Jin Shang

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EDUCATION

Louisiana State University

Baton Rouge, LA

Ph.D. in Computer Science, GPA 3.7/4.0

Aug. 2016 – Present, Advisor: Dr. Mingxuan Sun

University of Science and Technology of China

Hefei, China

M.S. in Solid Mechanics

Sept. 2013 – Jun. 2016

University of Science and Technology of China

Hefei, China

B.S. in Theoretical and Applied Mechanics

Sept. 2009 – Jun. 2013

RESEARCH INTERESTS

My research focuses on developing computationally efficient machine learning as well as deep learning models and algorithms, with applications in recommender systems, time-series analysis, and natural language processing.

WORK EXPERIENCE

Particle Media Inc.

Mountain View, CA

Data Scientist Intern

May. 2019 - Aug. 2019, Mentor: Dr. Ke Zhou

- ○ **Outer Product based Deep Factorization Machine**: Present a novel outer product based deep Factorization Machine(FM) that achieves the highest improvements among all the state-of-art baselines on the Click-through Rate(CTR) prediction task. The model is tested on the **News Break** App(The No.1 news app on Android and No.2 on iOS in the 2nd quarter of 2019 reported by App Annie with 5M+ daily active users) ForYou datasets(10M instances per day). The area under the curve(AUC) is improved by 0.8% and the test logistic loss is decreased by 1.8%. We also carry a series of experiments to explain why outer product benefits the performance.
- ○ **Online Serving with Deep Structure Distance**: Present a fast approximate nearest neighbor(ANN) search method based on Hierarchical Navigable Small World(HNSW) algorithm with multilayer perceptron(MLP) distance to make the deep learning based FMs/FFMs applicable to the online serving system. To the best of our knowledge, this is the first MLP based distance implementation for fast ANN search algorithm. It's a **C/C++** implementation based on the **Intel MKL Library** to achieve fast serving speed.
- ○ **Evaluate the Current State-of-art Baselines**: Apply some recent deep learning based FMs/FFMs on the **News Break** App ForYou datasets(10M instances per day) and evaluate the results which are measured by AUC and test logistic loss, including Deep&Cross(Google'17), Self-attention FM(KDD'18), FNFM(Tencent'17 Competition No.1), DLRM(Facebook'19).

RESEARCH EXPERIENCE

Louisiana State University

Baton Rouge, LA

Research Assistant

Aug. 2016 - Present

- ○ **Geometric Hawkes process with Graph CNN**: Design a framework that integrates the graph convolutional recurrent neural network and Hawkes processes to model temporal events. The model can be applied to a collection of correlated temporal sequences of recurrent events, and it is able to correlate each sequence through graph embedding. We implement it in **Tensorflow**, using **IPTV**, **Reddit**, and **Yelp** (4GB) datasets. [AAAI'19]
- ○ **Local Low Rank Hawkes Process**: Propose a framework that integrates the kernel smoothing and the Hawkes process to model the temporal events of user-item interactions. In this model, we assume that the intensity parameter matrix is locally low-rank. With non-parametric kernel smoothing, each user-item pair can be simulated by a series of local matrix mappings. Also, design an efficient convex optimization algorithm to estimate model parameters and present a parallel algorithm to further increase the computation efficiency. We use **IPTV**, **Reddit**, and **Yelp** (4GB) datasets. [ICDM'18][KAIS'19]
- ○ **Demographic Inference via Transfer Learning**: Build a Transfer Matrix Factorization method to solve the problem of predicting user demographics using ratings in a target domain, through knowledge transfer from the source domain, in which users' ratings and the corresponding demographics are available. Also, develop an iterative algorithm for this optimization and theoretically show its convergence. Extensive experiments using real-world data sets demonstrate that our model can achieve higher classification accuracy, regardless of the amounts of labeled users, the sparsity of ratings, and the difference of demographic distribution in source and target domains. We use **MovieLens**, **Flixster** and **BookCrossing** datasets. [ICDM'18]

- ○ **Explainable Recommender System and Text Mining**: Build an explainable recommender system that can give explanations with rating predictions. For each user-item pair, the key idea is we integrate the explicit feature and implicit SVD lantent user and item features as the input to the two layer LSTM networks to generate a explanation for the user corresponding to the item. We also adopt reinforcement learning to enhance the framework such that the explanations are not only close to review as ground truth but also capable of increasing the accuracy of rating classification. We implement it in **Caffe**, using the **Amazon Review** (20GB) dataset.

- **University of Science and Technology of China**   Hefei, China
  Research Assistant   *Sept. 2013 - Jun. 2016*
  - ○ **Image Processing**: Improve the Temporal Phase Extraction Algorithm by investigating the window size of the Windowed Fourier Transform. Also construct the optical measurement platform for measuring small deformation.

- **National Center for Nanoscience and Technology**   Beijing, China
  Research Assistant   *Jul. 2012 – Aug. 2013*
  - ○ **Material Mechanics**: Investigate the morphology effect to the mechanical properties of the graphene oxide fillers in nanocomposites and utilize mathematical models to simulate experiment data.

- **RoboGame at University of Science and Technology of China**   Hefei, China
  Team Leader   *May. 2011 – Oct. 2011*
  - ○ **RoboGame Competition**: Develop a housekeeping robot which can make coffee and send it to people along the black line.

PROJECTS

- **Local GVAE for rating prediction**:
  Build a local Graph variational auto-encoder that can reconstruct the rating matrix more accurately. We use the **MovieLens** and **Flixster** datasets.

- **Generating head portrait by DCGAN**:
  First crawl some images from some website and use a face detection tool to generate head portrait images. Then use the DCGAN model to generate head portrait images. We crawl 120K images and implement it in **Tensorflow**.

PUBLICATIONS

- [5]: **Jin Shang** and Mingxuan Sun, **Local low-rank Hawkes processes for temporal user-item interactions**, in Knowledge and Information Systems (KAIS) (2019): 1-24.
- [4]: **Jin Shang** and Mingxuan Sun, **Geometric Hawkes processes with graph convolutional recurrent neural Networks**, in Proc. of the AAAI Conference on Artificial Intelligence (AAAI), Hawaii, USA, Jan. 2019.
- [3]: **Jin Shang** and Mingxuan Sun, **Local low-rank Hawkes processes for temporal user-item interactions**, in Proc. of the IEEE International Conference on Data Mining (ICDM), Singapore, Nov. 2018.
- [2]: **Jin Shang**, Mingxuan Sun and Kevyn Collins-Thompson, **Demographic inference via knowledge transfer in cross-domain recommender systems**, in Proc. of the IEEE International Conference on Data Mining (ICDM), Singapore, Nov. 2018.
- [1]: **Jin Shang**, Yuli Chen et al., **Effect of folded and crumpled morphologies of graphene oxide platelets on the mechanical performances of polymer nanocomposites**, in Polymer 68 (2015): 131-139.

AWARDS

- **ICDM'18**: ICDM 2018 Student Travel Award(ranked 2nd in list of student recipients in the U.S.)
- **AAAI'19**: AAAI 2019 Student Scholar and Volunteer Program
- **LSU'19**: Meritorious Award at 2019 LSU EECS Graduate Student Research Symposium

PROFESSIONAL SERVICES

- **Program Committee/Reviewer**: NeurIPS'19(subreviewer), EMNLP'19(subreviewer)

TEACHING ASSISTANT

- **CSC 1253**: Computer Science I with C++, Fall'16   **CSC 1254**: Computer Science II with C++, Spring'17

PROGRAMMING SKILLS

- **Languages**: Python, Matlab, C/C++, Java, SQL   **Deep Learning Framework**: Keras, Tensorflow, Caffe