

Preface

The goal of this book is to provide readers with a comprehensive understanding of essential image processing techniques and their applications within computer vision and artificial intelligence. It covers foundational topics, including digital image processing, color models, and pixel structures, while advancing into complex areas like feature extraction, morphological processing, deep learning, and object recognition. Focusing on practical methodologies, the book emphasizes the role of Python programming and various machine learning frameworks in implementing these techniques. It also explores applications across different fields, such as autonomous vehicles, augmented reality, medical imaging, and video surveillance. Designed for developers, researchers, and practitioners, this book guides readers in applying image processing to real-world challenges, advancing capabilities in image enhancement, object detection, and system optimization. It serves as a robust resource for enhancing the efficiency and precision of AI-driven image processing systems through sophisticated tools and innovative approaches.