Sensing Data integration for road-side maintenance planning tools (IoT)

Université de Lorraine

NICOLAS BAUDIN
INTERNSHIPS IN FRANCE INITIATIVE

Name of the hosting institution in France	Université de Lorraine
Name of the host laboratory / research team	ERPI- Equipe de Recherche sur les processus Innovatifs
Address	8 rue Bastien Lepage 54010, Nancy, France
Website	https://erpi.univ-lorraine.fr
Name of the supervisor	Mauricio Camargo
Function	Professeur des Universités
Email	Mauricio.camargo@univ-lorraine.fr
Phone number	33 6 84 73 29 94

Internship offer

Topic of the internship (title)	Sensing Data integration for road-side maintenance planning tools (IoT)			
Proposed dates of the internship	Start	01/09/2021	End	01/01/2022

Scientific and academic objectives of the internship:

The road network is constantly growing, with over 25 million new roads expected to be built by 2050. This expanding road network has significant ecological impacts: habitat loss and fragmentation, light and noise pollution, chemical pollution of air and water, direct mortality of wildlife due to vehicle collisions. However, given the importance of roads in our society, mitigation of these negative impacts seems to be the most realistic solution. Roadsides represent an opportunity to mitigate these impacts, as by their location and composition they are able to provide several ecosystem services. However, for safety reasons, these roadsides have to be maintained regularly, which has negative impacts on the ecosystem: destruction of plant and animal habitats, modification of the environment by soil enrichment, reduction of the number of mowing tools, reduction of pollinating insect populations, weakening of biodiversity. As a result, roadsides play a less important role in mitigating the impacts of the road network. Therefore, through their collaboration, the ERPI laboratory and NOREMAT are seeking to develop sustainable roadside management solutions. The current projects concern the design of an innovative management tool consisting of an evaluation of the economic, social and environmental impacts of the management practices implemented by territorial managers and the design of an ecological mowing unit that should minimize the impacts of maintenance (soil preservation, fauna and flora, energy consumption reduction). These two projects are closely linked, as the innovative mowing unit must be able to feed the tool with important and relevant information from the territory. Thus, in situ information from the maintenance machines will provide the necessary information. Therefore, the objective of the research internship project is to identify several sensor technologies leading to the promotion of roadside ecosystem services and to transform the information obtained by these sensors (the data from the mowing units) into valuable data for the road-side management tool. The student will have to propose a system architecture and data specifications to feed regularly into the roadside management tool. The major topic is therefore around the transformation of sensing data in order to improve a global road side maintenance tool.

Industrial partner

Name	Noremat - Accopilot
Role of the industrial partner in the internship project	Co-supervision
Main contact	M. Christophe Bachmann

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Australian partner	
Name of the Australian partner institution	UTS University of Technology in Sydney
Lab/department/team involved in the collaboration	Future Mobility Lab/ Faculty of Engineering and IT/ School of Computer Science
Main contact in the Australian partner institution	Dr. Simona Mihaita.
Function	Senior Lecturer
Email	Adriana-simona.mihaita@uts.edu.au
Outside of this ongoing collaboration, will students from other Australian universities be considered by the hosting institution in France?	Yes

Expected profile of applicant	
Level of study	Bachelor/ Master Degree
Discipline	Computer Sciences
Prerequisite knowledge, qualities and skills	Programming skills, environment engagement, team work, analytical thinking
Other specific eligibility criteria	English and/or French; remote work from Australia for Noremat/France