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Undergraduate Research Program	
<b>Project Name</b>	Vehicle Collision Avoidance Control for Autonomous Vehicles
<b>Campus &amp; Location in Mexico</b>	Monterrey
<b>Faculty</b>	Engineering
<b>Research Area</b>	Automotive Consortium for Cyber-Physical Systems
<b>Research Responsible</b>	Riccardo Cespi
<b>Description of the Project</b>	In this project we count with on-board sensors such as infrared, lidar and radar given by the CarSim simulator. These sensors are able to recognize objects, vehicles, pedestrian etc. etc. The idea is to associate a repulsive potential field to each detected object. In this sense, we have a map of forces representing safe trajectories. Next, the vehicle tracks given trajectories using active front steering and torque vectoring. This strategy ensure collision avoidance maneuvers.
<b>Training Provided</b>	Elaboration / execution of projects;Preparation of specialized papers;Scientific-based problem solving
<b>Modality</b>	Virtual
<b>Offered During</b>	Semester

Student	
<b>Tasks/Responsibilities</b>	Study of the state of the art in order to find the best artificial repulsive potential field model. Implementation of the ARPF in Matlab/Simulink/CarSim. Execute several test in order to test quality and performances of the proposed method. To include the repulsive forces into the reference model given by the teacher and then to control the vehicle in order to track given references.
<b>Required Language Proficiency</b>	Spanish (Medium);Spanish (Advanced);English (Medium);English (Advanced)
<b>Required Skills and Abilities</b>	Matlab/Simulink
<b>Other Documents Required to APPLY for an</b>	<ol style="list-style-type: none"> <li>1) Being at least in your 2nd year of bachelor</li> <li>2) Accumulative grade point average (GPA) 2.5</li> <li>3) Official Transcript</li> </ol>

**Other Documents Required to APPLY for an Internship**

- 4) 2 letters of recommendation of faculty members
- 5) Resume
- 6) Letter of intention explaining the reason why you would like to participate in the research program