CS785-ST: Mobile Sensing and Applications

Instructor: Kasthuri Jayarajah
Office: TBA
Email: Kasthuri.jayarajah@njit.edu
Office hours: by appointment or immediately after class
Textbook: None required
Class times and location: Tuesday/Thursday, 11:30-12:50, CULM Lect 3
Grading: 20% assignments, 35% group project, 15% paper review/presentation, 30% final exam (take-home)
How to submit assignments: Canvas

Course Overview: This course introduces a wide range of research in the area of mobile sensing with applications for smart cities, smart homes and digital health. Topics will introduce fundamentals of sensing and analytics as applicable to smartphones, personal wearables, edge processors, AR/VR systems and mobile robots, and will cover a range of techniques pertinent to indoor/outdoor localization, activity and physiological sensing, deep learning under resource constraints, and collaborative processing. Students will critique mobile systems research papers through reviews and in-class presentations, work on a semester-long project, and appreciate design choices and performance trade-offs in the context of mobile sensing.

Grading Policy: The course is designed such that there'll be opportunities for evaluation and feedback throughout the semester. The course grade is allocated as follows:

- **Assignments (20%)** – Two take-home assignments each worth 10% composed of design questions. Some programming might be involved.
- **Project (35%) –** Students will form teams of two to work on a semester-long project involving implementation and demonstration on mobile hardware (to be provided). Interim presentations (i.e., project pitch and consultations) will also contribute towards the component grade. Final write-up in a workshop-style format will be due a week after the final presentations.
- **Paper critique (15%)** – Each student will pick one paper from a list of papers provided by the instructor to critique and present in class (worth 10%). 5% of the total grade will be allocated for joining in on the discussion for papers presented by the peers.
- **Final Exam (30%)** – A take home exam released in early-December following the format of the assignments. Students will be allowed > 3 weeks' time to turn this in.

Tentative Course Schedule:

			Topic	Due from me	Due from you
Week 1	Tue	9/5	**Course Introduction**		
	Thu	9/7	Wireless Communication		
Week 2	Tue	9/12	Wifi-based Localization		
	Thu	9/14	Wifi-based Localization		
Week 3	Tue	9/19	Inertial Tracking		
	Thu	9/21	Light-based and device-free localization		
Week 4	Tue	9/26	Device Mobility	Assignment 1 Released (Localization)	
	Thu	9/28	**Project Pitches**		Project Pitches (10+2 each)
Week 5	Tue	10/3	Context Awareness (Applications)		
	Thu	10/5	Context Awareness (Optimizations)		Assignment 1 Due
Week 6	Tue	10/10	Energy Awareness (Networking)	Assignment 2 Released (Wearable sensing)	
	Thu	10/12	Energy Awareness (Displays)		
Week 7	Tue	10/17	See More		
	Thu	10/19	Hear More	Paper reading assignment signup sheet available	Assignment 2 Due
Week 8	Tue	10/24	Offloading Computation		
	Thu	10/26	Edge Computing		
Week 9	Tue	10/31	Continuous Vision Processing		
	Thu	11/2	Collaborative Vision Processing		
Week 10	Tue	11/7	Connected Cars		
	Thu	11/9	**Project Consultations**		
Week 11	Tue	11/14	**Paper Presentations I**		20 min each, presentation (critique)
	Thu	11/16	**Paper Presentations II**		20 min each, presentation (critique)
Week 12	Tue	11/21	AR/VR Systems		
	~~Thu~~	~~11/23~~	No Class (Thanksgiving)		
Week 13	Tue	11/28	AR/VR Systems		
	Thu	11/30	Mobile Robotics		
Week 14	Tue	12/5	Human-Robot Teaming	Final Exam Released (Take Home, due in 3 weeks)	
	Thu	12/7	Intermittent Computing		
Week 15	Tue	12/12	**Final Project Presentations + Wrap Up**		30 min each, presentation + demonstration

Statement on academic integrity: "Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found at: http://www5.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf.

Please note that it is my professional obligation and responsibility to report any academic misconduct to the Dean of Students Office. Any student found in violation of the code by cheating, plagiarizing or using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the university. If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at dos@njit.edu"