



# Huiying Zhai

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## LINKS

[Portfolio](#) / [Github](#)

## SKILLS

C/C++ (intermediate)

DX11/12/HLSL

OpenGL/GLSL

Vulkan

CUDA C/C++

UE4/5

ImGui

UML

Python

ROS/Ubuntu (intermediate)

PCL (advanced)

IGL

OpenCV

Ceres Solver

## LANGUAGES

Chinese

English

German

## EDUCATION

### Master Degree at Technical University of Munich

April 2017 — February 2021

Automation and Robotics

### Bachelor Degree at University of Siegen

October 2014 — March 2017

Electrical Engineering

## PERSONAL PROJECT

### 3D Graphics Engine

Graphics Engine for learning purpose. Written in C++ and DirectX11/HLSL.

Portfolio: <https://pickoranges.github.io/Engine3d/>

- Reflection
- Exception Handling
- Scene Graph
- Resource Pool
- Render Queue
- Render Graph
- Normal Mapping
- Gauss Filter
- Outline and Shadow Effect

## MASTER THESIS

### 2D to 3D Ray Casting for Completeness Model Verification and Color Mapping of Airplane Inspections (Lufthansa Technik AG)

Devices: Boeing 787, DJI Spreading Wings S1000+, Velodyne vlp-16, 4K Camera

- Point Cloud Processing: Convex Hull, AABB, OBB, KdTree, KNN
- Mesh Processing: Midpoint / Loop / Catmull-Clark Subdivision
- Frustum Culling
- Ray Casting: Ray-Point, Box, Triangle Intersection Checking
- Parallelization: via OpenMP
- Texture Mapping: Parameterization, Weighted Mask Blending
- Shadowing: PCF, PCSS

## MASTER THESIS

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### LiDAR SLAM Methods - Implementation and Evaluation for Multi-Sensor Fusion and Precise Positioning (STIHL)

Devices: STIHL iMOW, Slamtec Rplidar A3

- Localization: Correlative Scan Matching
- Mapping: Occupancy Grid Map / Ray Casting, Truncated SDF, Pose Graph, Bundle Adjustment, Sensor Fusion

## RESEARCH PRACTICE

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### Ego-Motion Estimation with 2D LiDAR Data (STIHL)

Devices: STIHL iMOW, Slamtec Rplidar A3

- ICP Variants, Point Cloud Feature Extraction

## PROJECT

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### Visual Servoing (Lecture: Human Machine Interaction)

Devices: Kinect2, IMU, UR10 Manipulator

- Manipulator Controller Designing: FK/IK, Rigid Body Dynamics, FEM, Lyapunov Stability

## TUTOR

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### Lecture: Computational Intelligence

Laboratory of neural network for autonomous robotic car parking in factory, simulated with MATLAB.

## BACHELOR THESIS

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### PID Controller Designing for Autonomous Robotic Car Parking

Devices: MCU Microchip 64bit, Infrared Sensors, Ultrasonic Sensors, Incremental Encoder

- Port Drivers Testing
- PID-Controller Designing for Parallel / Perpendicular Parking