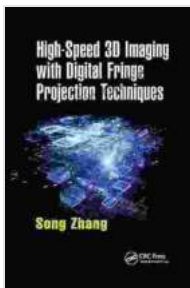


# High-Speed 3D Imaging with Digital Fringe Projection Techniques

This book provides a comprehensive overview of digital fringe projection techniques for high-speed 3D imaging, covering theoretical background, system design, algorithm development, and applications.



## High-Speed 3D Imaging with Digital Fringe Projection Techniques (Optical Sciences and Applications of Light) by Stan Gibilisco

★★★★★ 5 out of 5

Language : English

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Screen Reader : Supported



Digital fringe projection is a non-contact optical 3D imaging technique that uses a projector to project structured light patterns onto an object and a camera to capture the resulting images. By analyzing the phase information in the captured images, the 3D shape of the object can be reconstructed.

High-speed 3D imaging is essential for many applications, such as motion capture, robotics, and industrial inspection. However, traditional fringe projection techniques are often limited by their speed, accuracy, and robustness.

This book presents a number of new techniques that overcome these limitations and enable high-speed 3D imaging at unprecedented levels of accuracy and robustness. These techniques include:

- High-speed fringe projection algorithms
- Novel phase unwrapping algorithms
- Robust 3D shape reconstruction algorithms
- High-speed 3D motion capture systems

This book is a valuable resource for researchers and engineers working in the field of 3D imaging. It provides a comprehensive overview of the latest advances in high-speed 3D imaging and discusses the future directions of this exciting field.

## **Applications of High-Speed 3D Imaging**

High-speed 3D imaging has a wide range of applications, including:

- Motion capture
- Robotics
- Industrial inspection
- Medical imaging
- Virtual reality
- Augmented reality

In motion capture, high-speed 3D imaging is used to track the movement of human bodies or objects. This information can be used to create realistic

animations or to analyze human motion.

In robotics, high-speed 3D imaging is used to provide robots with a sense of their environment. This information can be used to help robots navigate around obstacles, avoid collisions, and interact with objects.

In industrial inspection, high-speed 3D imaging is used to inspect products for defects. This information can be used to identify and remove defective products from the production line.

In medical imaging, high-speed 3D imaging is used to create detailed images of the human body. This information can be used to diagnose diseases, plan surgeries, and monitor treatment progress.

In virtual reality, high-speed 3D imaging is used to create immersive virtual environments. These environments can be used for training, entertainment, or education.

In augmented reality, high-speed 3D imaging is used to overlay digital information onto the real world. This information can be used to provide users with additional information about their surroundings or to create interactive games and experiences.

### **Future Directions of High-Speed 3D Imaging**

The field of high-speed 3D imaging is rapidly evolving. New techniques are being developed all the time, and the performance of existing techniques is constantly improving.

Some of the future directions of high-speed 3D imaging include:

- The development of even faster 3D imaging systems
- The development of more accurate and robust 3D reconstruction algorithms
- The development of new applications for high-speed



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