# Zhankun Luo

Purdue University West Lafayette (PWL), West Lafayette, IN 47907

219-238-7103 | luo333@purdue.edu | zhankunluo.com | github.com/dassein

## 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 | 2020 |
| 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