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**Partner search**

**Date (07-10-20)**

* **(\*) Indicate numbers of relevant topics for Green Deal call:**

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| **5.1** |

* **Quick description of the project**

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| **(describe the objectives, activities, partners requested and their skills)**  **The project aims to Analysis of Complex Scenes by Multitasking Deep Learning. Application to Smart Mobility.**  It is always challenging to explain to decision-makers, experts and users the result obtained via an artificial intelligence based model which is supposed to be used in their operational and strategic choices. For example, it is not easy for a car manufacturer to accept, with a high level of insurance, the fact that the artificial intelligence solution allows to detect pedestrians at 100% of accuracy. How could he be sure when he does not understand how the product works? If he has no way to understand the logical process that led to the generation of such impressive results, how much credibility should gain such solution? The complex nature of artificial intelligence systems makes difficult to determine the precise process that has been employed to reach a specific solution to a given problem. Consequently, it is challenging to ensure that artificial intelligence mechanisms have not been compromised by external influences into producing a solution which undermines rather than boosting the safety and the security of the system. Thus, transparency reinforces user confidence and from this point of view artificial intelligence transparency is incompatible with normative and regulatory requirements so how can we certify an artificial intelligence solution if it still sees it as a black box? It is important to note that a system is performing well, but perhaps even more crucial is its ability to explain easily why it acted the way it did. To be safely deployed, artificial intelligence systems must rely on well-understood, realistic and testable assumptions. In this context, our project aims to develop a novel, ambitious and reliable system which explains decisions and advice at professional working proficiency under realistic circumstances. The main contribution of this proposal is to develop an artificial intelligence explainable machine learning platform applied to smart mobility, which not only leads to mitigating the risks of collisions but also explains how we build it. The model needs to be more transparent for users’ side, for this, we will validate it under a real experimental platform for smart mobility application. In fact, the development of reliable smart perception devices for advanced driver-assistance systems is an important issue identified by both the European Union in its Strategic Transport Research and Innovation Agenda (STRIA) and the Green Deal Call. The proposed project is also part of the answer to this challenge by proposing the use of artificial intelligence explainable approaches for perception applications with specific focus in critical systems of which the chosen exemplar is smart transport and mobility services. The project will not only make use of artificial intelligence to improve both port and airport environment perception (Indoor and Outdoor) to better understand the environment and thus to make robust decision, but focus on techniques to generate a model for the decision making process and make explanation in each step of the artificial based solution more transparent and interpretable.  **Our Skills**: computer vision, embedded system, mobile robotics, deep learning, environment perception, object detection and localization, tracking, scenes analysis and understanding.  **Objective**: We can be coordinator in this project or partner with another project regarding the topic 5.1 |

* **(\*) Do you intend to apply as? :**

**Coordinator: No**

**Participant: Yes (if similar project is available and needs our contribution)**

**(\*) Either Description of the expertise requested (up to 1000 characters) - *specify which points of the "expected impact" of the call you are targeting***

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| The proposed research is perfectly adequate to the field of Sustainable and smart mobility. The project will focus on the following topics:  1. Development of new generation of machine learning-based AI approaches that could work not only reliably, reduce risks and make very high decision accuracy, but also with more transparency and more interpretability which explain decisions and advice at a level profession working in application area of intelligent transport systems and smart mobility.  2. By developing perception algorithms for smart mobility with different algorithms like deep learning, fuzzy concepts and, symbolic reasoning, dealing with partial and contradictory information, justifying decisions, as well as neuro-adaptive estimation and identification algorithms, we will improve explanation in different level of technical knowledge and thus in different application domains.  3. Transparency and interpretability for explainability are included in all steps of our approaches: dataset collection, machine learning training, inferences, decision, evaluation, understanding, human machine interfaces, etc.  4. Reinforce interdisciplinary collaboration by connecting various AI subfields and exploration of human-machine integration and a real-life practical and high priority application area.  5. The higher human level explanations which can be substantiated with real-life data sources will improve transparency, trust and usability of the solution: validated under an instrumented vehicle as an open experimental platform, trials carried out in real validation environment, decision validated by comparison between both measured and estimated data.  6. The explainable machine learning approach to be developed will be validated within very high strategic domain for EU in safety fields through smart mobility for which our teams have real datasets, models for autonomous vehicle and access to real validation environments.  **+ key words :** |

**Or Description of the expertise proposed (up to 1000 characters) - *specify which points of the "expected impact" of the call you are targeting***

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| **+key words :** |

**Organisation information**

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| **Organisation and country:**  ESGELEC IRSEEM  Technopôle du Madrillet  Avenue Galilée - BP 10024  76801 Saint Etienne du Rouvray Cedex  FRANCE |
| **Type of organisation:**  **□ Enterprise □ SME** □ **Academic □Research institute □ Public Body □ Other: Association** |
| **Former participation in FP European projects?**  **□ Yes □ No** |
| **Web address:**  [**https://www.esigelec.fr/fr**](https://www.esigelec.fr/fr) |
| **Description of the organisation:**  IRSEEM and its researchers combine their skills in electronics, automation and computing and carry out solid and recognized scientific activities developed along several axes: EMC and reliability of components and systems, radio frequency and microwave circuits (design, modeling and characterization), autonomous and connected mobile systems (perception and localization), and system fault tolerance control (robust control, diagnosis/prognosis and estimation). |

**(\*) Contact details**

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**(\*) –Mandatory**