Course content

This course covers both traditional computer vision methods and modern intelligent computer vision technologies.The course emphasizes a balance between theoretical knowledge and practical skills. In addition to algorithmic theory, students are trained in hands-on problem-solving, algorithm design, and software development for computer vision applications. This course lays the groundwork for advanced studies in artificial intelligence and prepares students for software development roles involving vision technologies.

Key topics covered include:

1. Basics of image processing and feature extraction.
2. Techniques for image alignment, texture analysis, and segmentation.
3. Camera models, multi-view geometry, and 3D reconstruction.
4. Optical flow computation, motion tracking, and object recognition.
5. Deep learning methods for intelligent image analysis.
6. Applications of intelligent computer vision in scene reconstruction and parameter recovery.

Course objectives

Knowledge

1. Understand the foundational principles, algorithms, and methodologies of computer vision.
2. Gain insight into both traditional and intelligent approaches to vision problems.
3. Learn to research, analyze, and apply computer vision algorithms to real-world challenges.

Skills

1. Implement computer vision algorithms using programming languages such as C and Python.
2. Solve practical computer vision problems using theoretical principles and algorithms.
3. Compare and optimize algorithms to address complex engineering challenges.

Competencies

1. Analyze and design solutions for complex engineering problems in computer vision.
2. Collaborate effectively on research and project-based tasks involving computer vision.
3. Develop the ability to review and apply scientific literature to propose multiple solutions to computer vision problems.
4. Integrate computer vision algorithms as essential tools in diverse application scenarios.