Pavel Komarov

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EXPERIENCE

BioIntelliSense – Remote, Redwood City, CA, Golden, CO – Principal Data Science Engineer **2021 – 2023**

- *Estimated Body Temperature:* Tried to predict core temp from device signals and ground truth in a series of Jupyter notebooks
- *Body Position:* Determines whether someone is supine, prone, upright, etc. from device signals, analyzed correctness over trials
- *Pressure Ulcers*: Created algorithm to detect and time orientation change for paralyzed patients, a $10 bil per year problem
- *Infection Alerts*: Feature engineering and selection and careful train/validation to detect illness solely from accelerometer, skin temperature and derived signals like heart rate, respiratory rate, and personalized baselines
- *Cloud Deployments:* Led Data Science team's efforts to reimagine our process and save Cloud team time by empowering data scientists to package and deploy their own algorithms
- *Firmware Algorithms:* Key in Data Science team's efforts to better package device algorithms for piecemeal experimentation
- *Tech Debt:* Led Data Science team's efforts to track, improve, supersede, and clean up poorly-working systems and old docs
- *Mentored an Intern:* Project focusing on ML explainability of the infection model using SHAP

Banjo – Remote, Salt Lake City, UT – Machine Learning Engineer **2020 – 2021**

- *Correlation and Tracking*: Tracked cars in space to 15cm accuracy with Extended Kalman Filter, Camera Jacobians, Hungarian Algorithm, Transformation Matrices, etc. Investigated and mitigated broken tracks.
- *Anomaly Detection*: Implemented an Expectation Maximization-based algorithm to find outliers in a social network
- *Object Detection*: Proved reusability of deep net by improving Mean Average Precision via fine tuning on 4000 images

Northrop Grumman – Melbourne, FL – Principal Software Engineer **2017 – 2020**

- *Advanced Battle Management Systems*: Statistical Analysis of flight tracks data, Sequence Classification research 2018 – 2020
- *Algorithms, Common Open Mission Software Architecture*: Wrote learning models from scratch, created Bayesian Optimization-based hyperparameter search framework (>10x training speedup over "grid search"), made a fast database based on memory-mapped arrays (~5x faster than SQL), built recursive model params↔xml save/loader 2017 – 2018

Microsoft – Mountain View, CA – Intern, Outlook Team **2014 & 2015**

- *PM, Developer*: Discovered wide-angle insights about Outlook users using NLP, detected and reset "zombie" Exchange clients

Georgia Institute of Technology – Teaching Assistant, Subset of Research Assistantships **2012 – 2017**

- *Signals and Systems & Digital System Design - School of Electrical and Computer Engineering* 2015 – 2017
- *Yi Lab, Biology*: Applied ML techniques (mostly feature reduction) to look for patterns in high-dimensional epigenetic microarray data and classify samples as diseased vs not diseased 2016
- *Starner Lab, Human Centered Computing*: Laid out PCB, soldered, and programmed wearable rehabilitation device 2016
- *Object Oriented Programming in Java - College of Computing*: lots of debugging students' code 2013 – 2015
- *Calculus II/III Teaching Assistant and Math Tutor - School of Mathematics*: My section avg'd a B; class avg was C 2012 – 2013

EDUCATION

University of Washington, Seattle, WA **2023 – Present**

- PhD Electrical and Computer Engineering, Kutz Lab

Georgia Institute of Technology, Atlanta, GA **2011 – 2017**

- MS Electrical and Computer Engineering, extra CS and life science, 4.0 GPA 2015 – 2017
- BS EE, CS minor (Machine Intelligence), extra science, 4.0 GPA, Highest Honors, Senior Scholar Award 2011 – 2015

SKILLS

- *Artificial Intelligence*: Implemented Search Strategies, Boosting, Decision Trees, Reinforcement Learning, Bayesian Inference, GANs, Recurrent and Convolutional Nets, Clustering, Mathematical Optimization. Able to pair problems with methods, papers
- *Python*: Correlation and Tracking, Anomaly Detection, Projection Pursuit, Jupyter Notebooks, my own packages, etc.
- *Cloud*: Google cloud functions, BigTable, pub/sub, Redis, AWS S3, EC2 instances and images, data annotation in SageMaker
- *Control Systems/Robotics*: Derived and implemented motor control on hardware, robotic arm eqns, SLAM, Nonlinear, Optimal
- *Signal Processing*: Convolution, norms and vector spaces, coded Kalman Filter, Conjugate Gradient Descent, etc.
- *Java*: Satellite tracking (1000s at once) at Northrop, TA (recitations, grading, office hours), picture sorter, minesweeper
- *C/Microcontrollers*: Wrote a suite of middleware functions: GPIO, Clocks, SPI, Interrupts, etc. Interfaced with peripheral devices

SELECTED PROJECTS

Exportify – exportify.net **2019**

Hundreds of global users per month. Created to answer "What sort of music do you like?" Interacts with Spotify's Web API to fetch song data and save as .csv. Data analysis provided by my Jupyter Notebook https://exportify.net/taste_analysis

Projection Pursuit Regressor and Classifier – pypi.org/project/projection-pursuit **2018**

More than 10000 pip installs! Found, studied, and implemented a paper generalizing this ML model to multivariate output. Technical explanation of how it works: pavelkomarov.com/projection-pursuit/math.pdf

Automatic Trader – Machine Learning for Trading **2016**

Extracted technical indicators from market data, fed to machine learner, invented a trading strategy to utilize predictions, and simulated. Performed Mean Variance Portfolio Optimization. Also tried a Reinforcement Learner to find optimal action.