BrainCreators
Research Internship 2021-2022:
Open Applications and
Wild Card Projects

General Information

Contact and Interviews

Before you read on, .. **we encourage interested candidates to contact us as soon as possible for an intake interview!**

Please contact our head of research, Maarten Stol: maarten.stol@braincreators.com
Or visit our website: https://www.braincreators.com/contact

Like previous years, we have a limited number of available positions, and expect another rise in the number of candidates. Interviews will take place in September & October, and decisions to hire will be made for a timely start in November 2021.

To some degree, and given equal skills, this will be a first-come-first-serve selection process. (there is a chance of new positions opening up later in the year, so if you read this after November 2021, the door is not fully closed yet)

Introduction and overview

Welcome! You are looking at the research internships BrainCreators has on offer in 2021-2022.

BrainCreators is at the forefront of applied AI, with many years of successful research internship projects that combine cutting edge science with the challenges of applying AI in the real world. Located at Amsterdam's Prinsengracht and Science Park, we are a growing team of AI experts, software developers, MLOps & DevOps specialists and researchers.

Research internships in our applied vertical teams

The 4 business verticals that offer a research internship position this year are:

- **Road surface inspection**, combining Deep Learning Object Detection with Geo-information (and possibly 3D data).

- **Conveyor belt applications**: recognition, localization, and manipulation by robot of objects on a conveyor belt. Challenges concern high variance of object shape and visuals, and detection of out-of-distribution imagery.

- **Video surveillance**, based on, and extending our anonymization tooling. The focus is on understanding person and crowd behavior, anomaly detection, and video retrieval, all based on video representation Deep Learning and self-supervision.

- **Fashion & Retail**: this year with a focus on generative models for Virtual Try-on of clothing items.

Research internships on other activities

In addition to our business verticals, there are research topics that are more general, or concern pure research which is not immediately related to our commercial activities.

If you would like more information on topics like these, please contact our head of research, Maarten Stol: maarten.stol@braincreators.com

- **MLOps** is an essential part of every product we roll out live. Topics include data unit tests, live evaluations, deployment monitoring, handling shifting data, containerization, building KubeFlow pipelines, and scaling deployments.

- **Symbolic/Subsymbolic Hybrid Ai** In particular we are interested in compensating a lack of annotated training data with symbolically encoded background knowledge about the application domain. If valuable explicit background knowledge is available in the form of

rule-based information, then we are interested in e.g., imposing this knowledge as regularizers on our object detection models, or in other ways to exploit relational information.

- **Astronomy** A position working in tandem with our partners on the Cortex Consortium in the field of astronomy. BrainCreators is an industrial partner in this 6 year project, providing research and development with a focus on topics like neural network compression and autotuning of real-time ML pipelines. For a general impression see:
    - https://www.uva.nl/en/shared-content/faculteiten/en/faculteit-der-natuurwetenschappen-wiskunde-en-informatica/news/2019/06/self-learning-machines-hunt-for-explosions-in-the-universe.html?cb
    - https://www.esciencecenter.nl/projects/cortex/

What we offer, what we expect

We offer:

- Be part of a growing company with a proven track record in applied Ai
- A research internship position on one of our vertical teams
- Interaction with research interns from our other vertical teams, in a science oriented horizontal research team.
- A protected environment for your research, without distraction by commercial deadlines of the team
- Opportunities to contribute to the team by developing dual-use software: for your own research and the team's products.

- Weekly supervision on scientific progress, experimental design, and thesis text
- Weekly supervision on software development and code reviews
- Daily contact with the vertical team, and morning stand-up meetings
- Weekly participation in internal ML workshops, sharing ideas with others
- Access to compute resources (in addition to University resources)
- Opportunity to work from home, or work from our HQs at Prinsengracht or Science Park Amsterdam.
- A financial compensation of 300 euros per month

- Learn all the essential things a Master program typically does not offer, e.g.,
    - onboarding with software development skills,
    - MLOps skills,
    - optimal use of compute resources,
    - versioning of ML and datasets,
    - collaboration software,
    - and communication skills.
- Be the eyes and ears of your team, looking for promising academic developments that might be relevant to the vertical
- Opportunities to become a permanent team member, and join as ML engineer after the research internship.

We expect:

- Workload contribution of 40h per week, 6-8 months (all activities related to your MSc program are included in this 40h, other jobs and classes are not)
- Capable to work independently on your own research questions and experiments
- Active participation in team effort when needed
- Solid control of spoken and written English language

- A strong opinion on ML research and how to apply it in practice
- Solid fundamental knowledge of ML theory and practice
- Overall knowledge level of a graduating Ai MSc student
- Good PyTorch skills
- Good understanding of the required mathematics
- Good software development skills

- Active participation in internal workshops, presenting your progress, and discussing your experimental design choices with your team and other verticals in the company
- Willingness to rewrite the thesis as a publishable paper
- Co-authorship for your thesis supervisors on publications derived from the thesis.

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The Research Internship Position: Open Applications and Wild Card Projects

Summary

Join one of our teams working on a project of your own design, or apply for a research project that was not fully defined at the time of writing.

We are always interested in your views on where Ai technology is going, and how you think this applies to our business. We have multiple business verticals in which we are active, and developments of relevant technologies are going fast. In addition to business related research, we have a dedicated team for “pure” research projects, i.e., research on topics that may need more than one year to mature into a commercially viable product. These are our Wild Card projects and Open Applications.

Like in our other teams, your work aims to move Ai technology to the next level. You will report your scientific findings in a publishable paper.

The end-products of your projects may become part of our commercial R&D in the future. The lessons learned from your projects will be the basis of new insights starting today.

Product

Your product vision, please let us know. Otherwise, pure research on an academic topic that is related to our commercial activities.

BrainCreators is open for ideas, and willing to spend 1 year of scientific research on an academic topic related to our commercial product lines. You will join our internal science team, and perform experimental research in order to improve our understanding of relevant Ai technologies. The resulting software or insights serve as the basis for commercial work in following years. A publishable paper should also be the aim of the research intern and their internal/external supervisors.

Technology

… you tell us? As long as there is some relevance to our business activities, and you can suggest a research internship that might include topics like:

- visual inspection
- deep learning
- object recognition and manipulation
- video processing
- learning from shifting data
- explainable Ai
- lidar, 3D, Pointcloud
- DL-based visual recommenders
- MLOps, pipeline optimization and monitoring
- etc, etc.

Sources

[1] Your thesis next year?

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