S01/2026 – Semantic Parsing of Maps with Deep Learning

6-month engineering internship @ CEA List

Internship context

Based in Saclay (Essonne), the LIST is one of the two institutes of CEA Tech, the Technological Research Division of the CEA. Dedicated to intelligent digital systems, its mission is to carry out technological developments of excellence on behalf of industrial partners, in order to create value.

Within the LIST, the Laboratory of Vision and Learning for Scene Analysis (LVA) conducts its research in the field of computer vision and artificial intelligence for the perception of intelligent and autonomous systems. The laboratory's research themes include visual recognition, behavior and activity analysis, large-scale automatic annotation, and perception and decision models.

Missions

Tools for layout analysis have made significant progress for textual documents such as invoices and forms. However, plans and maps remain challenging due to the mix of vector and raster symbols, textual annotations, scales, north indicators, legends, and high graphical variability. Map-Layout-Parser, an AI software tool developed by CEA LIST, provides a promising foundation to address these challenges. Designed for the layout analysis of maps and plans, it paves the way for new real-world applications ranging from geospatial intelligence to urban planning, as well as archive digitization and robotics

The objectives of this internship are to evaluate the current performance of Map-Layout-Parser on different types of maps and plans (architectural, topographic, technical), and to improve its robustness through fine-tuning on dedicated annotated datasets, the use of adapted data augmentation and generation techniques, and the adaptation of target classes (symbols, dimension lines, hatching, legends, arrows, text). In addition, the work will involve developing a post-processing module for semantic grouping of elements, text–symbol alignment (label-to-object association), and structured export to JSON or graph representations. Finally, the proposed approach will be validated through benchmarks and a case study, such as the automatic extraction of key information

Qualifications

- Students in their 5th year of studies (M2)
- Computer vision skills
- Machine learning skills (deep learning, LLM, VLM, generative AI…)
- Python proficiency in a deep learning framework (especially PyTorch or TensorFlow)
- Strong interest for Multimodal Generative AI

Job-related benefits

Joining the CEA List and the LVA as an intern means:

- Working in one of the most innovative research organizations in the world, addressing societal challenges to build the world of tomorrow
- Discovering a rich ecosystem: privileged connections between the industrial and academic sectors
- Conducting research autonomously and creatively: encouragement to valorize results (scientific articles, patents, open-source codes...)
- Join a young and dynamic team
- Benefit from an internal computing infrastructure with more than 300 state-of-the-art GPUs
- Receive a stipend between €1300 and €1400 per month
- Have the opportunity to continue with a PhD or as a research engineer after the internship
- Have the possibility of remote work, receive a 75% reimbursement on public transportation costs, and benefit from the “mobili-jeune” aid to reduce rent costs…

To apply, contact the laboratory with a CV and cover letter: mohamed.chaouch@cea.fr; aboubacar.tuo@cea.fr

More details on https://kalisteo.cea.fr/index.php/apply-for-a-job/