

Company Description

The University of Deusto invites applications for several PhD projects to be performed in DeustoTech. Deusto Institute of Technology -DeustoTech- <http://deustotech.deusto.es/> located in Bilbao (Spain), is a Research Institute of the Faculty of Engineering at the University of Deusto, and was created with the mission of promoting research and postgraduate training in Information Technology and Communications (ICT) through the participation in research projects of interest to society and industry.

Information

 **Deadline:** 2021-04-23
 **Category:** Academia
 **Province:** Bizkaia

 **Country:** Basque Country
 **City:** Bilbao

Company

Universidad de Deusto



Main functions, requisites & benefits

Main functions

Deusto Smart Mobility <http://mobility.deustotech.eu/>, a high performance research team recognized by the Basque University System, invites competitive applications for several PhD projects. A total of 6 PhD grants are offered to be performed in some of the following research topics belonging to the ARTIFICIAL INTELLIGENCE area: Topic #AI1: Deep Learning and Explainable Artificial Intelligence for Mobility Applications The research proposed will be focused on the study and design of Explainable Artificial Intelligence methodologies for applications with demanding heterogeneous data, considering different spatial, temporal and contextual information in order to provide textual explanations. The research will include the use of recent methodologies such as attention layers, SHAP and model agnostics explanations and they will be applied over different data structures, including graphs and time series Deep Learning applications. For further information: Enrique Onieva enrique.onieva@deusto.es Topic #AI2: Optimization methods for sharing mobility scenarios The research proposed will be focused on the study and design of hybridization and parallelization of methods for optimization applied to large scale heterogeneous and collaborative transport scenarios. This includes the study of optimization in novel scenarios derived through new delivery and transport paradigms such as collaborative logistics, car-sharing and dial-a-ride. The developments will consider parallel and distributed computing, in order to provide scalable solutions to high dimensional problems. For further information: Enrique Onieva enrique.onieva@deusto.es Topic #AI3: Improving the Model Selection Problem of Traffic Forecasting Systems through new Automated Machine Learning (AutoML) methods The use of Machine Learning (ML) methods in traffic forecasting has been extensive in the last decade, but there are still important challenges to be addressed. Traffic data allows traffic predictions under different transportation scenarios, which can range from making predictions at multiple freeway segments to forecasting traffic at a whole road network. These characteristics of the transportation context influence the performance of machine learning models and, therefore, selecting the most appropriate method from a pool of candidates is a time-consuming task that involves a high human effort. Despite the great availability of ML methods for traffic forecasting, there are still no baselines to select the most appropriate algorithm given a specific TF problem. The latter makes necessary expert ML knowledge; nevertheless, it is an asset not always available or affordable in many research fields, such as traffic forecasting. In this context, this PhD project aims to develop new AutoML methods to deal with raw-complex data and the scarcity of expert ML knowledge. Thus, this project seeks to satisfy the ML demands of traffic forecasting users and applications. For further information: Antonio D. Masegosa ad.masegosa@deusto.es Topic #AI4: Auto-ML for Edge Computing Although we can currently find a wide variety of proposed AutoML methods, such as Auto-Sklearn, TPOT, AutoGluon, etc. or even commercial products developed by companies such as Google or H2O, all of them focus on maximising the accuracy of the models but without taking into account the resources that the generated models consume in terms of computation or memory, i.e. they are not designed to obtain models that can be deployed in IoT devices. In this project we propose the development of an Auto-ML framework specifically for edge computing. This approach will initially be based on model and hyperparameter selection, although full pipeline selection will also be