

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 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. These technologies are applied in major sectors such as security, mobility, advanced manufacturing, healthcare, and sports...

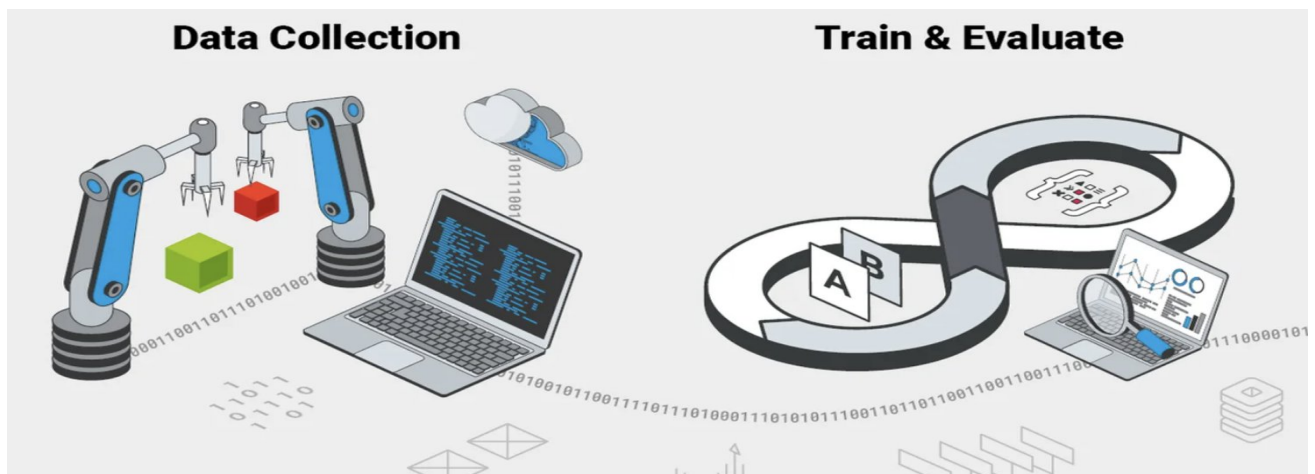
Missions

We are offering an exciting opportunity for a motivated Master's student in AI and Robotics to join our research team. This internship will focus on tackling one of the most critical issues in robotics: the scalable collection and curation of high-quality data to train robust AI models for various robotic tasks. This research will aim to leverage advanced AI techniques such as large language models and vision models to automate the processes of task generation, data collection, and data curation.

The deployment of high-performing, robust AI models in robotics, whether for industrial manufacturing or household automation, relies on the availability of diverse and high-quality data. Collecting sufficient data to cover the wide range of tasks and systems that robots might encounter is both time-consuming and difficult to scale. The challenge of this internship will be to address this key bottleneck by exploring methods to automate and enhance data collection and curation, potentially accelerating the deployment of effective AI models in the field of robotics.

During this internship, you will:

- Study and explore techniques for automatic data collection in robotic environments. Leverage existing large language models (LLMs) and vision models to automate task generation for various robotic applications. Develop methods for data curation and data mixing to improve the quality and diversity of the data used for training robotics AI models.
- Build methods that continuously improve the AI models using the newly generated and curated data, ensuring that the models evolve and become more robust and performant over time.
- Work closely with a team of researchers and engineers to prototype, test, and iterate on solutions aimed at reducing the complexity and cost of data collection in robotics.



Internship objectives

Your Roles

- Conduct literature reviews and state-of-the-art research on data collection techniques in AI and robotics.
- Develop systems that use LLMs and vision models to automate data gathering and task generation.
- Implement algorithms for data curation and mixing to enhance the training datasets for AI models.
- Test and validate the developed techniques in real-world robotic applications or simulations.
- Document your findings and contribute to research papers or internal reports.

References

- [1] Autonomous Improvement of Instruction Following Skills via Foundation Models, Zhiyuan Zhou et al, <https://arxiv.org/pdf/2407.20635>
- [2] AutoRT: Embodied Foundation Models for Large Scale Orchestration of Robotic Agents, Michael Ahn et al. <https://arxiv.org/abs/2401.12963>
- [3] Re-Mix: Optimizing Data Mixtures for Large Scale Imitation Learning, Joey Hejna et al, <https://arxiv.org/pdf/2408.14037>

Qualifications

- Students in their 4th or 5th year of studies (M1, M2 or gap year)
- Computer vision skills
- Machine learning skills (deep learning, perception models, generative AI...)
- Python proficiency in a deep learning framework (especially TensorFlow or PyTorch)

Job-related benefits

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

- Joining an organization that addresses societal challenges to build the world of tomorrow.
- Working in one of the most innovative research organizations in the world (ranked in the global top 100, top 3 in France).
- Discovering a rich ecosystem where the institute creates privileged links between the industrial and academic sectors.
- Conducting research in an environment where autonomy and creativity are recognized, and where valorizing results is encouraged (publication of scientific articles, patents, and sharing of open-source code whenever possible).
- Joining a young and dynamic team made up of research engineers, PhD students, post-doctoral researchers, and interns.
- Benefiting from an internal computing infrastructure equipped with around 300 state-of-the-art GPUs.
- Receiving a stipend between €1300 and €1400 per month.
- Having the opportunity to continue with a PhD or as a research engineer after the internship.
- Having the possibility of remote work, receiving a 75% (instead of 50%) reimbursement on public transportation costs, and benefiting from the "mobili-jeune" aid to reduce rent costs...