Zhankun Luo

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Education

Purdue University West Lafayette — West Lafayette, IN
Ph.D. in Electrical and Computer Engineering — *Aug 2021 – Present*

Purdue University Northwest — Hammond, IN
Master in Electrical and Computer Engineering GPA 3.96/3.96 — *Aug 2019 – May 2021*

Beijing Institute of Technology — Beijing, China
Bachelor in Telecommunication Engineering — *Sept 2015 – Jun 2019*

Research Projects

Computer Vision Techniques for Structured Light Vision Systems 2019 – 2021
Department of Electrical and Computer Engineering, Purdue University Northwest *Hammond, IN*

- Conducted the experiments of 3D reconstruction with the structured light method
- Developed the framework for structured light system with multiple cameras and multiple lasers
- Established the Multi-level RANSAC algorithm to tackle the intersection points of the multiple laser planes
- Reconstructed the shape of object using one camera and a single projector with Gray code sequence
- Published and presented papers to the IEEE eit 2020 conference and the UEMCON 2020 conference
- Instructed and mentored three student for their senior design on 3D reconstruction

Comparison of Capsule Networks and Other Networks for Object Segmentation 2019 – 2020
Department of Electrical and Computer Engineering, Purdue University Northwest *Hammond, IN*

- Customized the neural network architecture and compared the performance of SegCap, DenseNet and U-Net on the DRIVE data set for object segmentation task
- Examined the performance of VideoCapsuleNet on the action recognition UCF101 data set

Automated Fetal Brain Segmentation Using Deep Convolutional Neural Network 2018 – 2019
Department of Electrical and Computer Engineering, Purdue University Northwest *Hammond, IN*

- Manually labeled 2.8 thousand fetal brains from 30 to 33 weeks of 2139 images, 1900 images, and 2669 images for coronal, transverse and sagittal MRI scans, respectively
- Implemented the FPN, U-Net and WGAN architectures and the focal loss for automatic fetal brain segmentation
- The segmented slices of the volume will further be used in the autonomous fetus brain registration

Detection of Objects in Video Streams Using Deep Convolutional Neural Networks 2018 – 2019
Department of Electrical and Computer Engineering, Purdue University Northwest *Hammond, IN*

- Developed the program using Convoluional Neural Networks for parking space classification and counting occupied parking spaces, whose accuracy reached 90%, precision was 96%
- Incorporated the mutual information method for image registration and the affine transformation to eliminate the impact caused by camera shake, the robustness of detection was enhanced

Work Experience

Research Assistant Feb 2020 – May 2021
Center for Innovation through Visualization and Simulation, Purdue University Northwest *Hammond, IN*

- Developed a machine learning application using DNN, lightGBM to provide steel casting temperature predictions
- Collaborated the application with SQL database and GUI using Unity to display predictions and parameters
- Published the paper that was selected for the AIST 2021 Digitalization Applications Technology Best Paper Award
- Mentored three students and taught the models for sequential predictions

Awards

Energy Saving and Emission Reduction Competition May 2017 – Aug 2017

- Devised the circuit to store the charge generated by graphene oxide moisture, simulated the charge and discharge process with Multisim, and provided the theoretical analysis
- Awarded the national third prize in the 10th College Students' Energy Saving and Emission Reduction Social Practice and Technology Competition

Math Modeling Contests Mar 2016 – Jan 2017

- Implemented algorithms including SVM, K-means, LDA, PCA, multi-variable regression, time series analysis
- Led the team to win the second prize in CUMCM in Sep 2016, the Honorable Mentioned prize of ICM in Jan 2017

Professional Society

IEEE Member	2019 – Present
IEEE Signal Processing Society Member	2021 – Present
Material Advantage Member	2021 – Present
Association for Iron & Steel Technology (AIST) Member	2021 – Present

Honors

AIST 2021 Digitalization Applications Technology Best Paper Award	2021
Innovative Practice Outstanding Student (5%)	2019
The Second Prize of the People's Scholarship	2015 – 2017

Technical Skills

Languages: Python, Java, C/C++, SQL, C#, MATLAB, Mathematica, Git, Cmake
Frameworks: Pytorch, Tensorflow, Keras
Developer Tools: Pycharm, Colab, VS Code, Visual Studio, IntelliJ, Eclipse, KDevelop, Qt, Android Studio, Nsight
Libraries: eigen3, pangolin, Sophus, opencv, ceres, g2o, PCL

Publications

[**1**] Luo, Zhankun, Yaan Zhang, and Lizhe Tan. 2020. "Multi-Level Random Sample Consensus Method for Improving Structured Light Vision Systems." In *2020 11th IEEE Annual Ubiquitous Computing, Electronics & Mobile Communication Conference (UEMCON) (IEEE UEMCON 2020)*. New York, USA. https://doi.org/10.1109/UEMCON51285.2020.9298161

[**2**] Zhang, Yaan, Zhankun Luo, Jintao Hou, Lizhe Tan, and Xinnian Guo. 2020. "Computer Vision Techniques for Improving Structured Light Vision Systems." In *2020 IEEE International Conference on Electro Information Technology (EIT)*, pp. 437-442. IEEE, 2020. https://doi.org/10.1109/EIT48999.2020.9208332

[**3**] Luo, Zhankun. 2021. "Structured Light Vision Systems Using a Robust Laser Stripe Segmentation Method." Master thesis. Purdue University Graduate School, 2021. https://doi.org/10.25394/PGS.14536011.v1

[**4**] Nicholas J. Walla, Zhankun Luo, Bin Chen, Yury Krotov and Chenn Q. Zhou. 2020. "Smart Ladle: AI-Based Tool for Optimizing Caster Temperature." In Proceedings of *the Iron & Steel Technology Conference*. Nashville, USA. https://doi.org/10.33313/380/250