Lasith Adhikari

(Work authorization: *Green card holder*)
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Profile

Applied research scientist with 10+ years of experience in machine learning, simulation, mathematical/statistical modeling, and signal/image processing with applications in healthcare and basic sciences; with a proven track record of developing and publishing cutting-edge algorithms to solve complex real-world problems with tangible business impact; Responsible, independent, self-motivated, and hard-working individual passionate about AI for good.

Education

Ph.D. in Applied Mathematics — U.S.A.
University of California, Merced — Aug. 2012 - May 2017

B.Sc. (Special) in Mathematics — Sri Lanka
University of Sri Jayewardenepura — Apr. 2006 - July 2010

B.Sc. (Hons) in Information Technology — Sri Lanka
Sri Lanka Institute of Information Technology (SLIIT) — Jan. 2005 - Dec. 2008

Skills

- **Programming:** Python (Pandas, NumPy, Scikit-Learn), R, MATLAB
- **Database Query Languages:** SQL, Google BigQuery
- **Data Visualization:** Matplotlib, Seaborn, ggplot2
- **Software productization:** GitHub CI/CD, git, pytest, pylint, SonarQube
- **Modeling tools and methods:** Supervised learning (Random Forest, XGBoost, Logistic regression), time series modeling, discrete event simulation
- **Big data analytics:** Apache Spark (PySpark) with Apache Parquet datasets

Work Experience

Philips Research North America — Cambridge, MA
SCIENTIST — Jan. 2019 - Present

- Develop AI-driven software tools to assist hospital operations and care for the *Philips Patient Flow Capacity Suite* product
  - Chief designer and multinational project team lead to develop hospital patient flow simulation software product – forecast hospital census in real time using adaptive discrete event modeling technology (patent pending) with more than 90% accuracy
  - Implemented a machine learning model to predict patient discharge evaluation – modeling of physiological trends and labs using XGBoost classifier
- Ensure software meets quality standards according to company policies – Use GitHub CI/CD QA workflows, unit testing, static code analysis using SonarQube, etc.
- Actively work with R&D teams to deploying and testing AI algorithms as SaaS product in US hospitals– perform prospective validation using AWS cloud platforms
- Follow Agile methodologies in project management and help the team enhance and streamline the processes as Scrum Master

PRISMA^{P} Lab, Department of Medicine, University of Florida — Gainesville, FL
POSTDOCTORAL RESEARCH ASSOCIATE — Jun. 2017 – Jan. 2019

- Implemented an Intelligent real time surgery risk prediction system: *MySurgeryRisk*
  - Led the system and data engineering teams as the analytic core lead
- Improved predictive models for acute kidney injury (AKI) with IDEAs: Intraoperative Data Embedded Analytics
  - Incorporated intraoperative time-series data (vital signs, etc.) to predict post-surgical complication risk
  - Performed data engineering task/feature engineering on big data: electronic health care records, medication, labs, vital signs.
  - Achieved 8% net reclassification improvement in predicting kidney injury risk
  - Among the top 10% most cited PLOS ONE journal articles published in 2019

University of California, Merced — Merced, CA
GRADUATE STUDENT RESEARCHER/ TEACHING ASSISTANT — Aug. 2012 - Dec. 2016

- Researched on sparse recovery methods for the applications in medical imaging and signal/image processing
- Designed and implemented novel optimization algorithms using MATLAB:
  - Explicitly modeled Poisson noise to recover low light images and signals.
  - Enhanced sparsity and structure in the solution through p-norm ($p < 1$) regularization.
  - The proposed method eliminates spurious artifacts found in LASSO-type methods.
  - Employed different regularization techniques: nonconvex total variation, Shannon entropy, etc.
  - Applied these algorithms to solve time-dependent bioluminescence tomography and fluorescence lifetime imaging problems.
- Taught Probability and Statistics, Mathematical Methods for Optimization, Linear Algebra & Differential Equations, Numerical Analysis.

Other Selected Projects

A Method to explore variations of Ventilator-Associated Condition (VAC) Surveillance definitions Colab: MIT/Harvard/Duke/Stanford
CRITICAL CARE CONGRESS, 2022, DATATHON MEMBER Feb. 2020

- Analyzed large scale critical care databases in the United States (Philips eICU-CRD and MIMIC III)
- Developed a method to quantify the implications of variations in the VAC definition in different populations, across time and critical care settings

Predicting Hypoxemia trend in Critical Care patients MIT
2019.HST.953: COLLABORATIVE DATA SCIENCE IN MEDICINE GROUP MEMBER Sep. 2019 - Dec. 2019

- Led a team of three to predict the hypoxemia trend using machine learning
- Modeled trends within the first 24 hours following the start of mechanical ventilation using the last 24 hours of electronic medical records

Statistical and Applied Mathematical Sciences Institute NCSU, NC
INDUSTRIAL MATHEMATICAL AND STATISTICAL MODELING WORKSHOP MEMBER July 2016

- Worked as a lead member of a bathymetry estimation group under the guidance of the US Army Corps of Engineers
- Applied the linearized wave theory to estimate bathymetry near Duck, North Carolina from surface wave measurements
- Developed a MATLAB code to solve nonlinear inverse problem using the Tikhonov regularization techniques

Discrete image reconstruction using parallel beam geometry (CT: Computed Tomography) UC Berkeley/UC Merced
SCIENTIFIC COMPUTING GROUP PROJECT MEMBER Aug. 2013 - Dec. 2013

- Software Engineering for Scientific Computing: Developed a C++ software to build CT imaging system
- Implemented filtered back-projection using OpenCV and FFTW packages

Selected Publications

1. L. Adhikari et al., Improved Predictive Models for Acute Kidney Injury with IDEAs: Intraoperative Data Embedded Analytics, PLOS one Journal, 2019.
2. A. Ian Wong, L. Adhikari, et al., Analysis of discrepancies between pulse oximetry and arterial oxygen saturation measurements by race and ethnicity and association with organ dysfunction and mortality, JAMA Network Open Journal, 2021
3. C. M. Sauer, T. A. Dam, Leo A Celi, L. Adhikari, et al., Systematic Review and Comparison of Publicly Available ICU Data Sets—A Decision Guide for Clinicians and Data Scientists, Critical care medicine Journal, 2022
4. A. Ian Wong, L. Adhikari, et al., A Method to Explore Variations of Ventilator-Associated Event Surveillance Definitions in Large Critical Care Databases in the United States, Critical Care Explorations Journal, 2022
5. F. Wen, L. Adhikari, et al., Nonconvex regularization based sparse recovery and demixing with application to color image inpainting, IEEE Access Journal, 2017.
6. B. Shickel, T. J. Loftus, L. Adhikari, et al., DeepSOFA: A Continuous Acuity Score for Critically Ill Patients using Clinically Interpretable Deep Learning, Scientific Reports – Nature Journal, 2019
7. L. Adhikari and R. Marcia, Nonconvex relaxation for Poisson intensity reconstruction, Proceedings of the 2015 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), 2015.

(See more publications on my Google Scholar)

Patents

1. Inventors: S. Vij, G. Boverman, D. Noren, L. Adhikari, J. Weichert, Model to dynamically predict patient's discharge readiness in general ward, Patent number: WO2021009088A1, Date published: 2021-01-21.
2. Inventors: L. Adhikari, D. Noren, G. Boverman, Q. Li, System and method for dynamic workload balancing based on predictive analytics, Patent number: US 2021/0391063 A1, Date published: 2021-12-16.
3. Inventors: D. Noren, L. Adhikari, G. Boverman, System and method for identifying low clinical value telemetry cases, Patent number: US2022/0020478 A1, Date published: 2022-01-20.
4. Inventors: Y. Chang, S. Vij, L. Adhikari, System and method for personalized triage with survival modeling and constrained optimization, Patent number: US2022/0037026 A1, Date published: 2022-02-03.

(Find more Patent info on my Google Patents)