

Perfil de Profissional a Contratar

PhD Assistant Researcher for Artificial Intelligence and Point Cloud Applications - FCT Tenure

O BUILT CoLAB promove a transição digital e ecológica do Setor AEC – Arquitetura, Engenharia e Construção. Para isso baseamo-nos na transferência e na valorização do conhecimento para a indústria, numa abordagem “Technology to Market”, com o objetivo de aumentar da sua competitividade e internacionalização. Somos uma nova plataforma numa indústria já estabelecida e reunimos uma equipa criativa, ágil e diversificada, com objetivo de implementarmos soluções que conduzam o setor à inovação digital e sustentável. Respondemos a problemas tradicionais com novas abordagens, valorizamos as diferenças, potenciamos a individualidade e celebramos competências e perspetivas diversas, num ambiente produtivo e inclusivo. Conheça-nos melhor em builtcolab.pt/

DESCRIÇÃO DA FUNÇÃO

“The role involves exploring advanced computational models alongside point clouds, to enhance productivity and competitiveness in the Architectural, Engineering and Construction (AEC) sector. The focus is on extracting information from point clouds to augment existing workflows, leveraging BIM and AI. The prospective employee will perform tasks in three core areas: 1) create point cloud datasets to train, test and validate AI models; 2) develop AI models; and 3) apply the developed models to distinct AEC workflows. The researcher will focus on addressing the shortage of open-source point cloud datasets in the literature by creating a dataset. This dataset will serve various purposes and requires proper labelling to answer them (e.g., building elements will be individually labelled with class, instance, surface material, geometric and structural information). It should also integrate different sources of data (e.g., thermography, depth and infrared images), given the multimodal models promising performances in recent literature. Developing automatic mechanisms for dataset augmentation (e.g., BIM-to-point clouds workflows), integration of existing datasets, crowdsourcing through open-source development and issuing guidelines, as well as orientation and co-orientation of MSc and PhD thesis will be pivotal to successfully creating the dataset, given the impracticality of a full manual effort.

The researcher will also aim to advance various current point cloud-based AI problems, such as noise removal, registration, segmentation, classification, generation, and completion. It will emphasize creating neural networks to address these challenges across multiple domains, with special focus on 3D Convolutional Neural Networks (e.g., point-, voxel-, graph-, projection based), Transformers and hybrid approaches. Techniques for diminishing computational demands (e.g., pruning, quantization, low-rank approximation, tensor decomposition, distillation) will be expanded and dataset limitations will also be considered, with one-shot, transfer and ensemble learning techniques being tackled.

Finally, the researcher will also fine-tune the developed models to distinct problems facing the AEC sector, including automated scan-to-BIM and construction monitoring.”

CANDIDATURA

A candidatura deve ser efetuada seguindo obrigatoriamente as indicações disponíveis no Portal Euraxess em <https://euraxess.ec.europa.eu/jobs/453946> e enviada para info@builtcolab.pt, indicando no título do email “Artificial Intelligence and Point Cloud Applications Tenure”.