Willa Potosnak

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Website
Google Scholar
LinkedIn

Education

Carnegie Mellon University (CMU), Robotics Institute Aug. 2022 - Current

Ph.D. in Robotics

Advisor: Dr. Artur Dubrawski

Duquesne University, Rangos School of Health Sciences May 2022

Summa Cum Laude

B.S., Biomedical Engineering with Minor in Mathematics

Research Experience

CMU, Robotics Institute, Auton Lab May 2020-Aug. 2022

Advisors: Dr. Artur Dubrawski (May 2020-Present), Dr. James Kyle Miller (May 2020-Present), Mr. Anthony Wertz (Summer 2020)

Research Intern (hired between RISS summers) Aug. 2021-Aug. 2022

- Developed Machine Learning (ML) models that demonstrate improved risk predictions for multiple post-operative outcomes using preoperative and intraoperative data. Additionally, models developed using preoperative data from local institutions outperform the industry standard model.
- Co-developed the auton-survival code package with Chirag Nagpal and demonstrated the application of Propensity Adjusted Treatment Effects and Counterfactual Survival Estimation to provide insight into the effect of geographic region and confounding factors on breast cancer mortality rates.
- Conducted research on Federated Learning and Knowledge Distillation algorithms to improve ML models for institutional organizations with data privacy and communication bandwidth constraints.

Robotics Institute Summer Scholars (RISS) Program Researcher Summer 2020 and 2021

- Improved the reliability of algorithmic rule learning using non-parametric ML algorithms that provide insight into beneficial model transfer opportunities between institutions with data privacy constraints.
- Developed an ML model that demonstrates the ability of intraoperative data to identify patients at higher risk of post-operative renal failure based on preoperative risk baselines.

Duquesne University Biomedical Engineering Department Lab

Advisor: Dr. Benjamin Goldschmidt

Assistive Technology Project Co-Lead Jan. 2019-May 2019

- Designed and 3-D printed an assistive device to facilitate tasks for those with grip disabilities due to stroke or other hand injuries.
- Designed and printed an assistive device for a disabled faculty member to facilitate instruction with hand-held medical tools.

Other Lab Experience

The Citizen Science Lab May 2019-Aug. 2019

Curriculum designer and instructor of STEM lessons and experiments for K-12 students.

Achievements

Nominated and accepted to the Undergraduate Consortium (UC) mentorship program at the Thirty-Sixth AAAI Conference on Artificial Intelligence (AI) (AAAI-22).

Student panelist for the 2021 Artificial Intelligence and Data Science Education Leadership meeting hosted by CSforAll and supported by the White House Office of Science and Technology Policy (OSTP) and the National Science Foundation (NSF).

Awarded one of the 2019 John G. Rangos Prizes for Duquesne curriculum proposal that integrated 3-D printing with prosthetic and assistive technology device design for patients.

Skills

Languages/Software/Systems: Python, PyTorch, MATLAB, Linux, HTML, Git, LaTeX

3-D Printing: 3-D printer use and maintenance, Autodesk Fusion 360, Ultimaker Cura

Extracurriculars

Volunteer co-lead of a CMU Robotics Institute team developing the ***RoboticsEd*** website for the purpose of helping to make robotics and AI resources more accessible to educators and their students.

Piano (12 years of study); guitar (6 years of study)

Publications and Presentations

Conference Publications

C1 Nagpal, C., **Potosnak, W.**, Dubrawski, A. (2022). auton-survival: an Open-Source Package for Regression, Counterfactual Estimation, Evaluation and Phenotyping with Censored Time-to-Event Data. *Proceedings of the 7th Machine Learning for Healthcare Conference*, *PMLR*, 182, 1-24.
[Paper] [Blog] [Code]

C2 **Potosnak, W.**, Dufendach K. A., Kaczorowski, D., Miller, J. K., Dubrawski, A. (2022). Machine Learning Models with Intraoperative Features Improve Risk Predictions Following CABG [Oral Presentation]. *Society of Thoracic Surgeons Coronary Conference.*
[Abstract]

C3 Dufendach, K. A., Nagpal, C., **Potosnak, W.**, Dubrawski, A., Kaczorowski, D., (2022). Novel Machine Learning Technique Defines Patients Who Benefit from Off-Pump CABG [Oral Presentation]. *Society of Thoracic Surgeons Coronary Conference*.
[Abstract]

C4 **Potosnak, W.**, Caldas, S., Dufendach, K. A., Clermont, G., Miller, J. K., Dubrawski, A. (2022). Robust Rule Learning for Reliable and Interpretable Insight into Expertise Transfer Opportunities. in *Proceedings of the Thirty-Sixth AAAI Conference on Artificial Intelligence.*
[Paper]

C5 **Potosnak, W.**, Caldas, S., Dufendach, K. A., Clermont, G., Miller, J. K., Dubrawski, A. (2021). Robust Interpretable Rule Learning to Identify Expertise Transfer Opportunities in Healthcare. *NeurIPS 2021 Workshop Bridging the Gap: from Machine Learning Research to Clinical Practice.*
[Workshop details]

C6 **Potosnak, W.,** Dufendach, K. A., Wertz, A., Miller, J. K., Kilic, A., Dubrawski, A. (2021 January 29-31). Continuous Intraoperative Data Analysis Using Machine Learning Reveals Multiple Parameters to Predict Post-CABG Renal Failure [Conference presentation abstract]. *Society of Thoracic Surgeons (STS) 57th Annual Meeting.*
[Meeting details]

C7 Rühling Cachay, S., Erickson, E., Bucker, A. F. C., Pokropek, E., **Potosnak, W.**, Osei, S., Lütjens, B. (2020). Graph Neural Networks for Improved El Nino Forecasting. *NeurIPS 2020 Workshop on Tackling Climate Change with Machine Learning*.
[Paper]