



National University
of computer and emerging sciences

Assignment1

SS511 Research Methodology

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MCS-1B

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1) **Wide & Deep Learning for Recommender Systems**

In this paper the author had tried to combine widely used linear product features transformation to memorization sparse matrices and Deep Learning low dimensional model for significant improvement on Google Play store app recommendation.

2) **Optimize Recommendation Engine for Marketing System in Healthcare CRM**

Researchers had to try to use medical data with patient profile data for finding current medical marketing processes and also try to build recommendation systems for the medical industry.

- * Caching mechanism is one of the main performance improvement technique

- * use segmentation common attributes to build up target groups out of patient profile

- * caching is presented from the technical perspective of a single entity that can be queried efficiently replacing a sequence of queries for traditional mechanisms.

- * Comparison of simulation results shows that caching mechanism improved the overall recommendation engine

performance

3) **A hybrid scalable collaborative filtering based recommendation system using ontology and incremental SVD algorithm**

They are using clustering methods to form the clusters of most similar users and items depending upon the preferences which significantly improve the scalability of CF. In the Online phase, use SVD to find the most relevant item to the new item. measured performance with Mean Absolute Error (MAE) and Root Mean Squared Error (RMSE) on realworld two datasets Movielens and Flixster dataset. It solved scalability, data sparsity and improvement of prediction and recommendation.

4) **Online Product Recommendation Engine**

Based on online sales and purchasing data they have created a recommendation engine using some most important features like userId, invoiceNum, dateTime, Qty, country, unit price and stock code. Previous work has used SVD of Matrix factorization for doing the recommendations. In this paper they used Restricted Boltzmann Machine (RBM) to decode the text into a latent

vector sequence, especially for end-to-end collaborative filtering. Multi-task Learning is just used to improve the efficiency of learning through RBM which will give better predictions based on user and items it had purchased. We have achieved a recommendation score of 94.4% to the customers with RBM method

5) Robust Latent Factor Analysis for Precise Representation of High-Dimensional and Sparse Data

In this paper researcher is trying to improve High Dimension Sparse matrices Loss Function and outliers problem. Previously other researchers were using Latent Factor Model with L2_norm loss but, In this experiment he has used Smooth L1_norm_Oriented latent factor (SL-LF) model. Its main idea is to adopt a smooth L1-norm rather than L2-norm to form its Loss. Both techniques significantly improve prediction accuracy in any latest-art-of-the-technology (Deep Neural Network) and also reduce outlier problems or its prediction efficiently new user missing matrices values for prediction based on model learning(learned from training).

6) Joint Matrix Factorization: A Novel Approach for Recommender System

"Collaborative filtering and sparseness of use-to-item rating techniques are the most popular methods that are used to calculate rating between users and items. As we know we have extensively learning frameworks available In Deep learning so he is also trying to solve this problem using hybrid techniques there is one popular probabilistic technique JOINT Matrix factorization (JMF). there are three components

1) modified multilayer crossing version of the factorization machine (MFM) to extract user latent factor on user behavior information.

2) Modified Long-Short-Term Memory (LSTM) named as bidirectional LSTM(BLSTM) - item latent factors of a document sequence from both front and back direction.

3) w tightly integrate BLSTM and MFM into probabilistic matrix (PMF to form JMF)

JMF extracts document data as well as user behavioral data as item vectors and user vectors. They tested the above mentioned techniques on five real world datasets and also compared the results with previous techniques. it significantly shows better results in their experiment."

7) Exploiting the emotional preference of music for music recommendation in daily activities

In our daily life activities we listen to music. This report showed how a person listens to different songs based on his mood and performs different activities. they proposed and offered "EmoMusic " application. as we know that cultural/Regional based people's preference of music always have been changed or different.through cross-cultural survey in China and UK and build emotional map between activities and music for the two countries. "EmoMusic" a novel emotion-based music recommendation service for daily activities which support visualisation and control of music emotion through an interactive interface. results and users feedback is literally amazing.

1) the relation between personal characteristics and emotional preference of music

2) incorporate emotional preference with collaborative or content based recommendation engines for good personalization with user-centric.

8) "A YouTube Dataset with User-level Usage Data: Baseline Characteristics and Key Insights"

"Youtube is such a big platform for videos where daily 2Million users active and 1 Billion hour content watched.we collect YouTube watch history data from 243 users spanning, A 1.5 year period. The dataset comprises of a total of 1.8 million

videos. We also show that our analysis

can be used by researchers to tackle a myriad of problems in the

general domains of networking and communication.We present

baseline characteristics and also substantiated directions to solve

a few representative problems related to local caching techniques,

prefetching strategies, performance of recommendation engine, variability, and application specific load provisioning. they are answering the 5 questions:

How often do users watch the same video again?

ii) Is a user's watch behaviour predictable?

iii) What role does YouTube's recommendation engine play in influencing users?

iv) How dynamic are user's video preferences? and

v) What are user's typical YouTube data consumption patterns?"

9) Neural Data-to-Text Generation with Dynamic Content Planning

"they proposed neural based Dynamic content Planning(NDP) to improve text generation. a reconstruction mechanism with a novel objective

function that can reconstruct the whole entry of the used data sequentially from

the hidden states of the decoder, which aids the accuracy of the generated text.

Empirical results show that the NDP achieves superior performance over the

state-of-the-art on ROTOWIRE dataset, in terms of relation generation (RG),

content selection (CS), content ordering (CO) and BLEU metrics. The human

evaluation result shows that the texts generated by the proposed NDP are better than the corresponding ones generated by NCP in most of time"

10) A comprehensive study on recommendation systems their issues and future research direction in e-learning domain

"This paper aims to survey existing recommendation techniques, their algorithms, discusses

their issues and provides research directions for developing smart E-Learning recommender systems. The author has used many traditional and nontraditional. such as mining technique, multi criteria decision making and the one which includes semantic knowledge in the process of recommendation system. new recommendation approaches making use of semantic technology such as ontology and resource description framework and shed some light on developing smart future recommendation systems."

11) A Framework for Paper Submission Recommendation System

They developed demo framework to construct an

effective recommendation system for paper submission. input data (the title, the abstract, and the list of possible keywords)

of a given manuscript, the system recommends the list of top relevant journals or conferences to authors. By using state-of-the-art

techniques in natural language understanding, we combine the features extracted with other useful handcrafted features. We used a deep learning based recommendation algorithm and also presented UI (user interface) for our paper submission. They proposed a new recommendation system for paper submission target venues. They also build models with data, process data, investigate the suitable algorithm, integrate into recommendation servers with appropriate architecture and ul.

12) Music genre classification and music recommendation by using deep learning

They have developed music recommendation engines using acoustic features extracted and those learned by novel neural networks have been utilised for music genre classification and music recommendation on a dataset. The proposed MusicRecNet model has shown improvement in terms of music genre classification, music similarity and music recommendation, they also added some dropout layer in CNN layer that improved significantly model performance. They plan to design a more comprehensive deep neural network model and add extra data models as an input in addition to using only melspectrogram.

13) Recommendation System using Content Based Visual Similarity

"they have built recommendation using cnn where user can upload their required product image and this model predict this image product then second model recommended top N products based on upload image and user profile. The recommendation can be done

on the bases of pixels, colors, shape, size and many more. The

mainly use of our project would be for the commercial site for the faster growth and the objects which can be visually represented can get the quicker knowledge to a client about the specific structure of the object. This System can be used to reduce the time for the client and get quicker access to the product which the client requires.”

14) Leveraging Side Information to Anime Recommender System using Deep learning

Anime movies complies with specific user's interests. They use a collaborative filtering based recommender system that only takes user account historic extractions and is able to provide recommendations. they collected 301K rating from 116K users and 9,444 anime works in which crawled from MyAnimeList, as well as users' and items' side information. Second, they proposed a deep learning hybrid approach for user and item. This model learns the embedding separately for users and anime, also using LSTM layer to extract information from long text features like synopsis. Results show with side information gain result 5% better than the SVD model.

15) SYSTEM AND METHOD FOR RECOMMENDATIONS IN UBIQUITOUS COMPUTING ENVIRONMENTS

They developed an ad hoc pervasive computer environment composed of an inference recommendation engine coupled to commodity devices and sensors that collect human activity and behavioral data. They are using machine learning and deep learning applications that analyze data to generate preference based recommendation to assist, inform and guide subjects interacting with a connected living space and their connected social network.

16) Context enabled Multi-CBR based Recommendation Engine for E-commerce

Case-Based Reasoning (CBR) with two CBRs (User context CBR and Product context CBR) to aid Recommendation engine (RE) and also RE further drives personalized negotiation and presentation strategies based on contextual information and ontology.

17) A Practice of Tourism Knowledge Graph Construction based on heterogeneous Information

Tourism-domain knowledge graph (TKG), we presented a systematic framework to build a TKG for Hinan. They collected data from tourism websites and struction it into triples and the data is multi-source and heterogeneous, which raises a great challenge for processing it. so we develop two pipelines of processing methods for semi-structured data and unstructured data respectively. they extracted semi-structured knowledge extraction and leverage deep learning algorithms to extract entities and relations from unstructured from two sources. They applied TKG in some

scenarios and provided detailed reference for the construction of other domain-specific knowledge graphs.

18) MoView Engine : An Open Source Movie Recommender

In this paper Author used a Deep learning Recommendation Engine with Output top 10 prediction items.

19) "Scalable online product recommendation engine based on implicit feature extraction domain"

"They build recommendation engine using different classifiers such as decision trees, ANN and extended trees. collaborative filtering technique is used to recommend products in which similarity measures are used along with efficient rough set leader clustering algorithm is making faster and accurate recommendation system. they effectively compared with conventional approaches.

They use click-stream data and predict the preferences for the products clicked by the customer Using ML and DL classifiers. for the products not clicked, CF is used to predict their preferences. Rough set leader clustering is used to cluster similar customers having interest in a specific brand. they used weighted average customers with clusters technique to predict preference of the products not clicked by users. We used F1 measured for evaluation. In cold-start problems they use proximity measures defined in the experiment to give low similarity among peer users."

20) A recommendation engine by using association rules

"They used Apriori and collaborative filtering approach for recommendation engine for ecommerce website they also developed this application using C# language. They also check accuracy and coverage. They developed this application within three week. results show that basket ratio increases with the recommendation engine.

they collected 25 days data with 87.74% coverage and 16.43% accuracy. processing time was 318 minutes for those data"