

Neural Network Project Proposal

Movie Recommendation System using an autoencoder:

Autoencoders are a neural network family and are widely used for compressing data and denoising the corrupted data. The main goal is to create a hybrid recommender system that leverages both content and collaborative data. This approach tackles the content and collaborative data separately at first, then combines the efforts to produce a system with the best of both content and collaborative filtering. In order to create the hybrid model, we will ensemble the results of an autoencoder which learns content-based movie embeddings from tag data, and a deep entity embedding neural network which learns collaborative-based movie embeddings from ratings data.

Collaborative filtering: It recommends items based on the similarity measures between users and items.

Content based filtering: It is based on profile of the user's preference and the item's description.

Hybrid Filtering: It is the one that combines multiple recommendation techniques together (content and collaborative) to produce the output. The recommendation accuracy is higher in for hybrid systems than in content and collaborative filtering.

Application Domain: Neural Networks – Autoencoders

Problem: Using auto-encoders to build a movie recommendation System for Content based, collaborative and Hybrid filtering models.

Dataset: Movielens: The data set is obtained from <http://grouplens.org/>. They have a collection of ratings of movies from MovieLens website. The dataset contains 1,000,209 anonymous ratings of approximately 3,900 movies made by 6,040 MovieLens users.

Languages and Libraries: Python and libraries such as numpy, pandas, pickle, multiprocessing, keras, matplotlib, tensorflow

It sounds like you plan to train 2 autoencoders: one for the movie ratings, and one for the movie tags. I guess one AE will create a latent representation of users (ie. the "preference space"), and the other AE will create a latent representation of the movies (ie. the "genre space"). It's not clear to me how you are going to combine them, but it sounds like there is ample room for investigation. The dataset sounds interesting.

Let me know if you want to discuss it further. We can chat online.

References:

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2. Y. Liu, S. Wang, M. S. Khan and J. He, "A novel deep hybrid recommender system based on auto-encoder with neural collaborative filtering," in *Big Data Mining and Analytics*, vol. 1, no. 3, pp. 211-221, September 2018.
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4. Jiang, J., Xia, Y., & Shang, M., "A Fast Autoencoder-based Recommender", *IEEE International Conference on Systems, Man and Cybernetics (SMC)* (pp. 1732-1737), IEEE, October 2019.

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