



Internship - R&D Department

Machine Learning, Computer Vision, Computer Graphics, Signal Processing

R&D engineer internship position available in 2023

Dynamixyz - A Take-two Interactive Technology Studio in Rennes, France

Who are we?

Dynamixyz is a technology software studio, specializing in the development of high-quality facial motion capture software for the entertainment industry (video games, movies, broadcast, VR). Its track-record includes high-profile games such as *Red Dead Redemption*, *Resident Evil*, *Watch Dogs*, *Assassin's Creed*, *NBA 2K*, as well as Marvel movies (*Thor*, *Avengers Endgame*) and Netflix shows (*Love, Death & Robots*). As a tech-oriented company, Dynamixyz has maintained a strong R&D activity, and has widely been praised as a leading technology provider since its inception in 2010. In July 2021, Dynamixyz joined *Take-Two Interactive*, a world leading video games production company based in New-York City. *Take-Two Interactive* is the holding company of world-renowned video games studios *Rockstar Games*, *2K Games* and *Private Division*. Within the *Take-Two* group, Dynamixyz focuses on developing state-of-the-art technologies and tools, enabling its studios to create outstanding animation for video game characters with unparalleled quality and efficiency.

Internship subject: Using image-to-image translation to generate synthetic facial motion capture data

The last decade has seen the rise and advent of data-based image processing. The last few years have been particularly prolific in scientific and technical advances, in large part due to the emergence of deep learning as an overwhelmingly successful signal processing framework. Among others, the world of automatic object detection and deformable object tracking has been revolutionized by machine learning techniques. In the video-game industry, data-based markerless facial motion capture techniques have carried a push of both quality and volume for

the production of facial animation for virtual characters. A major characteristic of machine learning approaches is that their success hugely depends on the data they were trained on. This turned the task of creating, perfecting and maintaining datasets into the most central aspect of learning-based algorithms development. An interesting strategy to obtain data is to create synthetic dataset. For facial motion capture, examples of face images can be generated through computer graphics techniques instead of captured with real cameras. This enabled having clean and large data volumes at a fraction of the cost and time required for creating real-world capture scenarios. One caveat of creating synthetic dataset is the difficulty of generating synthetic images that look like real ones:



Facial Motion capture camera snapshots: synthetic rendering (*left*), real image (*right*)

In this internship, we're looking to explore machine learning techniques that would help bridge the realism gap. Techniques of image-to-image translation, such as Pix2Pix or Cycle-GAN already suggest interesting starting points to investigate producing real-looking facial capture images synthetically.

Your internship mission within the company will include:

- **Designing, experimenting, and integrating algorithms** to fuel the company's technological development, and by extension the vision and ambition of its associated video games studios

- **Discussing and documenting results**, methods, APIs, and conclusions
- Reporting progress to other teams within the company and beyond to the rest of the group
- Monitor and study relevant developments in science and technology, both in academic research and the industry

We are looking for the following profile:

- **Engineering/Masters degree student**, specializing in computer vision, machine learning, computer graphics or image processing.
- **Spirit of curiosity, problem-solving**, open-mindedness and team-oriented mindset
- Knowledge of the **Python** programming language
- **Proficiency in French and English** required, both oral and written.

The following is a plus:

- Knowledge of **deep learning frameworks** (Pytorch, Tensorflow, JAX, ...)
- Knowledge of **collaborative software development tools** (Git, Cmake, CI/CD, testing)
- Notions of 3D virtual character animation techniques are a plus

How to apply?

- nicolas.stoiber@take2games.com
- If your application is selected, you will start the recruitment process with our Head of R&D Nicolas Stoiber