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Module Descriptor

Advanced Driver Assistance Systems (Computing and Mathematics)

Advanced Driver Assistance Systems (A29462)

Short Title: Adv. Driver Assistance Systems
Department: Computing and Mathematics
Credits: 5 **Level:** Advanced

Description of Module / Aims

Advanced Driver Assistance Systems (ADAS) assist and complement drivers in the safe and effective control of vehicles. In this module, students will use the industry-standard tools and technologies required to develop ADAS applications using vision/camera systems, sensor technology, in-vehicle data networks, and Vehicle-to-Vehicle (V2V) technology. Furthermore, students will learn how to model and simulate ADAS systems.

Programmes

		stage/semester/status
COMP-0568	BSc (Hons) in Applied Computing (WD_KACCM_B)	4 / 7 / E
COMP-0568	BSc (Hons) in Applied Computing (WD_KCOMP_B)	4 / 7 / E
COMP-0568	BSc (Hons) in Computer Science (WD_KCMSC_B)	4 / 7 / E
COMP-0568	BSc (Hons) in Physics for Modern Technology (WD_KPHTE_B)	4 / 7 / E

Indicative Content

- The evolution of driver assistance systems: Overview; motivation; history; categorisation
- Vehicle Stability Systems
- Vehicle Control Systems
- Optical and radar based systems: Object and collision detection; Lane departure warning; emergency brake assist, traffic sign recognition
- Automated Driver Assistance Technology and Applications: Parking assistance; driverless car technology; driver behaviour monitoring
- Vehicle to Vehicle communication and applications: V2V technologies; Early warning applications; VANETs (Vehicular Ad Hoc Networks) based applications

Learning Outcomes

On successful completion of this module, a student will be able to:

1. Appraise the characteristics, motivations and applications of ADAS.
2. Evaluate, model, and simulate stability and control systems used in modern vehicles.
3. Develop in-vehicle and external optical based applications for driver assistance.
4. Integrate driver assistance application with existing in-car communication networks and applications.
5. Develop and implement driver assistance applications that use Vehicle-to-Vehicle(V2V) technologies.
6. Use industry-standard network and application development tools.

Learning and Teaching Methods

- Combination of lectures and lab-based practicals.
- The lectures will cover the theory and underlying technologies behind ADAS systems.
- The lab-based practicals, building on the theoretical knowledge from lectures, provide the practical skills to design, model, simulate and implement ADAS.
- The practical content will use automotive industry standard technologies and tools to design, model and implement ADAS systems.
- Student will be encouraged to enhance their lab work and assessment submissions using self-directed research and learning into state-of-the-art ADAS systems.

Learning Modes

Learning Type	F/T Hours	P/T Hours
Lecture	24	
Practical	24	
Independent Learning	87	

Assessment Methods

	Weighting	Outcomes Assessed
Continuous Assessment	100%	
Lab Report	30%	2,3,4,5
In-Class Assessment	20%	1,6
Assignment	50%	4,5,6

Assessment Criteria

<40%: Unable to interpret and appraise key characteristics and motivation for ADAS systems. Unable to design and simulate a basic ADAS solution.

40%–49%: Be able to interpret and appraise key ADAS technologies. Be able to design and simulate a basic ADAS solution.

50%–59%: In addition, be to design and implement a multi-modal ADAS solution. Able to appraise, with sufficient knowledge, the relative merits of ADAS technologies and solutions.

60%–69%: In addition, design and simulate complex ADAS solutions that incorporate Vehicle to Vehicle, optical and in-vehicle communication networks.

70%–100%: In addition to the above , combine self-directed research of state-of-the-art ADAS systems in assessment work. Exhibit the ability to solve unforeseen problems through the use and modification of self-learned skills and tools.

Requested Resources

- Room Type: Computer Lab