HEMING ZHANG

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EDUCATION

Washington University in St.Louis, St.Louis, MO *August 2021 - Present*
School of Medicine
Doctor of Philosophy, Biomedical Informatics and Data Science

Washington University in St.Louis, St.Louis, MO *August 2019 - May 2021*
McKelvey School of Engineering
Master of Science, Computer Science
Major GPA: 4.0/4.0

Central China Normal University, Wuhan, China *September 2015 - June 2019*
School of Information Management
Bachelor Degree, Information Management and Information Systems
Overall GPA: 87/100 (Ranked 1/44)

PAPERS

Predicting anti-cancer drug response with deep learning constrained by signaling pathways 🔗 </>
Heming Zhang, Yixin Chen, Fuhai Li
March 2021, Accepted to Frontiers in Bioinformatics

Investigate the relevance of major signaling pathways in cancer survival using a biologically meaningful deep learning model 🔗 </>
Jiarui Feng, **Heming Zhang**, Fuhai Li
October 2020, Accepted to BMC Bioinformatics

Predicting Tumor Cell Response to Synergistic Drug Combinations Using a Novel Simplified Deep Learning Model 🔗 </>
Heming Zhang, Jiarui Feng, Amanda Zeng, Philip Payne, Fuhai Li
July 2020, Accepted to AMIA Annual Symposium as Oral Presentation

PROJECTS

Deep Signaling Flow (Paper in progress) </> *May 2020 - Present*
Washington University School of Medicine in St. Louis, Supervisor: Fuhai Li

- We Leverage graph bidirectional convolution network to study the gene networks, where up-stream signaling-flow and the down-stream signaling-flow were mimicked by the trainable weights of network edges and then investigate complex mechanism of synergy (MoS). Compared with several other models like GAT, LSTM, our model GBCN is more interpretable and powerful in analyzing neighbor nodes contribution and critical paths in gene networks.

Kronos Incident - VAST Challenge </> *January 2020 - March 2020*
Washington University in St. Louis(WUSTL), Instructor: Alvitta Ottley

- Aimed to find the social network for Protector of Kronos and analyse the GPS track patterns for company GAStech to find out the critical person responsible for kidnapping incident
- Wrote front-end with framework **Vue**, **Semantic UI**, and drew dynamic gps map with **d3.js**, interacted with back-end **Flask** through **json** and implemented sql basic functions through ORM - **sqlalchemy**

Topics Evolution in Quora </> *December 2018 - May 2019*
Central China Normal Universtiy(CCNU), Supervisor: Ye Chen

- Won "Excellent Capstone Project"
- Aimed to analyze the users' interests and their evolution characteristics of on the social Q&A Community with our improved algorithms from **LDA** and **BTM**, so as to guide the personalized recommendation and advertising on Quora Film and Television topics.
- Divided and cleaned the data obtained by crawler according to the period, and then combined the user behaviour data to set weight for the question and answer text within that period.
- Improving BTM algorithm with consideration of text weight, we used new algorithm to conduct topic mining and analyzed the trend of topic evolution, which greatly improved the accuracy of topic mining.

PROFESSIONAL EXPERIENCE

Research Assistant *February 2020 - Present*
Washington University School of Medicine in St. Louis, St. Louis, MO

- Leverage computational and deep learning models to analyze cells signaling interaction and predict corresponding synergistic drug scores

Teaching Assistant of Introduction to Machine Learning *January 2020 - May 2020*
Washington University in St. Louis, St. Louis, MO

- Helped students about materials on theory of machine learning and build algorithms on logistic regression, bagging&random forests, adaboost etc.

Visiting International Research Students (VIRS) *Summer 2018*
University of British Columbia, Vancouver, BC

- Wrote python API with softmax, logistic and CNN machine learning algorithms and helped with bootstrapping the deployment of Biscotti on PyTorch with multiple dataset to generate baselines.

Research Assistant *September 2017 - October 2017*
Chinese Academy of Sciences, Beijing, China

- Cleaned GPS track data of 12,138 taxis, implemented ST matching algorithm to form road sections, and formed a traffic flow distribution for 96 time sections of 127,049 road sections in Beijing.
- Used NMF method to reduce data dimensions and used k-Mean to cluster data with 50 categories
- Insert Poisson distribution model into the system to achieve anomaly detection and eventually obtain detection accuracy rate of 85%

COURSE WORK

Selected Undergraduate Courses

- Game Theory - *Prof. Qingxing Dong*
- Operating System - *Prof. Yi Xiao*
- Optimization Models and Software Tool - *Prof. Qingxing Dong*
- Data Mining - *Prof. Xiang Liu*
- Social Network Analysis - *Prof. Zhongyi Wang*
- Theory and Technique in Search Engine - *Prof. Zhongyi Wang*
- System Engineering - *Prof. Jing Chen*
- Operation Research - *Prof. Qingxing Dong*

Master Courses

- CSE 361S Introduction to System Software - *Prof. Angelina Lee*
- CSE 417T Introduction to Machine Learning - *Dr. Henry Chai*
- CSE 503S Rapid Prototype Development and Creative Programming - *Prof. Todd Sproull*
- CSE 502N Data Structures and Algorithms - *Prof. Cytron & Prof. Cole*
- CSE 517A Machine Learning - *Prof. Marion Neumann*
- ESE 520 Probability and Stochastic Process - *Prof. Vladimir Kurenok*
- CSE 557A Advanced Visualization - *Prof. Alvitta Ottley*
- ESE 526 Network Science - *Prof. Arye Nehorai*
- CSE 541T Advanced Algorithms - *Prof. Sanjoy Baruah*
- CSE 587A Algorithms for Computational Biology - *Prof. Michael Brent*
- CSE 515T Bayesian Methods in Machine Learning - *Dr. Henry Chai*

ACADEMIC ACHIEVEMENTS

Awards

- 2018, Shuren Scholarship, Top 20% CCNU - *¥2000*
- 2018, Globalink Research Internship Award, Top 0.5%, Mitacs - *$4500*
- 2018, Overseas Exchange Scholarship, CCNU - *¥5000*
- 2017, Boya Silver Scholarship, Top 2.5% CCNU - *¥3000*
- 2016, Boya Scholarship, Top 10%, CCNU - *¥2000*

Achievements

- 2019, Outstanding Graduate, Top 20%, CCNU
- 2017, Grand Prize, The 11th Hubei Challenge Cup College Extracurricular Academic Scientific and Technological Works Competition, Top 3%, Hubei provincial department of education
- 2017, Honorable Mention, Mathematical Contest in Modeling and Interdisciplina (MCM/ICM), Top 30%, COMAP
- 2016, Admitted to the "Boya" Plan with excellent academic score and activities, Top 2%, CCNU

PRACTICAL SKILLS

Programming Languages: Python, MATLAB, R, C, JavaScript, Java, Assembly
Framework: PyTorch, Flask, Vue, Semantic UI
Environment: Linux, Mac, Windows