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Besombes Camille
Cam-B04

Camille BESOMBES

Data Scientist

I am a dedicated data scientist with a strong passion for analyzing and predicting complex datasets. During my PhD, I used deep learning methods to generate images to improve certain steps in the respective workflows of Météo-France and TotalEnergies. I also recently worked on a project to classify medical images and their associated uncertainties for the Department of Dentistry at McGill University (Canada). I bring valuable teamwork skills honed through my love for team sports, which I believe can greatly benefit the collaborative environment of a company. As a new challenge, I would like to work for an ambitious company in a dynamic environment where I can add value.

Professionnal

July 2022 – Decembre 2023 — **Research assistant in computer vision.**, *McGill Univserity - Dental Health departement*, Montréal, Canada

Missions: Development of a computer vision model for **classification/segmentation** of oral lesions from photographic images. Uncertainty quantification of model predictions. Put the built protoype into production for collaborator use, with an accessible documentation and a user-friendly interface.
Results: Accepted publication at **ICLR 2023 - Tiny papers** [2]. Working prototype delivered and accessible for external collaborators. Improvement of uncertainty quantification and reduction of computational cost.
Work environment: Data preparation and processing, model development : **Git, Linux, Python (Pytorch, Matplotlib, Pandas, Seaborn, Scikit-learn)**. Model training: Use of a **super computer (ComputeCanada)** using **Slurm** for ressources management. Putting the model into production on an internal serveur (**OS: Proxmox**). Interface creation for external users: (**Filemaker, Python (Flask, Tkinter)**). English-speaking work environment.

September 2018 – December 2021 — **PhD - Deep learning applied to physics**, *CERFACS, TotalEnergies*, Toulouse, France

Missions: Development of a Deep Learning Generative method **(Wasserstein GANs)** for the generation of physical field images in partnership with TotalEnergies and Météo France companies for improving their respective processes. Coupling the protoype with fluid flow simulator **Open Porous Media (OPM)** and their in-house data assimilation methods derived from **Bayesian Optimisation (Kalman filter)** methods. Documentation writing and user support. Communication of the project state and results to different audiences.
Results: Accepted publication at Non-linear Processes in Geosciences (NPG) [1]. Working prototype delivered in TotalEnergies internal work flow and tested with production data. User support and documentation.
Work environment: Data preparation and processing, model development : **Git, Linux, Python (Keras, Tensorflow, Matplotlib, Pandas, Seaborn, Scikit-learn)**. Visualization and management of geolocalised data : **ParaView, Python (Geopandas, cartopy)**. Model training, preprocessing and postprocessing done on internal supercomputer using **Slurm** for ressource management. Fast prototyping to explore quickly different research paths: **Jupyter notebooks**.

April 2018 – September 2018 — **Research internship in Deep Learning applied to geosciences**, *CERFACS, TotalEnergies*, Toulouse, France

Missions: Exploration and testing of different generative deep learning methods for image generation of hydrocarbon reservoir in partnership with TotalEnergies.
Results: Learning the work flow and problematics of the industrial partner. Development of different prototypes **(GANs, VAE)**. Results communication and choice of important metrics to take data-informed decisions.
Work environment: Same as above.

June 2017 – August 2017 **Research internship on fluid-structure interaction.**, *Queen's University*, Belfast, Royaume-Uni

Missions: Research code development in **MATLAB** of an innovative method for the simulation of the fluid-structure interaction on an aircraft wing.
Résultats: Working prototype delivered, documentation writing and creation of qualitative post-processing visualizations for results communication.
Work environment: OS : **Windows**, programming language : **MATLAB**. English-speaking work environment.

Juin 2016 – Juillet 2016 **Web development intership.**, *Happy people 31*, Toulouse, France, Improvement and support of a web site

Missions: Development of new features using PHP functions **Happy People 31**.
Results: Autonomous learning of Web programming languages (**HTML, CSS, PHP**), dynamic display of pictures using PHP scripts.
Work environment: OS : **Windows**, programmation : **HTML, CSS, PHP**.

Education

2018–2021 **PhD**, *CERFACS - INP Toulouse*, Toulouse, France
Coupling of a developped deep learning generative method with physics simulator of the atmosphere (Météo France) and geological subsurface reservoir (TotalEnergies).

2015–2018 **Engineering degree**, *INPT-ENSEEIHT*, Toulouse, France
Numerical simulation and modeling in fluid mechanics specialization.

2013–2015 **Classes Préparatoires aux Grandes Écoles**, *Lycée Camille Jullian*, Bordeaux, France
Physics and chemistery specialization.

2012–2013 **Bachelor degree**, *Lycée Anatole de Monzie*, Bazas, France

Skills

Personal: Autonomous, curious, agile, team player, rigorous.

Theoretical: Statistics, mathematics, data science, numerical simulation and modelisation.

Programming languages : Python, Git, LateX, Bashscript, MySQL.

Librairies : Data science : Pytorch, Tensorflow, Keras, Pandas, Scikit-learn. Visualization : Matplotlib, Seaborn, Geopandas, cartopy. Web : Python (Flask), HTML, CSS.

Operating system: Linux, Windows, MacOS.

Languages : Français, Anglais.

Intérêts

Sport • Technologies • Travelling • Video Game • Music • Programming

Publications

[1] Camille Besombes, Olivier Pannekoucke, Corentin Lapeyre, Benjamin Sanderson, and Olivier Thual. Producing realistic climate data with generative adversarial networks. *Nonlinear Processes in Geophysics*, 28(3):347–370, 2021.

[2] Camille Besombes, Adeetya Patel, and Sreenath Arekunnath Madathil. Incorporating expert prior knowledge for oral lesion recognition. In *ICLR 2023 - Tiny paper*, 2023.