Yong Zhuang

Contact Information	yong.zhuang001@umb.edu 617-763-8919 https://yong-zhuang.github.io/

Research Interests	Machine Learning, Big Data Analysis, Feature Selection on Big Data, Spatio-temporal Data Analysis, Time Series Prediction, Chaos Theory

Education

University of Massachusetts, Boston, Boston, MA

Ph.D., Computer Science, GPA: 3.906 — Sep. 2016 - Dec. 2021

M.S., Computer Science, GPA: 3.923 — Sep. 2014 - May 2016

Harbin Engineering University, Harbin, China

B.E., Computer Science, GPA: 3.68 — Sep. 2001 - June 2005

Highlighted Experience

Research Experience

- 5 predictive models.
- 5 open source docker projects.
- 5 peer reviewed publications.

Teaching Experience

- 4 semester as the instructor to counsel disadvantaged students to succeed in their compulsory courses such as Theory of Computation, Data Structures and Algorithms.
- 5 semesters as the teaching assistant in AI, Big Data Analysis, and Introduction to Computing
- 1 online tutoring material on time series forecasting

Industry Experience

- 5 years full-time working experience
- 2 semesters NSF Graduate Research Internship during Ph.D. study

Award

- Oracle Doctoral Research Fellowship in fall 2016, fall 2018
- The Randall Gates Malbone Fellowship in May. 2019

Selected Research Experiences

Feature Selection on Big Spatio-temporal Data

Given a large-scale Spatio-temporal database, effectively and efficiently identifying strongly related features and removing the irrelevant or less important features with respect to a target variable is a critical and challenging issue in many fields. In this work, we collaborated with scientists in climate science and water diplomacy in the Department of Civil and Environmental Engineering at Tufts University to design a new Information Theory-Based Feature Selection algorithm, Galaxy, for long lead extreme precipitation forecasting.

Deep Learning on Big Spatio-temporal Data

As the number, volume, and resolution of Spatio-temporal data sets increase rapidly, Spatio-temporal dependencies of features become highly complex and hard to capture. With strong hierarchical feature learning capabilities in both spatial and temporal domains, deep learning has become a promising method to solve this task. In this work, we collaborated with scientists in the School of Criminology and Justice Studies at UMASS Lowell to design a Spatio-temporal recurrent neural network to forecast crime hot spots.

Predicting the Long-Term Behavior of Chaotic Systems
Chaotic behavior is found in many nonlinear dynamical systems, such as climate dynamics, weather prediction, and the space-time dynamics of virus spread. A reliable solution for these systems must handle their complex space-time dynamics and sensitive dependence on initial and boundary conditions. In this work, We collaborated with a research team at Tufts University to propose a new recurrent architecture, Error Trajectory Tracing(ETT), and an accompanying training regime, Horizon Forcing, for predicting chaotic systems.

Teaching Experience

Instructor

CS Seminar — Fall 2017, Spring, Summer, and Fall 2018

- Deliver a 60-minute presentation weekly, covering the materials in the computer science courses: Intermediate Computing with Data Structures (CS210), Advanced Data Structures and Algorithms (CS310), and Introduction to the Theory of Computation (CS420).
- Provide practical guidance and answer specific questions.
- Previewing upcoming course content, assignments and predicting future challenges.

Mentor

CS187: Science Gateway Seminar — Spring 2017

- Design a semester-long in-class project to expose undergraduate students to research methods.
- Closely advised students on this project, after which they presented their research posters at UMASS Boston's symposium.

Teaching Assistant

CS110: Introduction to Computing — Fall 2021
CS670: Artificial intelligence — Fall 2017, Spring 2019
CS697: Big data analysis — Fall 2016, Spring 2018

- Design semester-long in-class projects.
- Closely advised students on these projects.
- Grade students' homework and projects.
- Provide several lectures for each course.
- Hold Q&A sessions through office hours twice a week

Grant Writing Experience

Have experience writing two federal agency grants projects with my advisor,
Total Amount: $355,581

- Project 1 is about physics-guided deep model for flooding forecasting.
- Project 2 is about symbolic expression exploring using deep learning.

Industry Experience

National Science Foundation Intern — Jun. 2019 - Nov. 2019
Radial Analytics — *Concord, MA*

- With the support from **National Science Foundation(NSF)**, I joined Radial Analytics to collaborate with a large health care system to use machine learning technology to help hospital systems and physician networks provide patients with more effective care to meet their individual needs.
- Applied Natural Language Analysis and causal-based feature selection on clinical data to choose the most valuable features.
- Created deep models to identify palliative care candidates with an improving average precision by 17%.

Software Engineer Mar. 2008 - Mar. 2013
Liaoning Triexcel Co., Ltd. *Anshan, China*

- Led front-end and back-end development of a GIS-based geological hazard management platform for data collection, data synchronism, risk scoring, and investigation planning.
- Led front-end and back-end development of an after-sales service management platform to rationalize the after-sale service process and Increase efficiency and customer satisfaction.
- Spearheaded product development of a remote solution to provide secure web remote control and system update services for terminals of Bank of Anshan.

Selected Peer Reviewed Publications

1. **Yong Zhuang**, Matthew Almeida, Wei Ding, Patrick Flynn, Shafiqul Islam, and Ping Chen. "Widening the Time Horizon: Predicting the Long-TermBehavior of Chaotic Systems with Error-Trajectory Tracing and Horizon Forcing"
   IEEE Transactions onPattern Analysis and Machine Intelligence (TPAMI), [under 2nd review]

2. **Yong Zhuang**, David Small, Xin Shu, Kui Yu, Shafiqul Islam, and Wei Ding. "Galaxy: Towards Scalable and Interpretable Explanation on High-dimensional and Spatio-Temporal Correlated Climate Data"
   IEEE International Conference on Big Knowledge (ICBK), Singapore, Nov. 2018

3. **Yong Zhuang**, Matthew Almeida, Melissa Morabito, and Wei Ding. "Crime Hot Spot Forecasting: A Recurrent model with Spatial and Temporal Information"
   IEEE International Conference on Big Knowledge (ICBK), Hefei, China, Aug. 2017

4. **Yong Zhuang**, Kui Yu, Dawei Wang, and Wei Ding. "An evaluation of big data analytics in feature selection for long-lead extreme floods forecasting"
   IEEE International Conference on Networking, Sensing, and Control (ICNSC), Mexico City, Mexico, Apr. 2016

5. **Yong Zhuang**, and Wei Ding. "Long-lead prediction of extreme precipitation cluster via a spatio-temporal convolutional neural network"
   International Workshop on Climate Informatics(CI), Boulder, Colorado, Oct. 2016

6. Matthew Almeida, **Yong Zhuang**, Wei Ding, Scott Crouter, and Ping Chen. "Mitigating Class-Boundary Label Uncertainty to Reduce Both Model Bias and Variance"
   ACM Transactions on Knowledge Discovery from Data(TKDD) 15.2 (2021): 1-18

Professional Services

Program Committee Member

- The SIAM International Conference on Data Mining (SDM), 2022
- AAAI Conference on Artificial Intelligenceg (AAAI), 2021, 2022
- The ACM International Conference on Information and Knowledge Management (CIKM), 2019

Reviewer for Journal Manuscript Submissions

- IEEE Transactions on Knowledge and Data Engineering (TKDE), 2017
- ACM Transactions on Knowledge Discovery from Data (TKDD), 2018 - 2019
- Knowledge and Information Systems (KAIS), 2015 - 2017
- Applied Computing and Informatics (ACI), 2018
- International Journal of Information Technology and Decision Making (IJITDM), 2017
- Journal of Ambient Intelligence and Smart Environments (JAISE), 2017

- Spatial Algorithms and Systems (TKDE), 2017

Reviewer for Conference Manuscript Submissions

- International Conference on Machine Learning (ICML), 2015
- Knowledge Discovery and Data Mining (KDD), 2016 - 2021
- American Association for Artificial Intelligence (AAAI), 2016, 2021
- The IEEE International Conference on Data Mining series (ICDM), 2016 - 2018
- ACM International Conference on Information and Knowledge Management (CIKM), 2019 - 2020
- SIAM International Conference on Data Mining (SDM), 2021
- Pacific Asia Conference on Knowledge Discovery and Data Mining (PAKDD), 2016, 2018
- European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases (ECML-PKDD), 2016 - 2017
- The ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems (ACM SIGSPATIAL), 2016
- International Conference on Networking, Sensing and Control (ICNSC), 2016
- International Workshop on Climate Informatics (CI), 2016

University Services

The College of Science and Mathematics(CSM) Faculty Senate

Assistant — UMASS Boston, Fall 2016

- Design a web application for CSM faculties to manage meeting agendas and minutes, proposals, and documents.

AI Association

Co-organizer — UMASS Boston, Fall 2019

- We hold talks, seminars, workshops, and fun activities in AI.
- Web page: https://ai-umb.github.io/

Tech-writing Seminar

Organizer — UMASS Boston, Fall 2021

- A seminar where students share good sentences from essays or articles, practice, and improve scientific writing skills.
- Web page: https://yong-zhuang.github.io/tech-writing

Activities

Microsoft's AI for Earth Summit

Member — Redmond, WA, Oct 2016

The Eighth Annual "Science Engineering Technology in the CITY"

instructor — Boston, MA, Apr 2016

- Give two demonstrations, "Image Printing" (a program that allows computers to copy paintings) and "Style Transfer" (a program that can convert photos into paintings)

Tech Savvy

Core Member & Instructor — Boston, MA, Jun 2016, 2017

- Worked with Boston University, Harvard, MIT, etc. to organize a one-week Tech-Savvy camp to prompt STEM education among Boston intermediate school students.
- Organized interactive games and talks to show these intermediate school girls what other people find valuable in the field of CS so they can have an accurate picture of what the field is.

Technical Skills

- **Language:** Python, Java, ASP.NET, C#, PHP, JavaScript
- **Machine Learning Libraries:**, Tensorflow, Keras, Pytorch, Matplotlib, Pandas, Numpy, scikit-learn, seaborn
- **Database:** Oracle, Access, Microsoft SQL Server, MySQL

- **ArcGIS:** Map, Server, SDE and Desktop
- **Developer tools:** Git, Docker, VS Code, Visual Studio, Eclipse
- **Advanced skills** Design Patterns, MVC, Jquery, AJAX

AWARDS

Honors and Awards

- Oracle Doctoral Research Fellowship Award from the Collage of Science and Mathematics at UMass Boston, Jun. 2016, 2018
- The Randall Gates Malbone Fellowship in Mathematics and Computer Science, May 2019
- National Science Foundation (NSF) Graduate Research Internship Program, Jun. 2019
- Microsoft's AI for Earth summit Travel Grant, Redmond, WA, Sep., 2018
- Climate Informatics Workshop Travel Grant, Boulder, Colorado, Aug. 2016