

RESEARCH LINE 4A	
<b>COMPANY</b>	<b>Repsol</b>
<b>PhD THESIS SUPERVISOR (UPM)</b>	<p>Prof. Dr. Álvaro Gutiérrez Martín  <i>Control and Robotics Laboratory (Robolabo)</i>  <i>Renewable Distributed Generation and Intelligent Control</i>  <i>Telecommunications Engineering School</i></p>
<b>PhD THESIS CO-SUPERVISOR (COMPANY)</b>	<p>Prof. Dr. Javier Juárez Montojo  <i>Senior Scientific</i>  <i>Repsol Technology Lab</i></p>
<b>DESCRIPTION OF THE PhD THESIS PROJECT</b>	<p><b>Title:</b>          Temporal Task Allocation for the Improvement of Eco-Driving Solutions in Dynamical Traffic Environments: An Approach Based on Swarm Intelligence</p> <p><b>Description:</b>          This PhD proposal is built on the foundation of sustainable transport in cities, specifically proving noninvasive and high reliable eco-driving solutions for time and energy saving in vehicles' displacements. It focuses on the 11<sup>th</sup> Sustainable Development Goal (SDG-11): "sustainable cities and communities" with specific impact on sustainable transport.</p> <p>The PhD aims to develop an eco-driving solution that recommends, in real time, the optimal speed so that vehicles can pass through successive traffic lights at the appropriate instants to save time and energy.</p> <p>The proposal is built on a practical application, where no infrastructure modifications are required, because of time and implementation restrictions.</p> <p>Swarm intelligence strategies based on temporal task allocation are selected to develop this eco-driving solution to save time and energy without the need for explicit communication. The PhD thesis will be grounded on swarm models based on stigmergy by the observation of the environment, the car's surroundings and the traffic flow.</p> <p>As a general result, the PhD proposal aims to develop a new methodology to optimize real time actions in a dynamically managed traffic flow. Moreover, the PhD should end up with a toolkit as a software application that could improve traffic efficiency both for users and cities. Nonetheless, it will create new artificial intelligence methods based on swarm intelligence for the regulation of cities mobility.</p>
<b>TRAINING ACTIVITIES</b>	<p>Different training activities related to the PhD will be offered to the awarded candidate: bibliographic search, techniques for writing communications in conferences, public speaking techniques, research methodology, personal skills' courses for research, research seminars, between others.</p> <p>Moreover, the candidate will gain experience in the preparation of scientific articles in journals and conferences, with the objective of publishing several journal papers during the PhD development.</p> <p>Nonetheless, the candidate will co-supervise BSc and MSc Thesis in collaboration with his/her supervisors.</p>
<b>SECONDMENT(S)</b>	<p>Two international internships of 3 months' duration are planned in the PhD proposal.</p> <p>The first one is proposed at the middle of the PhD, to an Artificial Intelligence research laboratory. The second one, to a specific transportation lab during the third year of development. Both secondments will be finally decided between the candidate and the supervisors according to development of the thesis.</p>
<b>REQUIREMENTS FOR CANDIDATES</b>	<p>The candidate should be experienced in programming (using C, C++, python or any other languages), and be familiar with machine</p>

	<p>learning, swarm intelligence and deep learning concepts. The candidate should have MSc degree in Computer Science or similar. Moreover, the candidate should have a special interest in dynamical, complex, distributed and collective systems. Nonetheless, the candidate should have the ability to conduct innovative research, both as an independent researcher and as a strong team player.</p> <p>He/She should be fluent in English.</p>
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