

WenXiang Qin

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📅 Date of Birth: March.1994

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🎓 EDUCATION

Sept.2016 — Apr.2019 Nanjing University of Science and Technology (211)

System Engineering

Research Area: Robot Vision Computer Vision 3D Reconstruction

Sept.2012 — Jun.2016 Nanjing Agricultural University (211)

Automation

⚙️ SKILL TREE

✍ Learned books: "Matrix theory", "Probability theory", "Optimization", "Differential Geometry", "Statistical learning methods", "Pattern recognition", "Machine learning", "Deep learning", "Fourteen lectures on SLAM", "Principle of Automatic Control", "C++ Primer" and "Introduction to Algorithms"

Theory

✍ Familiar with mathematical tools such as advanced mathematics, matrix algebra, probability theory, differential geometry, linear and nonlinear optimization
✍ Good at using mathematics to analyze practical problems and design solutions

Math

✍ Familiar with the 3D reconstruction method based on structured light
✍ Familiar with camera model, multi-view geometry, optimization, linear space, good at establishing and solving SLAM problems
✍ Familiar with vision-based SLAM methods such as ORB-SLAM and DSO-SLAM and their internal principles

SLAM

✍ Familiar with a variety of machine learning and statistical decision-making algorithms
✍ Familiar with the mathematical principles of deep learning

Pattern recognition

✍ Familiar with C++ programming language, good at algorithm research and development and packaging them into libraries
✍ Familiar with the QT framework and its multi-threading mechanism, good at the overall design and development of QT projects
✍ Familiar with various data structures and CUDA parallel computing programming, good at writing high-performance algorithms
✍ Familiar with OpenCV, PCL, Eigen3, G2O, OpenGL, Sophus and other open source libraries
✍ Familiar with Git version library management system, good at multi-feature parallel research and development
✍ Familiar with Office including Word, Excel, Power Point, Visio, etc.
✍ Qualified in CET-6, with strong ability in English reading, writing and dictation

Basic skills

WORK EXPERIENCE

Nanjing Institute of Chip Innovation, Institute of Automation, Chinese Academy of Sciences Research, Development and Optimization of Structured Light 3D Camera	One of the project leaders	Technology Research and Development Jun.2018-Aug.2020
<p>☞ A camera and a projector are used to compose a projector-camera system. Gray-Phase code is used in this system to help achieve high-speed 3D reconstruction of the object surface. High-precision calibration algorithm and de-distortion algorithm are completed to ensure the accuracy, and at last, accuracy of 0.01mm is achieved.</p> <ul style="list-style-type: none">⊙Theoretical Derivation of Point Solving in 3D Space⊙Research and development of encoding and decoding algorithm⊙Research and development of 3D reconstruction algorithm based on structured light⊙Research and development of high-speed 3D reconstruction algorithm⊙Research and development of high-precision calibration method for projector-camera system⊙Research and development of 3D reconstruction de-distortion algorithm⊙Design, development and packaging of software architecture modules		
Universal Calibration System for Lens Models	Project leader	Jul.2020-Now
<p>☞ The Graph Optimization idea is used in this system to establish a small hole model group problem and solve it. Any product that can be abstracted as small hole model, including camera and projector, can be processed to achieve its intrinsics and extrinsics.</p> <ul style="list-style-type: none">⊙Abstract modeling of the projector-camera system⊙Design of Universal Calibration System⊙Design of Data format, division of software module		
High-speed 3D Reconstruction and Point Cloud Analysis System for Moving Targets	Project leader	Mar.2020-Oct.2020
<p>☞ Self-developed 3D camera and structured light cross-synchronous projection technology are used in this system to reconstruct living pig's model. After completing the model reconstruction, the model is processed by steps of Denoising, alignment, registration, segmentation and measurement. At last, efficient and accurate living pig's physical sign data is acquired.</p> <ul style="list-style-type: none">⊙Research and development of multi-3D camera joint calibration algorithm⊙Research and development of multi-object joint ICP algorithm⊙Design of system architecture⊙Division of software and algorithm modules		
3D Modeling System based on Single 3D Camera	One of the project leaders	Apr.2019-Now
<p>☞ Self-developed 3D camera is used in this system to achieve 3D modeling of 3D objects. Lie algebra and non-linear optimization algorithm is used in this system to achieve pose estimation of 3D camera and elimination of accumulated error of loopback. Computer graphics technology is used in this system to achieve visualization of 3D models and human-computer interaction.</p> <ul style="list-style-type: none">⊙Research and development of 3D space manifold fitting algorithm⊙Research and development of point cloud stitching algorithm⊙Research and development of loopback error elimination algorithm⊙Division of software and algorithm modules⊙Research and development of 3D visualization module based on OpenGL⊙Design of architecture and development of system		

ZHONG KE SHI JIE(Nanjing) Technology Co., Ltd	CTO	
Indoor Object Monitoring System under Earthquake Scene	Technology leader	Oct.2020-Dec.2020

- ☞ Multi-camera and self-made mode markers are used to solve 3D space coordinates, realize high-speed monitoring and record indoor objects' trajectory, shaking and other status information
- ☉Design of high-speed 3D perception scheme based on monocular camera and pattern marker
- ☉Division of synchronous capturing software module, mark block detection and recognition algorithm module, and state information solving algorithm module
- ☉Choice of camera lens, mechanical structure, etc.
- ☉Division of labor for software development, structural design, PC configuration, marker block production, etc.
- ☉Research and development of algorithms.

Human Body 3D Modeling System	Technology leader	Sept.2020-Now
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- ☞ Self-developed 3D camera and structured light cross-synchronous projection technology are used in this system to achieve 3D modeling of the human body
- ☉Design of system structure based on 12 3D cameras for covering the whole body
- ☉Division of capturing, reconstruction, stitching software module, fine stitching algorithm module, system calibration algorithm module and surface reconstruction algorithm module
- ☉Choice of camera, lens and projector
- ☉Development of the system

Foreign Matter Alert System for Power Transmission Cables	Technology leader	Jan.2021-Jun.2021
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- ☞ A monocular camera is used in this system to help calculate the 3D model of the power transmission cable and detect foreign objects in real time. combined with the binocular distance measurement, another camera is used in this system to determine whether the power transmission cable is threatened by foreign objects.
- ☉Research and development of power transmission cable extraction algorithm
- ☉Research and development of power transmission cable 3D model calculation algorithm
- ☉Research and Development of Foreign Object Alert Algorithm Based on Binocular Measurement

High-speed Dynamic Face 3D Reconstruction System	Technology leader	May.2021-Oct.2021
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- ☞ 3 self-developed 3D cameras and structured light cross-synchronous projection technology are used in this system to achieve high-speed capturing and 3D modeling of dynamic faces. Multi-3D camera joint calibration algorithm and multi-object joint ICP fine stitching algorithm are used in this system to ensure the quality of model. 200 models are acquired per second.
- ☉Design of system architecture
- ☉Division of software and algorithm modules
- ☉Construction and development of system

SCIENTIFIC RESEARCH ACHIEVEMENTS

- </> **Wenxiang Qin**, Lin Guo, Shuhong Lin, “RGBD-based Box Size Measurement and Packaging Optimization”, *Computer And Modernization*, 2019(5):46-50 (**Accepted**)
- </> **Wenxiang Qin**, Lin Guo, “RealSense-based Size Measurement System and Method”, Invention, Patent No :CN201811400371.3
- </> Xiling Liu, **Wenxiang Qin**, Qinyi Gu, Menjuan Chen, “Method and System for Removing Strong Noise from Point Cloud of Complex Curved Surface”, Invention, Patent No :CN201911098448.0
- </> Xilong Liu, Qinyi Gu, Menjuan Chen, **Wenxiang Qin**, “Method, Device, Computer Equipment and Storage Medium for Measuring Spatial Straight Line Orientation”, Invention, Patent No :CN201811244687.8

PERSONAL EVALUATION

- >_Accumulated a large amount of basic knowledge, and is handy in dealing with various related problems, and is good at the integration and application of knowledge in various disciplines
- >_Good at observing the essence of things, proposing practical and effective solutions, and have a strong interest in cutting-edge technology
- >_Positive and optimistic, strong sense of responsibility, patient, and steadfast in handling the tasks received
- >_Pay attention to document induction, record formula documents for researched and developed algorithms, and store the algorithms in database, pursuing independence and repeated usability
- >_Good at self-management, summarizing and sorting out the context of knowledge, and finding the way forward