

Tamkang University Academic Year 111, 1st Semester Course Syllabus

Course Title	COMPUTER VISION	Instructor	WANG YIN-TIEN
Course Class	TKFXB2A DEPARTMENT OF ARTIFICIAL INTELLIGENCE, 2A	Details	<ul style="list-style-type: none"> ◆ General Course ◆ Selective ◆ One Semester
Relevance to SDGs	SDG4 Quality education		
D e p a r t m e n t a l A i m o f E d u c a t i o n			
<p>I. Students may analyze problems in applied science based on the fundamental knowledge of programming, mathematics, and artificial intelligence.</p> <p>II. Students may plan and implement an AI system following the procedures of problem analysis, experiment testing, data visualizing, derivation and deduction.</p> <p>III. Educate the students to be AI engineers who may accomplish their missions independently and may collaborate with their colleagues in the workplace.</p> <p>IV. Students may have basic skills and global competence for career diversification, and may keep lifelong learning.</p>			
Subject Departmental core competences			
<p>A. Professional analysis.(ratio:30.00)</p> <p>B. Practical application.(ratio:30.00)</p> <p>C. Professional attitude.(ratio:30.00)</p> <p>D. Global Mobility.(ratio:10.00)</p>			
Subject Schoolwide essential virtues			
<p>1. A global perspective. (ratio:10.00)</p> <p>2. Information literacy. (ratio:20.00)</p> <p>3. A vision for the future. (ratio:10.00)</p> <p>4. Moral integrity. (ratio:5.00)</p> <p>5. Independent thinking. (ratio:30.00)</p> <p>6. A cheerful attitude and healthy lifestyle. (ratio:10.00)</p> <p>7. A spirit of teamwork and dedication. (ratio:10.00)</p> <p>8. A sense of aesthetic appreciation. (ratio:5.00)</p>			

Course Introduction	<p>This course provides basic concepts of computer vision technology and applications. Four major topics include: (a) Review of image processing algorithms; (b) Image feature detection, and texture and shape analysis; (c) Construction of three-dimensional vision, camera calibration, and three-dimensional motion; (d) Image object detection and recognition using machine learning and deep learning methods. The applications of computer vision are also included in this course.</p>
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The correspondences between the course's instructional objectives and the cognitive, affective, and psychomotor objectives.

Differentiate the various objective methods among the cognitive, affective and psychomotor domains of the course's instructional objectives.

I. Cognitive : Emphasis upon the study of various kinds of knowledge in the cognition of the course's veracity, conception, procedures, outcomes, etc.

II. Affective : Emphasis upon the study of various kinds of knowledge in the course's appeal, morals, attitude, conviction, values, etc.

III. Psychomotor: Emphasis upon the study of the course's physical activity and technical manipulation.

No.	Teaching Objectives	objective methods
1	Review of image processing algorithms	Cognitive
2	Image feature detection	Cognitive
3	Image object detection and recognition	Cognitive

The correspondences of teaching objectives : core competences, essential virtues, teaching methods, and assessment

No.	Core Competences	Essential Virtues	Teaching Methods	Assessment
1	AB	12345678	Lecture, Practicum	Testing, Study Assignments
2	ACD	12345678	Lecture, Practicum	Testing, Study Assignments, Practicum
3	CD	12345678	Lecture, Practicum	Testing, Study Assignments

Course Schedule

Week	Date	Course Contents	Note
1	111/09/05 ~ 111/09/11	Introduction	
2	111/09/12 ~ 111/09/18	Image Formation	

3	111/09/19 ~ 111/09/25	Digital Image Processing	
4	111/09/26 ~ 111/10/02	Edge and Corner-Interest-Point Detection	
5	111/10/03 ~ 111/10/09	Texture Analysis and Binarize Shape Analysis	
6	111/10/10 ~ 111/10/16	Hugh Transform – Line and Circle	
7	111/10/17 ~ 111/10/23	3D Vision	
8	111/10/24 ~ 111/10/30	Camera Calibration	
9	111/10/31 ~ 111/11/06	Seminar (AI研習會)	
10	111/11/07 ~ 111/11/13	Midterm Exam Week	
11	111/11/14 ~ 111/11/20	3D Motion	
12	111/11/21 ~ 111/11/27	Object Detection with Machine Learning	
13	111/11/28 ~ 111/12/04	Object Detection with Deep Learning	
14	111/12/05 ~ 111/12/11	Object Detection with Deep Learning	
15	111/12/12 ~ 111/12/18	Face Detection and Recognition	
16	111/12/19 ~ 111/12/25	3D Object Tracking	
17	111/12/26 ~ 112/01/01	Reviews	
18	112/01/02 ~ 112/01/08	Final Exam Week	
Requirement			
Teaching Facility		Computer, Projector	
Textbooks and Teaching Materials		Handout	
References		1.Richard Szeliski, Computer Vision: Algorithms and Applications, 2nd ed., Springer, 2022. 2.Valliappa Lakshmanan, Martin Görner, Ryan Gillard, Practical Machine Learning for Computer Vision: End-To-End Machine Learning for Images, O'Reilly, 2021. (電腦視覺機器學習實務-建立端到端的影像機器學習·楊新章譯·歐禮萊·2022) 3.張德豐·電腦視覺最新應用·深智數位·2022.	

Number of Assignment(s)	5 (Filled in by assignment instructor only)
Grading Policy	◆ Attendance : 10.0 % ◆ Mark of Usual : % ◆ Midterm Exam : 30.0 % ◆ Final Exam : 30.0 % ◆ Other (assignments) : 30.0 %
Note	This syllabus may be uploaded at the website of Course Syllabus Management System at http://info.ais.tku.edu.tw/csp or through the link of Course Syllabus Upload posted on the home page of TKU Office of Academic Affairs at http://www.acad.tku.edu.tw/CS/main.php . ※ Unauthorized photocopying is illegal. Using original textbooks is advised. It is a crime to improperly photocopy others' publications.