curriculum vitæ of
Sebastian Partarrieu

Student @ Mines ParisTech specialized in
Applied Mathematics, Data Science and Machine Learning

sebastianpartarrieu.github.io spartarrieu@fas.harvard.edu
+1 33 6 11 02 13 77 sebastian-partarrieu

Education

Sep. 2019 – Jul. 2023 **M.Sc. equivalent** specialization in applied mathematics — Mines ParisTech | part of PSL University

The cycle ingénieur civil of Mines ParisTech is one of the most prestigious[1] curriculums in France. Students enter after taking nationwide exams ranking them across scientific and literary disciplines. Cumulative GPA: 3.9/4.0

Major subjects include Mathematics, Physics and Computer Science. Specific modules chosen include Stochastic, Integral and Differential Calculus, Optimization, Intro to Data Science, Deep Learning for Image Analysis, Advanced Data Science, Signals Processing, Operations Research, Databases & Networking, ...

Sep. 2017 – Jul. 2019 **B.Sc. equivalent** Mathematics (major) and Physics — Lycée Privé Sainte-Geneviève

Two year multidisciplinary, intense and competitive curriculum in preparation for nationwide exams ranking France's top students[2] for entrance into the top Graduate programs. Cumulative GPA: 3.91/4.0. National ranking for Mines ParisTech entrance exams (out of approximately 5600 undergraduates majoring in mathematics): 13th

Major subjects include Mathematics, Physics, Chemistry and Computer Science.

Research & Work Experience

Mar. 2021 – Aug. 2021 **Visiting Research Intern (current)** — Harvard University

Full-time research position (Jia Liu Group) on using deep learning tools, such as coupled adversarial autoencoders, to improve multi-modal analysis of neuronal cell types. The ultimate objective is to build robust characterizations of these cell types and their stereotypical interactions to better understand the brain's computations. Another current project of mine focuses on proving the stability of novel 'soft' mesh electrode brain machine interfaces and using them to study brain aging.

Jul. 2020 – Aug. 2020 **Summer Research Intern** — National Physical Laboratory (NPL)

Research was conducted on assessing the impact of Convolutional Neural Network (CNN) architectures on the accuracy of the supervised classification task of detecting cardiovascular diseases such as Atrial Fibrillation or Myocardial Infarction from raw electrocardiogram signals. I investigated the performance of "shallow" and "deep" CNNs as well as larger residual networks. Tests on the publicly available PTB-XL dataset showed that the residual network built during the internship was able to obtain around 0.9 averaged class-wise AUC, very close to state-of-the-art bench marked results.

Nov. 2019 **Data Analyst Intern** — Prüftechnik group | CRC Laboratory Mines ParisTech

Built a predictive maintenance framework for a wind-farm. A total of five years worth of accelerometer data coming from 5 wind turbines was processed and used to train both 'traditional' machine learning algorithms (SVM, Random Forest) on feature engineered data and deep learning methods (CNNs, Autoencoders) trained on spectrogram images or wavelet features. All of this in python and keras using GPU clusters provided by CRC laboratory. The final pipeline evaluated on held-out test datasets showed potential cost savings on the order of hundreds of thousands of euros.

Projects, Skills & Activities

Projects[3] include:

- Developped a mobile application linking small store owners with nearby customers. Front-end was written using React Native and back-end in Python with the help of Flask and other relevant libraries.
- Using style transfer powered by machine learning to create a Virtual Reality (VR) application with Unity plunging the user into the immersive worlds of Van Gogh, Monet, Kirchner and many others...
- Worked with E-Cube to improve the valuation accuracy of Natural Gas (NG) storage facilities. Three complementary python modules can (1) webscrape relevant data , (2) generate scenarios of spot and forward prices of NG markets and (3) solve the optimization problem of optimal buying/selling strategy.

Technical skills: Advanced knowledge of Python and it's scientific libraries/deep learning frameworks (pandas, scipy, sklearn, tensorflow, keras, pytorch, ...) along with flask. Knowledge of HTML, CSS/Sass, JS and React Native, PostgreSQL, Git, LaTeXand C#.

Linguistic skills: French (native), English (native - TOEFL 119/120), Spanish (advanced), Chinese (beginner).

Activities: Tennis team of Mines ParisTech, Ski, Philosophy, Writing, Hiking and lots and lots of Reading

[1] Generally ranked #2 or #3 Grande Ecole d'Ingénieur in France whilst PSL ranked 21st worldwide in CWUR
[2] Ranked #1 Classes Préparatoires aux Grandes Ecoles in France
[3] For a complete overview of the different projects: sebastianpartarrieu.github.io and https://github.com/SebastianPartarrieu