

INTRODUCTION to COMPUTER VISION

Syllabus

| Course Description | | | | | |
|--|--|--------------------------------|----------|---------------------------|------|
| Name | Code | Semester | T+A Hour | Credit | ECTS |
| INTRODUCTION to COMPUTER VISION | EEE3147020 | Fall Semester | 3+0 | 3 | 6 |
| Prerequisites Courses | LİNEER CEBİR VE DİFERANSİYEL DENKLEMLER | | | | |
| Recommended Elective Courses | | | | | |
| Language of Instruction | English | | | | |
| Course Level | First Cycle (Bachelor's Degree) | | | | |
| Course Type | Elective | | | | |
| Course Coordinator | Prof.Dr. Bahadır Kürşat GÜNTÜRK | | | | |
| Name of Lecturer(s) | Assist.Prof. İbrahim KARLIĞA | | | | |
| Assistant(s) | | | | | |
| Aim | To understand the basic topics in computer vision and to apply and evaluate various computer vision techniques. | | | | |
| Course Content | This course contains; Optical image formation,Imaging pipeline,Image filtering,Edge detection and Hough transform,Morphological operations,Image enhancement,Keypoint detection (basic ideas),Keypoint detection (scale invariant methods),Image interpolation,Geometric transformations,Motion estimation,Camera calibration,3D vision,Color space. | | | | |
| Course Learning Outcomes | | Teaching Methods | | Assessment Methods | |
| Understand and apply basic image processing techniques | | 12, 14, 6, 9 | | A, E | |
| Understand and apply image formation and modeling concepts | | 12, 14, 16, 6, 9 | | A, E | |
| Understand and apply mid-level computer vision techniques, including feature extraction and optical flow | | 12, 14, 16, 6, 9 | | A, E | |
| Design and evaluate solutions to computer vision problems | | 12, 14, 16, 6, 9 | | A, E | |
| Teaching Methods | 12: Problem Solving Method, 14: Self Study Method, 16: Question - Answer Technique, 6: Experiential Learning, 9: Lecture Method | | | | |
| Assessment Methods | A: Traditional Written Exam, E: Homework | | | | |
| Lecture Schedule | | | | | |
| Sequence | Topics | Preliminary Preparation | | | |
| 1 | Optical image formation | | | | |
| 2 | Imaging pipeline | | | | |
| 3 | Image filtering | | | | |
| 4 | Edge detection and Hough transform | | | | |
| 5 | Morphological operations | | | | |
| 6 | Image enhancement | | | | |
| 7 | Keypoint detection (basic ideas) | | | | |
| 8 | Keypoint detection (scale invariant methods) | | | | |
| 9 | Image interpolation | | | | |
| 10 | Geometric transformations | | | | |
| 11 | Motion estimation | | | | |
| 12 | Camera calibration | | | | |
| 13 | 3D vision | | | | |
| 14 | Color space | | | | |
| Evaluation Methods | | Weight(%) | | | |
| Midterm Exam | | 30 | | | |
| General Exam | | 70 | | | |

| Resources |
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| Sonka, Hlavac, and Boyle. "Image Processing, Analysis, and Machine Vision." Cengage Learning, 4th edition. |