Andrea Nicolas

Chandler, AZ | 765-409-4609 | andreanicolas91@gmail.com | www.linkedin.com/in/andrea-nicolas-flores

Skills

Technical
- Machine Learning: Regression, Gaussian Processing (GP), dimensional reduction (PCA), time series forecasting.
- Data Analytics: cleaning, manipulation, scraping, visualizations (seaborn, matplotlib).
- Statistics: descriptive and inference statistics, Bayesian optimization, Monte Carlo, non-gaussian distributions.
- Project Management: SCRUM, version control, code documentation, unit testing, linting.

Software
- Languages and libraries: Python (scikit-learn, pytorch, numpy, pandas, scipy), MATLAB, C++, Bash, Latex.
- Data and workflow management: Git, PostgreSQL, Docker, MLflow, Prefect, Grafana, AWS, HDF5.
- Design and Simulation: COMSOL, ANSYS, Xpedition Layout, SolidWorks

Professional Experience

Mar 2021 – Present | Research Engineer | Intel Corporation | Phoenix, AZ
- Created a **regression model** to predict manufacturing risk early in the product lifecycle, **reducing resource waste by 30%** by prioritizing high-viability projects and enhancing late-stage performance. Feature engineering & PCA used.
- Co-developed software using multi-objective **Bayesian optimization** to recommend optimal product designs and manufacturing processes, **hitting 100% of performance targets** compared to 50-75% with manual methods.
- Refactored the main software engine and streamlined the overall pipeline, simplifying a 3-month+10 engineer process to a 1-week+1 engineer process. Vectorization and parallel processing were used to speed up core software.
- Implemented version control, regular documentation, **unit testing, e2e testing**, and SCRUM.

Sep 2019 – Mar 2021 | Postdoctoral Researcher |Argonne National Laboratory | Lemont, IL
- Developed a failure prediction model for high-temperature nuclear vessels using **Monte Carlo + GP**. The training data was generated via non-Newtonian FE models of vessels to **improve runtime by 30x**. See [1].
- Developed “GOOSE” to predict the probability of failure within nuclear graphite cores so that engineers can rate the quality of the core and establish its operational limits and maintenance requirements. See [2].

Jun 2014 – Aug 2019 | Research Assistant | Purdue University | West Lafayette, IN
- Generated a **crack prediction parametric model** using feature engineering and large datasets (60M+ datapoints) of aerospace material data. The model accurately **predicted** the crack initiation site for **4/4** of test case scenarios. See [3].
- The model showed that cracking resulted from the joint effect of microstructure, localized stress, and corrosion profile.
- Stress/strain calculations done with FFT, data analysis done via **GP + Principal Component Analysis**, data via HDF5.

Personal Projects

Jun 2024 – Present | Canadian Immigration CRS Cutoff Predictor
- Developed a time series forecasting model to predict Canadian immigration score cutoffs. The final model showed similar performance to state-of-the-art models while having an improved 60x runtime and easier redeployment. See [4].
- Implemented best **DevOps** practices for model creation, deployment & monitoring via Docker, MLflow, Prefect, Grafana.

Education

PhD Aerospace Engineering, Purdue University, 2019 – Bilsland Fellowship recipient.
MS Aerospace Engineering, Purdue University, 2016 – Chair of graduate student group “AeroAssist”.
BS Aeronautics Engineering, Universidad Aeronautica en Queretaro, 2013 – DHL Academic Excellence award.

Sources

[1] report: https://publications.anl.gov/anlpubs/2020/09/161948.pdf
[2] repository: https://github.com/Argonne-National-Laboratory/goose (report: https://publications.anl.gov/anlpubs/2020/08/161661.pdf)
[3] article: https://www.sciencedirect.com/science/article/abs/pii/S0013794419303005
[4] repository: https://github.com/anicolas91/CRScanada_MLOps