

CAI4301 Computer Vision

COURSE INFORMATION

Prerequisites	Academic Year & Level		Teaching Methods			Credit Hrs.
	Year	Semester	Lecture	Tutorial	Laboratory	
CAI3103 & CCS4505	4	8	2	2	0	3

COURSE AIM

- Understand the camera model and the fundamentals of projection of real-life scenes to images.
- Understand the mathematical foundation behind the basic Computer Vision algorithms.
- Gain a deeper understanding of the transition from 2D to 3D space, and vice versa in Computer Vision tasks.
- Leverage their understanding of Deep Learning approaches and their relevance to Computer Vision tasks.
- Identify the appropriate techniques and design tradeoffs in relation to the Computer Vision application under investigation.
- Implement Computer Vision algorithms to gain practical experience.

COURSE WEEKLY CONTENTS

1	Introduction: The Digital Camera and Image Formation
2	Projective Geometry and transformations
3	Scene Planes and Homographies
4	Model Fitting and Optimization: RANSAC algorithm and Graph Cut Algorithm
5	Image Alignment and Stitching
6	Motion Estimation: Parametric and Deep Learning Approaches
7	7th week Assessment
8	Pose Estimation
9	Structure from Motion and Simultaneous Localization and Mapping (SLAM)
10	Epipolar geometry and sparse Correspondence
11	Stereo Matching
12	12th week Assessment
13	Deep Learning and Depth estimation
14	3D Reconstruction
15	Recovering Texture Maps

STUDENT GRADING & ASSESSMENT

Weeks	Exams	Assign.	Quizzes	Reports	Present.	Lab.	Total
1 to 7	←		30	MARKS		→	30
8 to 12	←		20	MARKS		→	20
1 to 15	←		10	MARKS		→	10
16 or 17	40	Final					40

REFERENCES

Textbook	Coulouris G., Jean Dollimore J., Kindberg T., and Blair G., Distributed Systems: Concepts and Design, Addison-Wesley.
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