Jin Shang
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Education

- **Louisiana State University** — Baton Rouge, LA
  Ph.D. in Computer Science, GPA 3.72/4.0 — *Aug. 2016 – Aug. 2020, Advisor: Dr. Mingxuan Sun*
- **University of Science and Technology of China** — Hefei, China
  B.S. in Theoretical and Applied Mechanics, M.S. in Solid Mechanics — *Sept. 2009 – Jun. 2016*

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, computer vision, computer graphics, and natural language processing.

Work Experience

- **DGene Inc.** — Baton Rouge, LA
  Senior Engineer — *March. 2021 - present*
  - **Image Inpainting**: Present an efficient method for gate hair removal in the film, combining deep learning methods and traditional techniques such as line segment detection(LSD), edge detection, Poisson image editing, and optical flow.
- **DGene Inc.** — Baton Rouge, LA
  Postdoctoral Researcher — *Sept. 2020 - March. 2021*
  - **Image Segmentation**: Present a novel foreground segmentation method with a high degree of accuracy for mask generation in 3D reconstruction, combining deep learning and traditional techniques such as joint bilateral up-sampling. **PyTorch** implementation for training and **LibTorch** implementation for testing. Achieving fast speed with high-resolution output by CUDA programming in the application.
  - **Non-rigid Registration**: Working on non-rigid registration for continuous meshes. Considering several energy terms such as rigid, non-rigid, smooth, local, and temporal based on the traditional Iterative Closest Point(ICP) method. Using Levenberg-Marquardt algorithm for fast optimization.
- **News Break App(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 - Aug. 2020*

- **List-wise Fairness Criterion**: Propose a novel list-wise fairness criterion for point processes, which can efficiently evaluate the ranking fairness in event prediction. We also present a strict definition of the unfairness consistency property of a fairness metric and prove that our list-wise fairness criterion satisfies this property. We use the Nelder-Mead simplex method to optimize the non-continues functions. We use **Portland**(Crime), **Dallas**(Crime), and **Houston** (disaster rescue) datasets. [KDD'20]
- **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. 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. We 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. 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.
- **Local GVAE for rating prediction**: Build a local Graph variational auto-encoder(GVAE) that can reconstruct the rating matrix more accurately. We use the **MovieLens** and **Flixster** datasets.

Publications

- [**6**]: **Jin Shang**, Mingxuan Sun and Nina S. N. Lam, **List-wise fairness criterion for point processes**, in Proc. of the ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (KDD), San Diego, USA, Aug. 2020.
- [**5**]: **Jin Shang** and Mingxuan Sun, **Local low-rank Hawkes processes for modeling 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, EMNLP'19, ACM Computing Surveys, KDD'20, ICPR'20, KDD'21

Skills

- Python, Matlab, C/C++, Java, SQL, CUDA, Visual Studio, OpenCV, PyTorch(LibTorch), Keras, Tensorflow, Caffe, Meshlab, PhotoShop