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Colin Rennie

Expertise in machine learning and optimization – experience in software engineering, robotics, and data analytics

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education

Rutgers University, Piscataway, NJ
Master of Science (MS), Computer Science (GPA: 3.83) August 2014–July 2017
- Thesis: "Bayesian Optimization for Efficient Gait Library Generation in Complex Robotic Systems"
- Relevant coursework: pattern recognition, robot learning, artificial intelligence, algorithm design

Sonoma State University, Rohnert Park, CA
Bachelor of Science (BS), Finance (GPA: 3.50) August 2006–May 2011
- Concentration on computational finance; minor in computer science (cum laude)

software development skills

Languages: ‡C/C++, ‡Python, ‡SQL, †Matlab, †Cython, ❋R, ❋Ruby, ❋Node.JS
Libraries: ‡NumPy, ‡GPyOpt, ‡Pandas, ‡Matplotlib, †SciPy, †sk-learn, †Keras, †Caffe, ❋TensorFlow
Platforms & Tools: ‡Linux, ‡ROS, ‡Git, ‡Mercurial, †Anaconda

‡ Expert
† Proficient
❋ Novice

research experience

Rutgers University, Piscataway, NJ
Research Assistant - PRACSYS Lab August 2015–present
- Led research into novel techniques for efficient Bayesian optimization of a gait library – the optimized library was able to achieve similar results to Monte Carlo trials in only 1/4 the number of samples
- Collected large data-sets from simulation, architected machine learning model prototypes (e.g., scikit-learn and GPy) in data-driven approach to solving difficult problems in robotics – integrated models with C++ motion planning framework using Cython
- Headed computer vision effort for our Amazon Picking Challenge team, increasing pose estimation accuracy of LINEMOD algorithm by 15% through feature engineering in structured warehouse environment
- Designed and implemented controllers, motion planning algorithms, and robotic plants as core contributor to in-house developed, object-oriented C++ robotic simulation framework

NASA Ames Research Center, Mountain View, CA
Graduate Summer Intern - Pirate Lab July 2016–September 2016
- Designed multi-layer perceptron (MLP) neural network architecture to model forward dynamics for second-order controlled robotic system in Caffe
- Implemented bio-inspired control algorithms for central pattern generator (CPG) networks and designed physically-simulated, snake-like robotic system as simulation testbed

Max-Planck Institute, Berlin, Germany
Research Assistant - Center for Adaptive Behavior & Cognition January 2009–July 2009
- Through correlation analysis on large-scale data-set using Stata, reduced length of publicly administered questionnaire by 9/10 while retaining 95% of predictive capabilities in terms of future health care needs
- Analyzed and compared performance of SVM, random forests, and decision trees on both datasets

professional experience

RPX Corporation, San Francisco, CA
Senior Analyst - Corporate Development Group August 2012–August 2013
- Developed patent value regression model based on litigation, ownership, and market data – pricing estimates were used as primary tool for asset purchasing decisions
- Compiled and segmented patent market sales and settlement cost data – developed and presented market trend analyses and asset purchasing suggestions to C-level management, demonstrating business impact of data-driven predictive models

Data Analyst - Data Science & Analytics Group July 2011–August 2012
- Scripted data extraction and cleansing (ETL) processes from financial data provider APIs – used data to perform market segmentation and generate leads for internal sales team
- Designed PostgreSQL database schema for data storage and integration of internal and externally-provided data sources

teaching experience

CS674: Seminar in Robotic Learning Spring 2016
CS520: Introduction to Artificial Intelligence Fall 2015

research publications

C Rennie, Z Littlefield, V SunSpiral, and KE. Bekris. "Learning Gait Libraries using Gaussian Processes for Planning Trajectories of Snake-like Robots." 2017. [In Submission]

C Rennie, R Shome, KE. Bekris, and AF. De Souza. "A Dataset for Improved RGBD-based Object Detection and Pose Estimation for Warehouse Pick-and-Place." *IEEE Robotics and Automation Letters.* Vol. 1, no. 2. 2016. [approx. 33% acceptance]