Offer #2023-07047

R&D Internship (Computer vision) - Pen Tracking for handwriting rehabilitation

**Contract type:** Internship

**Level of qualifications required:** Master’s or equivalent

**Function:** Internship Engineering

**Context**

**About us**

Retras is a start-up incubated at INRIA Paris. Retras offers a medical handwriting rehabilitation device to patients suffering from neuromotor disorders (stroke, Parkinson, etc.) based on artificial intelligence, which generates feedback to guide the correction of gesture and posture. We work both in English and in French.

**Context of your work**

To generate feedback and analyze the patient’s movements, we need to precisely track the movements of the pen in space during the handwriting. We are interested in exploring optical/motion-based tracking of a pen, as demonstrated [here](#) or [here](#).

**Assignment**

**Assignments:**

Using existing literature, implement a pen tracking system using a camera and motion sensors. Testing the robustness of the system and improving it.

For a better knowledge of the proposed research subject, please read:

- [https://github.com/Jcparkyn/dpoint](https://github.com/Jcparkyn/dpoint)

**Main activities**

**Main activities:**

1. Review the literature on pen tracking
2. Play with existing methods, reimplement some methods if needed
3. Test the robustness of the current methods to various perturbations (lighting conditions, angle, sensitivity to calibration,...)
4. Adapt the sensor fusion system to the tablet and pen we use
5. Write a report in the end to help Retras make the most of your findings.

**Additional activities:**

1. Helping the team implement and use your findings in the project
2. *(If enough time, use an hardware device to collect more movements and finger pressure metrics)*
3. *(If enough time, testing your system with our patients and partners)*

**Skills**

**The ideal profile for us**

1. Familiar with python and computer vision (OpenCV, ...)
2. Good knowledge of maths (linear algebra, Kalman filters, ...)
3. Autonomous
4. Has already worked with embedded devices (like Arduino or Raspberry Pi)
5. Native or ≥ B2 in English or French

We invite you to put in your application:

1. Computer science & python projects you’ve made in the past (github repo links, ...)
Benefits package

- Subsidized meals
- Partial reimbursement of public transport costs
- Leave: 7 weeks of annual leave + 10 extra days off due to RTT (statutory reduction in working hours) + possibility of exceptional leave (sick children, moving home, etc.)
- Professional equipment available (videoconferencing, loan of computer equipment, etc.)
- Social, cultural and sports events and activities
- Access to vocational training
- Social security coverage

Remuneration

The duration of the internship can vary between 5 and 6 months as required.

General Information

- Town/city: Paris
- Inria Center: Centre Inria de Paris
- Starting date: 2024-03-01
- Duration of contract: 6 months
- Deadline to apply: 2024-01-19

Contacts

- Inria Team: INCUB-PRO
- Recruiter: Micaux Nicolas / nicolas.micaux@inria.fr

About Inria

Inria is the French national research institute dedicated to digital science and technology. It employs 2,600 people. Its 200 agile project teams, generally run jointly with academic partners, include more than 3,500 scientists and engineers working to meet the challenges of digital technology, often at the interface with other disciplines. The Institute also employs numerous talents in over forty different professions. 900 research support staff contribute to the preparation and development of scientific and entrepreneurial projects that have a worldwide impact.

Warning: you must enter your e-mail address in order to save your application to Inria. Applications must be submitted online on the Inria website. Processing of applications sent from other channels is not guaranteed.

Instruction to apply

The duration of the internship can vary between 5 and 6 months as required.

Defence Security: This position is likely to be situated in a restricted area (ZRR), as defined in Decree No. 2011-1425 relating to the protection of national scientific and technical potential (PPST). Authorisation to enter an area is granted by the director of the unit, following a favourable Ministerial decision, as defined in the decree of 3 July 2012 relating to the PPST. An unfavourable Ministerial decision in respect of a position situated in a ZRR would result in the cancellation of the appointment.

Recruitment Policy: As part of its diversity policy, all Inria positions are accessible to people with disabilities.