

Jinghe Zhang

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Information Homepages:

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Research **Machine Learning**, e.g., representation learning, metric learning;

Interests **Machine Learning Applications**, e.g., data mining, predictive modeling, recommender systems, health and medical informatics

Education **University of Virginia**

Ph.D., Systems & Information Engineering

GPA: 3.91/4.0

08/2013 - 05/2017 (expected)

Charlottesville, VA

Binghamton University, State University of New York

Master of Science, Industrial & Systems Engineering

GPA: 3.76/4.0

08/2011 - 05/2013

Binghamton, NY

Hebei University of Technology

Bachelor of Science, Industrial Engineering

GPA: 3.65/4.0

09/2007 - 06/2011

Tianjin, China

Technical **Programming:** Python, Java, R, Matlab, SQL, HTML, CSS, JavaScript, Hadoop, Spark

Skills **Operating Systems:** Windows, Unix/Linux

Tools: Latex, Git, SVN, Vim, Emacs, Arena, Simio, ExpertFit, Minitab, NetLogo

Languages: English and Chinese

Experience **Graduate Research Assistant**

Department of Systems & Information Engineering, University of Virginia

08/2013 - Present

High-risk Patients Retrieval using Electronic Health Data

02/2015 - Present

- Perform representation learning on patients' medical histories to construct feature vectors with reduced information loss than using common methods
- Conduct metric learning on the representation of patients' medical data and discovered informative features for clinical use, such as transitions from unrelated diagnoses of anxiety/depression to potentially related ones
- Train well-established classifiers, such as support vector machine, linear discriminant analysis, random forest, k nearest neighbors, etc., to discriminate patients with and without anxiety/depression
- Evaluate the proposed framework by the early detection of anxiety/depression on new patients and the preliminary results achieved a 1%–4.5% higher accuracy compared to baseline methods
- Communicate with professors and MDs to define research problems, to explore potential methodologies, and to gather feedbacks regularly from them

Predictive Modeling on Hyperlactatemia Sepsis

05/2015 - Present

- Analyze the characteristics of different ICU patient populations extracted from the MIMIC-II database, including mortality rates, the usage of antibiotics and intravenous fluids, and timing of severe sepsis, etc.
- Examine different definitions of severe sepsis and its correlation with ICU, hospital, and 30-day mortalities
- Build predictive models on a patient's likelihood of developing severe sepsis using statistical approaches (e.g., Cox proportional hazards model and logistic regression) and machine learning algorithms (e.g., support vector machine and random forest)
- Predict the real-time probability of lactate clearance considering a patient's demographic and physiological characteristics and clinical interventions
- Teamworked with professors, MD, data scientists, and other colleagues from medical and engineering backgrounds and lead weekly meetings to deliver presentations and to conduct discussions

Text Mining on Restaurant Reviews from Yelp

03/2015 - 04/2015

- Preprocessed 1 million restaurant reviews crawled from Yelp with tokenization, stemming, stop word removal, and normalization, to construct N-gram vector space representation for text documents and computed similarities among different documents
- Implemented statistical language models with maximum likelihood estimation and smoothing; generated text documents from language models and evaluated the constructed N-gram language models
- Developed a text categorization system, including feature selection, Nave Bayes and KNN classifier, to distinguish positive and negative restaurant reviews
- Evaluated the text categorization system with 10-fold cross-validation and performed parameter tuning to explore the best configuration of KNN with brute force and random vector projection, respectively.

Measuring Care Variation among Congestive Heart Failure Patients

09/2013 - 08/2014

- Applied vector space models to measure the similarities between congestive heart failure patients based on their medication and procedure orders
- Utilized clustering (K-means and co-clustering using bipartite graph) and topic modeling methods to detect patient subgroups within the congestive heart failure population according to medication orders, diagnostic and demographic information
- Teamworked with software engineers to implement the above models using Spark on Hadoop clusters with significantly decreased computation time

Web Crawler and Document Analysis & Retrieval

09/2014 - 11/2014

Spam Filtering Using Machine Learning Approaches

09/2013 - 11/2013

Graduate Teaching Assistant

01/2014 - 05/2014

SYS6016 Machine Learning, University of Virginia

Graduate Research Associate

08/2011 - 05/2013

Watson Institute for Systems Excellence, Binghamton University
Quality Management Department, United Health Services (UHS)

Predictive Modeling on 30-day Hospital Readmission

04/2012 - 05/2013

- Collected clinical and demographic data and identified significant risk factors in readmission using statistical analysis
- Accomplished predictive models using Nave Bayes, particle swarm intelligence-based support vector machine (SVM), random forest, and ensemble neural networks, and improved average prediction accuracy by 22% to assist clinicians in identifying high-risk patients

Selected Publications

1. **Jinghe Zhang**, Haoyi Xiong, Yu Huang, Hao Wu, Kevin Leach, and Laura E. Barnes. *M-SEQ: Early Detection of Anxiety and Depression via Temporal Orders of Diagnoses in Electronic Health Data*, 2015. *IEEE International Conference on Big Data (IEEE BigData 2015)*. Oct 29 - Nov 1. Santa Clara, CA.
2. Bichen Zheng, **Jinghe Zhang**, Sang Won Yoon, Sarah S. Lam, Mohammad Khasawneh, and Srikanth Poranki. Predictive modeling of hospital readmissions using metaheuristics and data mining, 2015. *Expert Systems With Applications* vol.42, no.20, pp 7110-7120.
3. **Jinghe Zhang**, Sarah S. Lam, and Srikanth Poranki. A Classification Model for Hospital Readmission Using Combined Neural Networks, 2013. *Proceedings of Industrial and Systems Engineering Research Conference (ISERC)*. May 18-22. San Juan, PR.
4. **Jinghe Zhang**, Sang Won Yoon, Mohammad Khasawneh, Srikanth Poranki, and Krishnaswami Srihari. A Readmission Prediction Model Using Swarm Intelligence-based Support Vector Machine, 2013. *Proceedings of Industrial and Systems Engineering Research Conference (ISERC)*. May 18-22. San Juan, PR.
5. Chanchal Saha, **Jinghe Zhang**, Sang Won Yoon, Mohammad Khasawneh, and Krishnaswami Srihari. Selection and Matching of Kidney Donor and Recipient Using Fuzzy Techniques and Analytic Hierarchy Process, 2012. *Proceedings of Industrial and Systems Engineering Research Conference (ISERC)*. May 18-22. Orlando, FL.

Honors & Awards

Graduate Research Scholarship, University of Virginia, 2014-2016
Commonwealth Fellowship, University of Virginia, 2013-2014
Graduate Research Scholarship, Binghamton University, 2011-2013
National Aspiration Scholarship, China's Ministry of Education, 2009