Multi Model Approach For Item Prediction Using Item Based Filtering and CNN To Extract Image Features.

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Abstract

Motivation - End users can get more relevant recommendations which will help them with smarter shopping decisions. Help businesses design more accurate recommendations for end users and enhance user experience.

Experiments- Performed numerous experiments on CNN using all available options, In CBF to check performance, we experimented with different attributes.

Results- Successfully achieved 70% by annotating very less samples, CBF worked better when more attributes were used.

Data

- DeepFashion2 dataset which had clothing images with features like cloth_category, bounding box etc.
- Synthetic Dataset for User data that had features like usr_id, product review, no. of products bought etc.
- Dataset to identify patterns in clothing

Features

- Input features for recommender system
  - As part of product details, we used cloth pattern, product colour, cloth category, occlusion, zoom and viewpoint.
  - As part of the user details, we used user id, product reviews and number of products.

Model

BatchNorm2d(Conv2d(3, 15, kernel=(5,5))) =>
MaxPool2d(kernel=(2,2), stride=2)
BatchNorm2d(Conv2d(15, 30, kernel=(5,5))) =>
Dropout(p=0.25)
Linear(input=84270, output=512)
Linear(input=512, output=64)
Linear(input=64, output=8)

CNN → Clothing pattern

OpenCV → Color

Deepfashion2 → Category, Zoom-in, Occlusion, Viewpoint

User Data
- User id
- Product id
- Product Rating
- No. of products bought

Recommender System

Results

- The convolutional neural network model performed admirably, with an overall accuracy of 70%.
- All attributes contributed significantly to the recommendations

Experiments

- Changed the number of layers and adjusted all of the network's hyper parameters.
- We got different results using different layers (affine, batch norm, and dropout) and activation functions (Relu, Sigmoid, and Tanh).
- With varied batch sizes, SGD performed better than Adam and SGD with momentum.
- Patterns extracted with CNN and color data from OpenCV2 aided in the development of improved suggestions.
- When the attributes were combined with zoom-in, occlusion, and views, good recommendations were generated.

References

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2. Tan Pengshi Alvin, "A Content-Based Recommender for E-Commerce Web Store," *Medium*, Nov. 16, 2020. https://towardsdatascience.com/a-content-based-recommender-for-e-commerce-web-store-7554b5b73eac.