Xiaoyu (Lesley) Zhu

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EDUCATION

Carnegie Mellon University − School of Computer Science Pittsburgh, PA
Master of Science in Artificial Intelligence and Innovation May 2021 GPA: 3.9/4.0

Beijing Jiaotong University / Rochester Institute of Technology Beijing, China
Bachelor of Science in Management Information Systems May 2019
Commencement Speaker & Highest Honor & Outstanding Alumni GPA: 94.6/100 Ranking: 1/110

PRE-PRINTS & PUBLICATIONS

Zhu, X., Liang, J., Hauptmann, A. (2020). *MSNet*: *A Multilevel Instance Segmentation Network for Natural Disaster Damage Assessment in Aerial Videos*. 2021 Winter Conference on Applications of Computer Vision (*WACV*-21). Waikoloa, Hawaii.

Zhu, X., Chen, J., Zeng, X., Liang, J., Li, C., Zhang, J., Liu, S., Ban, X., Xu, M. (2020). *Weakly Supervised 3D Semantic Segmentation Based on Cross-Image Consensus and Inter-Voxel Affinity Relations.* Submitted to The Thirty-Fifth *AAAI* Conference on Artificial Intelligence (*AAAI*-21). Vancouver, Canada.

Zhu, X., Zeng, X., Li, C., Liu, S., Ban, X., Xu, M. (2020). *Unsupervised 3D Semantic Segmentation Based on Multi-Level Self-Supervision.* Submitted to Nature Machine Intelligence.

Zhu, X., Yu, Y., Wu, D., Zhang, H. (2018). *The Effects of Impulse Purchase Behavior on Post-Purchase Satisfaction in E-Marketplace: Relationship between Online Search Session and Consumer Review Sentiments*. The 12th China Summer Workshop on Information Management (*CSWIM*-18). Qingdao, China.

RESEARCH EXPERIENCE

Research Assistant at Carnegie Mellon University Aug. 2019 – Present

Project 1. Multilevel Instance Segmentation for Natural Disaster Damage Assessment in Aerial Videos

- Presented the first natural disaster building damage assessment dataset, namely ISBDA, using aerial drone videos. It provided the first quantitative benchmark for assessing damage assessment in aerial videos.
- Proposed a novel neural model termed Hierarchical Region Proposal Network (HRPN), which explores the hierarchical spatial relationship among different objects, and thus significantly improving the model performance.
- Proposed an unsupervised score refinement model named Score Refinement Network (SRN) based on inter-frame consistency to tackle the challenges of detections using drone videos.
- The proposed model achieved the best results compared to state-of-the-art object detection models. Advised by Prof. Alexander Hauptmann.

Project 2. Weakly Supervised 3D Semantic Segmentation for Biomedical Images (COVID-19)

- Proposed the first 3D volumetric segmentation model based on image-level supervision.
- Proposed an inner-image consensus learning module to tackle the challenges brought by CAM and imaging limits.
- Proposed an inter-voxel affinity learning module to predict segmentation with accurate boundaries of complex 3D structures with only image-level labels available.
- The proposed model achieved superior performance on both simulated and real datasets. It surpassed previous state-of-the-art relying on stronger supervision. Advised by Prof. Min Xu.

Research Assistant at Rochester Institute of Technology Aug. 2017 – Dec. 2017

- Quantified customers' impulse degrees by calculating clicks and search time and comparing them against benchmarks.
- Detected product reviews' mood polarity using NLTK and classification algorithms such as Naïve Bayes, MNB, Linear SVC and Logistic Regression.
- Obtained product reviews' emotion intensity using NRC Emotion Lexicon and normalization algorithms.
- Identified product reviews' main topics and consumers top complaints using LDA and word2vec**.**
- Concluded that the more impulsive customers tend to have stronger negative emotions on fitting problems for jewelry and women's clothing purchases. Advised by Prof. Yang Yu and Prof. Han Zhang (Georgia Institute of Technology).

PROFESSIONAL EXPERIENCE

Shenzhen Phantom Tiger Information Technology Ltd. (AI and Manufacturing Unicorn) Shenzhen, China
Research Intern Dec. 2017 – June 2019

Project 1. Intelligent Video Analysis for Railway Safeguard

- Detected risks caused by engineer drivers' hazardous behavior and sent reminders in real-time; used MOG2 to calculate

foreground contour area to determine sleep or awake status; used KCF and geometric relationships between moving track and work zone edge to detect leaving illegally; used YCrCb model to calculate facial area to determine if the driver is playing with a mobile.

- Implemented association analysis Apriori and FP-Growth for 6C railway systems.

Project 2. Real Time Ultrasonic Signal Processing for Rail Flaw Detection

- Detected and recognized rail flaws based on K-Nearest Neighbor and Convolutional Neural Network.
- Used k-medoids and feature-based image registration to align detection car tracks and conducted life cycle analysis of individual flaws to support maintenance decisions.

Project 3. Prognostics and Health Management in Manufacturing

- Designed and built IOT distributed system with Hadoop and Docker to handle high volume manufacturing data.
- Developed a risk monitoring and forecasting information system using SQL, Pandas, Numpy and MongoDB.
- Detected surface flaws of aluminum materials based on Inception v3.

China Mobile Co. Ltd. Anhui Branch — Anhui, China
Data Analysis Intern — July 2017 – Aug. 2017

- Supported promotion decisions by analyzing and visualizing marketing data using Excel and Tableau .
- Proposed a plan to enhance user experience by analyzing China Mobile app review sentiments using Naïve Bayes.

Information Center of Beijing Jiaotong University — Beijing, China
Team Leader of Student Group — Nov. 2015 – June 2017

- Detected DDoS attacks by analyzing daily traffic flows using SVM, KNN and Naïve Bayes classification.
- Designed and implemented a new network structure with the concept of SDN and "Users Triggering Flow."

AWARDS

- Winner of NIST Automated Streams Analysis for Public Safety Challenge ($30k prize), 2020
- Outstanding Alumni of Beijing Jiaotong University, 2020
- Cohort Commencement Speaker, 2019
- Highest Honor of Rochester Institute of Technology, 2019
- National Scholarship of China, 2017
- First Class Scholarship of Beijing Jiaotong University, 2015-2019
- Merit Student of Beijing Jiaotong University, 2015-2019
- Dean's List of Rochester Institute of Technology, 2015-2019
- Global Scholar of Rochester Institute of Technology, 2017

SELECTED MEDIA

- Carnegie Mellon University News. *Amateur Drone Videos Could Aid in Natural Disaster Damage Assessment*. August 28, 2020.
- Carnegie Mellon University News. *AMD Provides Computing Resources To Support CBD's COVID-19 Research* (Major contributor of the COVID-19 research project). September 21, 2020.
- Yahoo News. *CMU Developing Program To Assess Hurricane Damage*. August 29, 2020.
- Microsoft News. *CMU: Amateur Drone Videos Posted To Social Media Could Be Used To Assess Storm Damage*. August 31, 2020.
- AZO Robotics. *New AI System Helps Detect Damage Caused to Buildings by Hurricanes*. August 31, 2020.
- Beijing Jiaotong University News. *Outstanding Alumni of BJTU Developed AI Techniques for Damage Assessment*. August 31, 2020.

TALKS & ACADEMIC SERVICE

- Invited Talk: Automatic Damage Assessment Using Social Media Drone Videos. At *AI for Social Good Symposium*, Carnegie Mellon University.
- Research Presentation: MSNet: A Multilevel Instance Segmentation Network for Natural Disaster Damage Assessment in Aerial Videos. Live presentation for hundreds of Chinese college students.
- Research Presentation: MSNet: A Multilevel Instance Segmentation Network for Natural Disaster Damage Assessment in Aerial Videos. Live presentation for multiple Chinese companies.
- Reviewer of *WACV/BMC Supplies/ICIBM/CSWIM*.