Chinmay Sahu

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Seeking Career Opportunities in application of Machine Learning & Computer Vision starting from June 2021

EDUCATION

Ph.D. Candidate, Electrical and Computer Engineering, **Clarkson University** (GPA: 4.0/4.0) *Fall 2017-Present* ***(Expected: May 2021)***

M.S. Process Control Engineering, **NIT, Tiruchirappalli** (GPA: 9.2/10.0) *Fall 2013 - Summer 2015*

B.S. Electrical and Electronics Engineering, **Biju Patnaik University of Technology** (GPA: 8.77/10.0) *Fall 2008 -Spring 2012*

SKILLS

- **Languages & Database:** (Proficient) Python, Matlab, C#, C++, Latex, Docker; (Prior Experience) Java, SQL, CSS, jQuery, Javascript.
- **Machine Learning Libraries:** Numpy, Pandas, Matplotlib, TensorFlow, Scipy, Keras, PyTorch, OpenCV, DLIB, CUDA, Scikit-Learn.
- **Machine Learning Concepts:** Classification, Regression, Clustering, Recommender Systems, Computer Vision, CNN, RNN, NLP.
- **Relevant Coursework**: Pattern Recognition & Neural Networks, Digital Signal Processing, Adaptive Signal Processing, Coding & Information Theory, Detection & Estimation Theory, Advanced Applied Statistics, Advanced Biometrics.

PROFESSIONAL EXPERIENCE

Research Assistant at Clarkson University, Potsdam, New York *Jan 2019 – Present*

- Design and develop algorithms to mitigate bias in face recognition.
- Design a machine learning pipeline to identify and classify users based on keystroke typing patterns to secure user privacy in web applications.
- Design a data-driven localization algorithm to estimate the source of secondary pacemakers during atrial fibrillation.
- Investigating gender bias and text classification in language models in NLP.
- User classification based on keystroke audio dataset.

Research Data Scientist Intern at Potsdam Sensors, Potsdam, New York (Project video**)** *May 2020 – Aug 2020*

- Built a data-driven indoor air exchange model to analyze the quality of air based on the real-time air contaminant data collected from classrooms.
- Estimated metrics such as air exchange rate, aerosol particle decay time to determine ideal gap time between two classes to prevent airborne infections.
- Designed data-driven localization models to locate sick patients suffering from cough, sneeze in indoor environments.

Teaching Assistant at Clarkson University, Potsdam, New York *Jan 2018 – Dec 2018*

- Instructor and grader for Linear circuits, sophomore level, Spring 18, class size 72 & Electrical circuit design lab, junior level, Fall 18, lab size of 48.

Software Designer at Alstom Transport India Ltd., Bangalore, India *Sep 2015 - July 2017*

- Delivered critical solutions to clients as a software designer, working on numerous backend windows based services built using WPF, WCF & MVC.
- Lead, architected & designed a testing tool for the client at Charleroi, Belgium.
- Researched, designed & developed a stable, scalable, and maintainable testing framework for ASP.NET based applications.

Research Assistant at National Institute of Technology, Trichy, India *July 2013 -Aug 2015*

- Developed and adapted a metaheuristic algorithm for building HVAC systems using real-time closed-loop data in Matlab.
- Designed an explicit model predictive controller for multi-variable and nonlinear processes using the Matlab platform.

ACADEMIC PROJECTS (2017 - Present) (LINKS)

Mitigating gender bias and text classification in Language Models (NLP, BERT, Deep learning)

- The objective is to investigate and analyze different language models to prevent gender bias in text.
- Researched topic classification using NMF, and LDA.
- Investigating to classify hate in text and tweets using BERT based text classification model.

Mitigating demographic bias in Face recognition using Skin Reflectance (Machine Learning, Biometrics, Computer Vision, Deep learning)

- The objective is to quantify the effect of skin reflectance to mitigate bias across demographics.
- Proposed a novel skin reflectance(SR) measure for subjects under different lighting conditions by detecting the face and extracting landmarks from the face using NIST MEDS-II (1k images), CMU Multi-PIE (750k images), Morph dataset (55k images), and FairFace Challenge dataset (153k images).
- Used Individual Typology Angle (ITA) to quantify skin tone of subjects to match Fitz-patrick skin type standards.
- Designing an explainable deep learning model with a softmax loss function to quantify the race of subjects with a certain confidence.

Mutli-User Authentication for cybersecurity applications using localization techniques (Machine Learning, Biometrics, Localization)

- The objective is to design a pipeline to identify multiple users accessing a keyboard (System/Mobile) based on their typing patterns.
- Used CMU benchmark keystroke data and MobiKey data of known users to extract features and project them in a reduced 2-D space using PCA, Kernal-PCA, t-SNE, MDS.
- Used an ordinal localization algorithm along with a set of clustering algorithms (X-means, DB-SCAN, GMM, KNN) for identifying number of users accessing a system and classifying them based on the nearest neighbor rule.
- Achieved a classification accuracy of 98.87 % for 4 users (Project video).

Estimating the core of spiral waves for atrial fibrillation ablation (IoT, Localization, Detection & estimation theory)

- Designed and formulated two novel modified time difference of arrival (mTDOA) based localization algorithms to identify the source of spiral waves during cardiac arrhythmia.
- Validated the algorithms by running Monte-Carlo simulations to evaluate the performance of algorithms in MATLAB.
- Extended the same algorithm to estimate forest fire propagation speed and tsunami wave speed along with source estimation.

PUBLICATIONS (LINKS)

- **Sahu, C.**, M. Banavar, J. Sun, "A Novel Modified and Generalized Time Delay of Arrival Algorithm for Target Estimation in Non-homogeneous Media." (In preparation).
- **Sahu, C.**, M. Banavar, S. Schuckers, "A novel non linear transformation based multi user classification algorithm for fixed text keystroke behavioral dynamics". (In Preparation for IEEE T-BIOM).
- Divyesh, V. R., **C. Sahu**, V. Kirubakaran, T. K. Radhakrishnan, and M. Guruprasath. "Energy optimization using metaheuristic bat algorithm assisted controller tuning for industrial and residential applications." Transactions of the Institute of Measurement and Control 40, no. 7 (2018): 2310-2321.
- **Sahu, C.**, V. Kirubakaran, T. K. Radhakrishnan, and N. Sivakumaran. "Explicit model predictive control of split-type air conditioning system." Transactions of the Institute of Measurement and Control 39, no. 5 (2017): 754-762.
- Kirubakaran, V., **C. Sahu**, T. K. Radhakrishnan, and N. Sivakumaran. "Energy efficient model based algorithm for control of building HVAC systems." Ecotoxicology and environmental safety 121 (2015): 236-243.

SELECTED INTERNATIONAL CONFERENCE & POSTER PRESENTATIONS (Full list on webpage)

- Bahmani, K., R. Pleash, **C. Sahu**, S. Schuckers, M. Banavar, SREDS: A dichromatic separation based measure of skin color, IWBF 2021 (Submitted).
- **Sahu, C.**, M. Banavar, Nonlinear Feature Transformation-Based Multi-User Classification For Keystroke Dynamics, CVPR Workshop 2021 (To be Submitted).
- **Sahu, C.**, M. Banavar, S. Schuckers, A novel distance-based algorithm for multi-user classification in keystroke dynamics, Asilomar 2020.
- **Sahu, C.**, M. Banavar, J. Sun, Vanitha M, Estimating the center of a rotor for AFib Ablation, ic-ETITE 2020.
- **Sahu, C.**, M. Banavar, J. Sun, Modified Time Delay of Arrival for Biomedical and Environmental Applications, Asilomar 2019.
- **Sahu, C.**, M. Banavar, J. Sun, Optimized Modified Time delay of arrival for Biomedical and Geo-hazard Applications, RAPS, Aug 2019.
- **Sahu, C.**, M. Banavar, J. Sun, Estimating the core of spiral waves for Atrial Fibrillation Ablation, RAPS, April 2019.
- **Sahu, C.**, M. K. Banavar, Performance comparison of matrix decomposition algorithms in event detection, RAPS, July 2018.
- **Sahu, C.**, K.V. Mack, M.K. Banavar, De-noising, event extraction from noisy wireless data using Go-Dec algorithms, RAPS, Apr. 2018.

AWARDS

- Best Poster Presentation in the Computational Methods (Graduate) category in 2019 Annual Summer Research and Project Showcase, Aug 2019, Clarkson University, Potsdam, NY.
- Best Poster Presentation in the Mathematical Methods and Simulations (Graduate) category in Third Annual Spring Research and Project Showcase, April 2019, Clarkson University, Potsdam, NY.

OTHER ACADEMIC ACHIEVEMENTS, HONORS, AND ACTIVITIES

- Session Chair for "Applications of Deep Learning I" at Asilomar Conference on Signal, System and Computers 2020.

REFERENCES

- Available upon request.