



Prasoon Patidar

Ph.D. Student, Carnegie Mellon University

I am a fourth-year PhD candidate, skilled at developing large-scale systems, embedded computing and machine learning to enhance ubiquitous sensing for user health/wellness. Expertise in human-AI collaboration, learning-based systems, and privacy-conscious data analysis. Seeking exciting opportunities to apply my user-centric sensing and ML expertise to build innovative, practical solutions.



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EDUCATION

Ph.D. in Societal Computing, S3D (Software and Societal Systems Department)

School of Computer Science, Carnegie Mellon University

08/2020 - Present

Pittsburgh, USA

B.Tech in Computer Science and Engineering (CSE)

Indian Institute of Technology, Delhi

08/2013 - 08/2017

New Delhi, India



TECHNICAL SKILLS

Artificial Intelligence

Generative Modeling, Deep Sequence Modeling, Time Series Analysis, Deep Vision Models, Reinforcement Learning

Data Science

Probabilistic Graphical Models, Big Data Analytics and Visualization tools, Experiment Design, Statistical Analysis

Programming Languages

Python, Go, MySQL, MongoDB, C, C++, Web Frameworks (ReactJS, Flask, Streamlit, Gradio)

Embedded Systems

Microcontrollers (Arduino Boards, Particle Devices, ESP32), FMCW Radars, IoT development, 3D modeling

Computer Systems

Machine Learning Operationalization (MLOps), Distributed Systems, Virtualization (Xen / KVM), Linux Administration

Cloud Computing

Serverless Functions, Elastic File Systems, API Design and Automation, Database Management



RESEARCH PROJECTS

AUTONOMOUS: Assisting dementia patients with day to day activities using ambient sensing systems (11/2023 - Present) [↗](#)

- Building an AI-system that can be integrated into existing technologies such as smart watches to offer communication assistance for people living with dementia and prolong independent living at home.
- Designing intervention strategies for patients to alleviate impact of dementia (forgetting steps, repeating activities etc.) without human intervention.
- Our team is semi-finalist for **The Longitude Prize on Dementia (over £4.42 million)** to drive the creation of technology-based tools for people living with the early stages of dementia.



AWARDS

CMLH Translational Fellowship in Digital Health (01/2024 - 12/2024)



Award Title: Assisting Dementia Patients with Day to Day Multi-step Activities using Privacy-sensitive Ambient Sensors.

Organization : Center for Machine Learning and Health, CMU



REFERENCES

Dr. Yuvraj Agarwal (Advisor) [↗](#)

"Associate Professor of Computer Science"

Email: yuvraj@cs.cmu.edu -

Office: (412) 268-7328

Dr. Mayank Goel [↗](#)

"Associate Professor of Computer Science"

Email: mayankgoel@cmu.edu -

Office: (412) 268-7260



TOP PUBLICATIONS

Proceedings of ACM Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT)

VAX: Using Existing Video and Audio-based Activity Recognition Models to Bootstrap Privacy-Sensitive Sensors [↗](#)

Author(s)

Prasoon Patidar, Mayank Goel, Yuvraj Agarwal

27 September 2023

Proceedings of ACM IMWUT. 7, 3, Article 117 (September 2023), 24 p.

Automate training of novel (private) sensors in unseen environments using **labels acquired from existing A/V models for recognizing activities of daily living** towards assisted living and healthcare monitoring.



RESEARCH PROJECTS

Edusense: Real-world Classroom Sensing at Scale (08/2020 - Present) [↗](#)

- Studying Human- AI collaboration towards professional growth of STEM university instructors using ambient classroom sensing systems.
- Built an **open-source, integrated sensing and analytics platform** to provide insights on classroom activities and behaviors to support instructor learning and pedagogy research.
- Recognized as **the first ever sensing tool used in real-life classroom environments** to unify the sensing, vision and machine learning features into a single system.

COCO-ML: Carbon Optimization on Cloud Computation for Machine Learning Inferences (01/2024 - Present)

- Building an **deployment and scheduling policy** for current MLOps platforms to reduce carbon emission from ML inference task in AWS cloud.
- Formulating a constrained optimization problem using historical patterns and resource availability, and **train optimal policies using deep Q-learning** approaches.

DOPE-ML: Designing Operational Policies for Machine Learning Environments (01/2022 - 06/2022) [↗](#)

- Proposed a learning based framework which creates **runtime policies to choose deployment platforms for ML tasks** based on user priorities.
- Implemented end to end pipeline for application creation, packaging, isolation and deployment using docker and bento-ml framework.
- Evaluated our system on five popular ML tasks including image classification, object detection, speech to text services, and language modeling.

Self-Serviced IoT: Practical and Private IoT Computation Offloading with Full User Control (08/2020 - 05/2022) [↗](#)

- Proposed an **IoT computation offloading framework** that allows apps to process users' private data using function as a service platforms.
- Built an end-to-end prototype of SSIoT using Jetson Nano and AWS Lambda to reduce cost and latency, while facilitating developer adoption.
- Created smart doorbell app with SSIoT that provides commercial devices functionalities while **protecting user data privacy at low cost (\$10/year)**.

Multiagent-RL: Privacy-preserving Incentive Mechanisms for Resource Sharing in IoT Markets (08/2021 - 12/2021) [↗](#)

- Devised trading **incentive model for multi-buyer, multi-seller scenarios** to include provider resource limitations and penalty mechanisms.
- Reformed RL-based techniques to find optimal provider strategies for pricing and resource allocation based on computing demand.
- Introduced deep reinforcement learning methods to **scale solution to large market sizes** that outperform current methods and are scalable.

Multi-purchase Behavior: Modeling, Estimation, and Optimization (06/2019 - 06/2020) [↗](#)

- Proposed BundleMVL-K model for multi-product **purchase behavior modeling** and efficient **optimization strategy** to compute recommendations.
- Demonstrated efficacy of modeling and optimization techniques on real-world datasets, with **~5% revenue gains** and **17% better log-likelihood** fits.



WORK EXPERIENCE

Data Scientist

Bidgely UtilityAI

08/2017 - 08/2020

Bangalore, India

Bidgely is an energy intelligence company that gives utilities unique behind-the-meter insights and the solutions platform.

Achievements/Tasks

- Applied advanced statistical & predictive modelling techniques to estimate global impact of Bidgely's engagement on customers for energy savings.
- Created automation pipeline for various Energy Efficiency experiments and verification reports on a periodic basis.
- Curated personalized lifestyle attributes for customers based on their energy usage patterns to improve quality of targeted rebate programs and user recommendations.



TOP PUBLICATIONS

Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT)

TAO: Context Detection from Daily Activity Patterns Using Temporal Analysis and Ontology [↗](#)

Author(s)

Sudershan Boovaraghavan, Prasoon Patidar, Yuvraj Agarwal
27 September 2023
Proceedings ACM IMWUT. 7, 3, Article 87 (September 2023), 32 pages.

Leverage OWL-based ontologies and temporal clustering approaches to **detect high-level contexts** from human activities to automate **productivity and stress measurement** in offices.

ACM Designing Interactive Systems

"An Instructor is [already] able to keep track of 30 students": Students' Perceptions of Smart Classrooms for Improving Teaching & Their Emergent Understandings of Teaching and Learning [↗](#)

Author(s)

Tricia J Ngoon, David Kovalev, Prasoon Patidar, Chris Harrison, Yuvraj Agarwal, John Zimmerman, Amy Ogan,
July 14, 2023,

DIS '23: Designing Interactive Systems Conference, Pittsburgh, PA, USA

Designing of upcoming classroom sensing systems that reconcile with student and instructor beliefs around teaching and learning.

IEEE World Forum on Internet of Things

Optimizing Adaptation of Smart Traffic Lights with Resource Constraints [↗](#)

Author(s)

Prasoon Patidar, Geoffrey B Dobson, Kathleen M Carley, Yuvraj Agarwal
09 November 2021

2021 IEEE 7th World Forum on Internet of Things, New Orleans, LA, USA, 2021, pp. 211-216

An algorithm to efficiently **deploy smart intersections within given budget constraints** in a city using a generic **simulation-based framework** based on historical patterns.