Zhifei Hu

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Education

- **Fudan University**, Shanghai, China 2020 – 2023
  M.Sc. in Optical Engineering.
  Supervised by Dr. Min Xu and Dr. Xiangchao Zhang.
  Total Grade: 3.16 / 4
- **Wuhan University of Technology**, Wuhan, China 2016 – 2020
  B.ENG in Photoelectric Information Science & Engineering
  Total Grade: 3.84 / 4

Research Projects

- **Fast Measurement of Surface Topographies Using a Phase-Measuring Deflectometric Microscopy**[MATLAB] June 2020 – June 2023
  Lead Researcher
  - **Objective:** Implement a deflectometric microscope system from 0 to 1 to semiquantitatively measure surface defects for in-situ applications.
  - **Methods:**
    - Designed a pinhole camera model to release precise focusing requirements.
    - Achieved defect reconstruction using a path integral reconstruction algorithm combined with sparse representation.
  - **Outcome:** Research findings were published in the IEEE Photonics Journal.

- PaintPro Paint Defect Detection System [OpenCV][C++] June 2023 – July 2024
  - **Objective:** Develop a 3D camera based on Phase Measuring Deflectometry, specifically designed to capture mirror-like and quasi-mirror-like images.
  - **Methods:**
    - Developed a geometric calibration model using a markerless flat mirror and the Levenberg–Marquardt algorithm.
    - Implemented paint surface reconstruction through Multiple View Geometry and the Particle Swarm Optimization (PSO) algorithm.
  - **Outcome:** The project was put into production at the Geely plant in Hunan, China.

Publications

- **Z. Hu**, X. Zhang, W. Lang, Y. Chen, T. Chen and M. Xu, "Fast Measurement of Surface Topographies Using a Phase-Measuring Deflectometric Microscopy," in *IEEE Photonics Journal*, vol. 15, no. 2, pp. 1-7, April 2023, doi: 10.1109/JPHOT.2023.3243736.
- W. Lang, X. Zhang, Y. Chen, T. Chen, **Z. Hu** and X. Jiang, "A General Reconstruction Framework for Deflectometric Measurement Based on Nonuniform B-Splines," in IEEE Transactions on Instrumentation and Measurement, vol. 72, pp. 1-11, 2023, Art no. 5015511, doi: 10.1109/TIM.2023.3279466.

Professional Experiences

- **Speedbot Robotics Co., Ltd.** June 2023 – Present
  Algorithm Engineer(3D vision) Mentor Dr. Junhui Ge
  - **Projects:**
    - PaintPro Paint Defect Detection System.
    - 3D Vision Guided system for defects polishing of body paint.

Patents

- **X**. Zhang, W. Lang, **Z. Hu**, "Catadioptric hybrid form and position integrated deflection measurement method," China patent,CN114234804A,2022.03.25.
- **HU ZHIFEI**; GE JUNHUI; DENG WENPING "Surface segmentation and three-dimensional reconstruction method and device, storage medium and terminal equipment", China patent,CN118261919A, 2024. 06. 28.

Honors and Awards

- Gold medal at International Exhibition of Inventions of Geneva — April 2022
- Outstanding Graduate of Whuhan University of Technology — June 2020
- National inspiration Scholarship — September 2019

Skills

- MATLAB
- C/C++ Programming
- Python
- Git/GitHub
- IELTS 7, L7.5, R8.5, W6.5, S6.0
- Pytorch
- Java