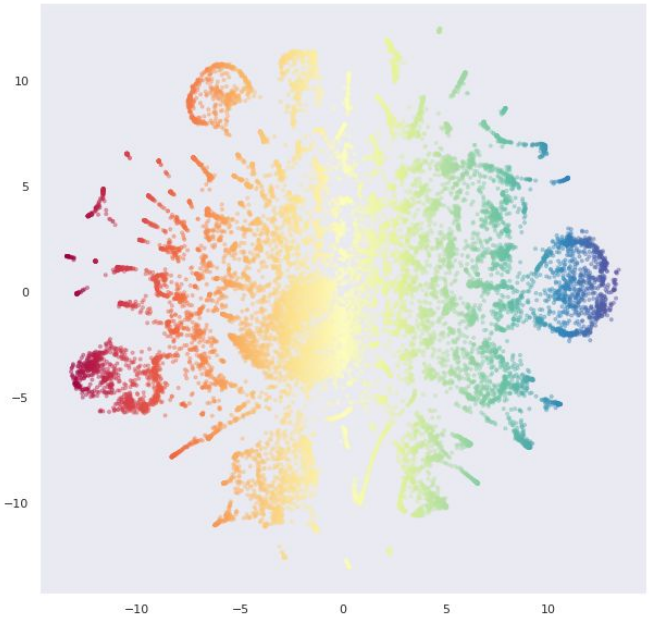
Evaluation

The Variational Encoder performed the best in terms of Mean Average Precision, Coverage and Personalization on a random test set, and all three autoencoders performed much better than a popular track baseline.

	Metric @ k = 10		
Model	MAP	Coverage	Personalization
Popular	3.25%	0.03%	0.00%
Regular AE	31.47%	2.83%	96.26%
Hybrid AE	29.67%	2.62%	95.88%
VAE	35.61%	4.30%	97.13%



Encoder Embeddings



Questions