Xu Min ***Curriculum vitae*** **(version: 03/07/2020)**

CONTACT INFORMATION

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RESEARCH INTERESTS

Healthcare Informatics, Bioinformatics, Deep Learning, Machine Learning, Computer Vision

Currently, I focus on applying artificial intelligence (AI) or machine learning methods to healthcare data analysis. In particular, I am interested in data representation for Electronic Health Records (EHRs), time series clinical data, and medical images, using either deep learning techniques or statistical models. I am committed to developing models with robustness, interpretability, safety and trustability for various healthcare scenarios.

WORK EXPERIENCE

Research Scientist at IBM Research China 2019.07-now

- I joined IBM after I got my Ph.D. from Tsinghua University. I am devoted to AI research in healthcare. As a new employee so far, I am the author of four patents rated as search, and the author of two research papers submitted to AAAI 2020 and IJCAI 2020. I also paticipated in multiple projects, including the CMS AI Health Outcomes Challenge .

Algorithm Engineer Summer Intern at Hiscene 2015.07-09

- In this three-month internship, I worked as an algorithm engineer helping to design algorithms for automatic driving. Specifically, I applied recent advances in deep learning, including R-CNN, Fast R-CNN, in vehicle detection. The proposed algorithm achieved good performance on the datasets collected by the vehicle traveling data recorder.

EDUCATION

Cornell University, New York, USA

Oct. 2017 - Oct. 2018, Visiting Scholar, Weill Cornell Medical College,

- Research Topic: *a) Hospital readmission prediction using electronic health records data. b) Skin lesion analysis on imaging data for Melanoma disease*
- Advisor: Fei Wang, Ph.D.

Tsinghua University, Beijing, China

Sep. 2014 - June 2019, Ph.D., Computer Science and Technology,

- Research Topic: *Data Representation in Biomedical Analysis*
- Advisor: Ting Chen, Ph.D.

Huazhong University of Science and Technology, Wuhan, China

Sep. 2010 - June 2014, B.Eng., Electronic Information Engineering,

PUBLICATIONS

1. Yiqin Yu*, **Xu Min***, Shiwan Zhao, Jing Mei, Fei Wang, Dongsheng Li, Kenny Ng and Shaochun Li. "Dynamic Knowledge Distillation for Black-box Hypothesis Transfer Learning". Submitted to IJCAI 2020 (*equal contribution).

2. **Xu Min**, Bin Yu, and Fei Wang. "Predictive Modeling of the Hospital Readmission Risk from Patients' Claims Data Using Machine Learning: A Case Study on COPD". In: *Scientific Reports* **9**, Article number: 2362 (2019).

3. Wanwen Zeng, **Xu Min**, Rui Jiang. EnDisease: a manually curated database for enhancers-diseases associations. In: *Database*, Volume 2019, 1 January 2019.

4. Xi Zhang, Dandi Chen, Yongjun Zhu, Chao Che, Chang Su, Sendong Zhao, **Xu Min**, and Fei Wang. "The NIPS'17 Competition: A Multi-View Ensemble Classification Model for Clinically Actionable Genetic Mutations." arXiv preprint arXiv:1806.09737. 2018.

5. Yujuan Feng, **Xu Min**, Ning Chen, Hu Chen, Xiaolei Xie, Haibo Wang, Ting Chen. "Patient Outcome Prediction via Convolutional Neural Networks based on Multi-Granularity Medical Concept Embedding". In: *IEEE International Conference on Bioinformatics and Biomedicine (BIBM)*. 2017.

6. **Xu Min**, Wanwen Zeng, Ning Chen, Ting Chen, Rui Jiang. "Chromatin Accessibility Prediction via Convolutional Long Short-Term Memory Networks with k-mer Embedding". In: *Intelligent Systems for Molecular Biology and the 16th European Conference on Computational Biology (ISMB/ECCB)*. 2017.

7. **Xu Min**, Ning Chen, Ting Chen, Rui Jiang. "DeepEnhancer: Predicting Enhancers by Convolutional Neural Networks". In: *IEEE International Conference on Bioinformatics and Biomedicine (BIBM)*. 2016.

8. **Xu Min**, Xiaolei Xie, Haibo Wang, Ning Chen, Ting Chen. "Medical Concepts Embedding and Visualization". In: *Translational Bioinformatics Conference (TBC)*. 2016.

9. **Xu Min**, Yu Zhou, Shu Liu, Xiang Bai. "Real-Time Object Tracking Via Optimal Feature Subspace". In: *IEEE International Conference on Image Processing (ICIP)*. 2014.

Projects and Experience

Hospital Readmission prediction based on Electronic Health Records 2017 - 2018

- Chronic Obstructive Pulmonary Disease (COPD) is a prevalent chronic pulmonary condition that affects hundreds of millions of people all over the world. We conduct a systematic study on developing different types of machine learning models, including both deep and non-deep ones, for predicting the readmission risk of COPD patients. We evaluate those different approaches on a real world database containing the medical claims of 111,992 patients from the Geisinger Health System from January 2004 to September 2015.

Hospitalization Expenses Prediction based on Electronic Health Records 2016 - 2017

- Electronic Health Records hold a tremendous amount of information about patients and diseases. In this project, I proposed a method using Skip-gram model to learn low-dimensional representations for thousands of medical concepts, including diseases and procedures. Experiments showed that our representations could group related concepts well. We trained a regression model to predict hospitalization expenses on basis of this representation and achieved good performance on test set.

DNA Sequence Analysis 2016 - 2017

- DNA sequences have functional regions, such as enhancers, promoters, etc., which can be identified by sequence information. To classify these functional regions against background regions, I proposed a method based on Convolutional Neural Network (CNN). The method achieved great performance and found some interesting

motifs. Then, I further improved this method by adding Long Short-Term Memory (LSTM) networks and k-mer embedding which presented a better performance.

Video Tracking Algorithm Based on Online Multiple Instance Learning 2012

- This project was sponsored by Huazhong University of Science and Technology. The goal was to design an efficient algorithm based on online multiple instance learning. Our team had three undergraduates in which I was the leader. With an abundant review on literatures, we creatively designed a new algorithm and implemented it using MATLAB.

AWARDS

Challenge Awards

- NIPS 2017 Competition Track entitled Classifying Clinically Actionable Genetic Mutations. Rank 1st out of more than 1,300 solutions.
- ISIC 2018: Skin Lesion Analysis Towards Melanoma Detection. Rank 14th out of 112 unique solutions in task 1: Lesion Boundary Segmentation. Rank 9th out of 26 unique solutions in task 2: Lesion Attribute Detection.

Travel Awards

- ISMB/ECCB 2017, Prague, Czech Republic July 2017
- IEEE BIBM 2016, Shenzhen, China Dec 2016

Student Awards — Tsinghua University

- State Scholar Fund by China Scholarship Council (CSC) June 2017
- Schlumberger Scholarship Oct 2017
- Schlumberger Scholarship May 2016
- Guanghua Scholarship Oct 2015

Student Awards — Huazhong University of Science and Technology

- National Scholarship Oct 2012
- Outstanding Students Pacemaker (top 20 student) Dec 2012
- Outstanding Student Scholarship Oct 2011

COMPETITIONS

Mathematics

- The 2011 Chinese Mathematics Competition First prize in Hubei Province

Mathematical Modeling

- The 2013 Mathematical Contest in Modeling Meritorious Winner
- The 2012 Chinese Undergraduate Mathematical Contest in Modeling Second prize
- The 2012 Central China Undergraduate Mathematical Modeling First prize

HARDWARE AND SOFTWARE SKILLS

Computer Programming:

- Python, C, C++, MATLAB, Bash, make, git, latex, html, markdown and others
- Keras, Theano, Tensorflow, Lasange, Caffe, scikit-learn and others