CEE 6185

Construction Automation and Robotics

This course covers recent developments in construction automation and robotics. The emphasis is on understanding the capabilities and methods that can be selected for a particular construction automation project. Lectures on automation in construction provide exposure to available state-of-the-art technologies (mobile robots, drones, laser scanning, etc.). Lectures on needs assessment, AHP, and economic feasibility provide the means to evaluate the new technology. Case study and hands-on activities provide more details on specific applications and address obstacles to the implementation of new automation technology.

Key Points

- One exam and no final
- Group project
- Hand-on practices of state-of-the-art technologies

Grading Criteria

- Participation (10%)
- HW (30%)
- 1 Exam (30%)
- Final group project (30%)

For questions, contact

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Week	Topics	Remarks
1	Introduction to Construction Automation	
2	Automated Building Construction Systems Needs Assessment Process	
3	Analytic Hierarchical Processes (AHP) for automated technology design & evaluation	
4	Economic feasibility analysis	Assignment #1 - AHP
5	Introduction to Robotics	Assignment #2 –Econ
6	Kinematics	Assignment #3
7	Introduction to Artificial Intelligence	
8	3D reconstruction—Photogrammetry	Assignment #3
9	Automated 2D/3D object recognition	Assignment #4
10	3D Laser scanning using targets (field practice) UAV introduction & demos	Exam review Group project intro.
11	Exam Automatic point cloud registration methods	Assignment #6 Autodesk Recap 360
12	*Simultaneous localization and mapping* (*SLAM*)	
13	AR and VR	
14	3D reconstruction data comparison	
15	Mobile robot navigation & demo	RICAL Lab Tour
16	Final Group Project Presentation	