Zikang Leng

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Education

Georgia Institute of Technology Atlanta, GA
PhD in Computer Science *Aug. 2024 - Present*

- Research Areas: Human Activity Recognition, Data Generation, Computer Vision
- Advised by Prof. Thomas Plötz

Georgia Institute of Technology Atlanta, GA
B.S. in Computer Science (Theory & AI), B.S. in Physics | GPA: 4.0 *Aug. 2021 - May. 2024*

- Advised by Prof. Thomas Plötz and Hyeokhyen Kwon

Experience

Graduate Research Assistant Aug. 2024 - Present
Georgia Institute of Technology *Atlanta, GA*

- Developing a system to generate smart home sensor data using large language model and home simulator.
- Developing a phone-based system that uses ultrasound to detect breast tissue anomalies and monitor fetal heart rate

Undergraduate Research Assistant Aug. 2022 - May. 2024
Georgia Institute of Technology *Atlanta, GA*

- Created IMUGPT, a system that can generate virtual IMU data from virtual textual descriptions of activities by combining large language models, motion synthesis, and signal processing method
- Developed a novel image segmentation model to segment foot ulcers in naturalistic foot images of patients of color
- Designed and evaluated two data collection methods for wheelchair transportation mode detection without requiring direct participation from wheelchair users.
- Developed a personalized emotion recognition system using wearable IMUs, leveraging synthetic data to minimize the need for real-world data collection
- Created FingerSpeller, an innovative text entry system that accurately recognizes American Sign Language fingerspelling words using smart rings
- Introduced a novel method for measuring the subtlety of motion involved in activities in videos using optical flow and 2D pose estimation to evaluate the benefit of virtual IMU data for fine-grained Human Activity Recognition.

Machine Learning Research Intern - SULI (Advised by Dr. Xiaodong Yu) May. 2023 - Aug. 2023
Argonne National Laboratory *Lemont, IL*

- Accelerated the training of graph neural network (GNN) for ocean simulation 213 times using 256 GPU
- Augmented GNN training data by performing IDW interpolation on existing data, enabling training at a larger scale
- Showcased findings in a poster presentation to the students and staff of Argonne National Laboratory

Publications

Recognizing Diabetic Foot Ulcers in Patients of Color by Automatically Analyzing Naturalistic Foot Images Under Review
Cynthia Baseman, **Zikang Leng***, Thomas Plötz, Gabriel Santamarina, Marcos C. Schechter, Maya Fayfman, Rosa I. Arriaga*

IMUGPT 2.0: Language-Based Cross Modality Transfer for Sensor-Based Human Activity Recognition IMWUT *[paper]*
***Zikang Leng**, Amitrajit Bhattacharjee, Hrudhai Rajasekhar, Lizhe Zhang, Elizabeth Bruda, Hyeokhyen Kwon, Thomas Plötz*

We Need More Data for People with Disabilities: A Comparative Study on Data Collection for Wheelchair Transportation Mode Detection UbiComp/ISWC '24 *[paper]*
Sungjin Hwang, **Zikang Leng***, Seungwoo Oh, Kwanguk Kim, Thomas Plötz*

Emotion Recognition on the Go: Utilizing Wearable IMUs for Personalized Emotion Recognition UbiComp'24 HASCA *[paper]*
Zikang Leng, Myeongul Jung* Sungjin Hwang, Seungwoo Oh, Lizhe Zhang, Thomas Plötz, Kwanguk Kim*

*Both authors contributed equally to this work

FingerSpeller: Camera-Free Text Entry Using Smart Rings for American Sign Language Fingerspelling Recognition ASSETS '23 *[paper]*
David Martin, **Zikang Leng***, Tan Gemicioglu, Jon Womack, Jocelyn Heath, Bill Neubauer, Hyeokhyen Kwon, Thomas Plötz, Thad Starner*

Generating Virtual On-body Accelerometer Data from Virtual Textual Descriptions for Human Activity Recognition (Best Paper Honorable Mention) UbiComp/ISWC '23 *[paper] [code] [news]*
***Zikang Leng**, Hyeokhyen Kwon, Thomas Plötz*

On the Utility of Virtual On-body Acceleration Data for Fine-grained Human Activity Recognition UbiComp/ISWC '23 *[paper]*
***Zikang Leng**, Yash Jain, Hyeokhyen Kwon, Thomas Plötz*

On the Benefit of Generative Foundational Models for Human Activity Recognition GenAI4PC Symposium *[page][paper]*
***Zikang Leng**, Hyeokhyen Kwon, Thomas Plötz*

Awards

NSF Graduate Research Fellowship (GRFP) 2024
- Supports exceptional graduate students in STEM disciplines by providing a three-year stipend of $37,000 annually, plus a $16,000 yearly allowance for tuition and fees

Georgia Tech President's Fellowship 2024
- Awarded to a select group of highly qualified students pursuing doctoral degrees who bring exemplary levels of scholarship and innovation. $5,500 annual stipend, renewable for three years

Georgia Tech Institute Fellowship 2024
- Georgia Tech's most prestigious fellowship for graduate students, awarded to a select few President's Fellowship holders. $2000 annual stipend, renewable for three years

Provost's Academic Excellence Award 2024
- Recognized as the top graduating senior from Georgia Tech's College of Computing, receiving a $2,000 award

Best Paper Honorable Mention ACM ISWC 2023
- Awarded at Ubicomp/ISWC 2023 to recognize papers that stand out for demonstrating innovative research, significant contributions to the field, and high-quality writing

President's Undergraduate Research Awards (Salary and Travel) 2023
- Awarded $2,500 to conduct undergraduate research with Georgia Tech faculty and offset travel expenses

Relevant Courseworks

CS 4644: Deep Learning
CS 4641: Machine Learning
CS 4540: Advanced Algorithm
CS 4510: Automata and Complexity Theory
CS 3630: Introduction to Perception and Robotics
CS 3600: Introduction to Artificial Intelligence

Technical Skills

Languages: Python, Java/JavaFX, C/C++, LaTeX, UML, Bash
Developer Tools: Git, Docker, VS Code, IntelliJ, Eclipse
Libraries: PyTorch, OpenCV, scikit-learn, NumPy, Keras, TensorFlow

Mentored Students

Masters Students: Amitrajit Bhattacharjee, Yaqi Liu, Hrudhai Rajasekhar, Zijun Wang
Undergraduate Students: Elizabeth Bruda, Jocelyn Heath, Lizhe Zhang, William (Bill) C Neubauer, Ruijia Peng

References

Dr. Thomas Plötz Professor, School of Interactive Computing, Georgia Institute of Technology
Dr. Hyeokhyen Kwon Assistant Professor, Department of Biomedical Informatics, Emory University
Dr. Thad Starner Professor, School of Interactive Computing, Georgia Institute of Technology