

IMANE LAMRANI

EMAIL: ilamrani@asu.edu

Phone: 571-331-4366

Google Scholar: [Click Here](#)

INTERESTS

Research & Development, Data Science, Machine Learning, AI Systems, Information retrieval, Database Management

EDUCATION

Arizona State University 01/2015 - 08/2020
Ph.D. in Computer Engineering (Focus: AI Systems, Model Learning, Information Retrieval, Operational Safety)

- Evaluating the safety of deployed systems using AI-based Hybrid Automata Learning approach (Minimed 670G)
Details: Learning an operational model from field collected data to extract system's safety information
- Explainable ML-based ASL cooperative learning application.
Details: Contributed to the development of an American Sign Language (ASL) tutoring system that provides informative and corrective feedback to the learner in human understandable form.
- Learning personalized control for the Artificial Pancreas (AP) using log data.

Jacksonville State University 08/2012 - 05/2014
M.S. in Computer Systems and Software Design

Capstone: Modeling and Simulation of cyber attacks on SCADA systems using *Matlab* and *Simulink-Truetime*

Faculté des Sciences de Kénitra, Morocco 09/2011 - 07/2012
Master1 in Intelligent Systems

Faculté des Sciences et Techniques de Fes, Morocco 09/2008 - 07/2011
Bachelor of Electronics, Telecommunications, and Computer Science

WORK EXPERIENCE

Nikola Motor 10/2022 - 10/2024
Sr. Research and Development Engineer

- System safety engineering and development of Automated-Driver Assist features for FCEV semi-trucks
- Software-in-the-loop (SIL), Hardware-in-the-Loop (HIL), and in-field testing
- Prototyping, Performance Analysis using timeseries log signals, Diagnosis, and Control Optimization

iMPACT Lab, Arizona State University 10/2020 - 10/2022
Postdoctoral Research Scholar

- Development of a novel AI-based method for operational model extraction
- Safety evaluation using hybrid automata learned from log signals of medical devices and automotive systems
- Contributed to grant proposals writing, research and development, and results generation (DARPA AMP grant in collaboration with the SEFCOM lab at Arizona State University)

Arizona State University 01/2015 - 08/2020
Research Assistant

- Personalized control of blood glucose for Type 1 diabetic patients via a parameter estimation tool where the subject-specific control parameters are automatically learned using log data collected from the AP's operation and used to generate personalized control of blood glucose for T1D subjects.

Food and Drug Administration (Silver Spring, MD) 05/2017 - 08/2017
ORISE Research Fellow

- Project: Development of a self-adaptive artificial pancreas using a supervisor to detect changes in the human body and adapt the control system accordingly

Square Zero, Inc (Santa Barbara, CA)
Research Intern

05/2013 - 01/2014

- Project: Analysis and implementation of different factoring algorithms using C++

Société Nationale de Radiodiffusion et Télévision (SNRT) (Rabat, Morocco)
Intern

06/2011 - 09/2011

- Project: VLSI implementation of Reed Solomon Code for errors detection and correction (Graduation Project).

PUBLICATIONS

JOURNAL

14. [IEEE-TII'20] **Imane Lamrani**, Ayan Banerjee, and Sandeep K.S Gupta. "Operational Data Driven Feedback for Safety Evaluation of Agent-based CPS." *IEEE Transactions On Industrial Informatics*, 2020.

CONFERENCE

13. [WAISE'2021] **Imane Lamrani**, Ayan Banerjee, and Sandeep K. S. Gupta. "Certification Game for the Operational Safety Analysis of AI-based CPS." *Artificial Intelligence Safety Engineering Workshop @SAFECOMP*, 2020.
12. [ICPS'2021] Ayan Banerjee, **Imane Lamrani**, and Sandeep K. S. Gupta. "FaultEx: Explaining operational changes in terms of design variables in CPS control code." *IEEE Conference on Industrial Cyber-Physical Systems*, 2020.
11. [AIED'2020] Ayan Banerjee, **Imane Lamrani**, Sameena Hossain, Prajwal Paudyal, and Sandeep K. S. Gupta. "AI Enabled Tutor for Accessible Training." *21st International Conference on Artificial Intelligence in Education*, 2020.
10. [ICPS'2020] Ayan Banerjee, **Imane Lamrani**, and Sandeep K.S Gupta. "Non-linear Analysis for Operational Safety Verification of Cyber Physical Systems." *IEEE Conference on Industrial Cyber-Physical Systems*, 2020.
9. [AAAI'20] **Imane Lamrani**, Ayan Banerjee, and Sandeep K.S Gupta. "Toward Operational Safety Verification of AI-Enabled CPS (student abstract)." *AAAI Conference on Artificial Intelligence*, 2020.
8. [SafeAI'20] **Imane Lamrani**, Ayan Banerjee, and Sandeep K.S Gupta. "Toward Operational Safety Verification Via Hybrid Automata Mining Using I/O Traces of AI-Enabled CPS." *Artificial Intelligence Safety Workshop*, 2020.
7. [AITEST'19] Ayan Banerjee, **Imane Lamrani**, Prajwal Paudyal, Sandeep Gupta. "Generation of Movement Explanations for Testing Gesture Based Co-operative Learning Applications." *IEEE International Conference On Artificial Intelligence Testing*, 2019.
6. [ICPS'18] **Imane Lamrani**, Ayan Banerjee, and Sandeep K.S Gupta. "HyMn: Mining Linear Hybrid Automata from Input/Output Traces of Cyber-Physical Systems." *IEEE Industrial Cyber-Physical Systems*, 2018.
5. [STAF'18] **Imane Lamrani**, Ayan Banerjee, and Sandeep K.S Gupta. "Co-simulation of Physical Model and Self-Adaptive Predictive Controller Using Hybrid Automata." *Federation of International Conferences on Software Technologies: Applications and Foundations*, 2018.

TUTORIAL/POSTER/SPECIAL SESSIONS

4. [ICPS'21 - Special Session] Sandeep K.S. Gupta, Ayan Banerjee, Imane Lamrani. "Operational Safety Verification of Cyber Physical Industry 4.0 Applications." *IEEE Conference on Industrial Cyber-Physical Systems*, 2021.
3. [ICPS'21 - Tutorial] Sandeep K.S. Gupta, Ayan Banerjee, Imane Lamrani. "Ensuring Safety and Establishing Trust for AI enabled Cyber-Physical Systems." *IEEE Conference on Industrial Cyber-Physical Systems*, 2021.
2. [ICPS'20 - Tutorial] Sandeep K.S. Gupta, Ayan Banerjee, Imane Lamrani. "Ensuring Safety and Establishing Trust for AI enabled Cyber-Physical Systems." *IEEE Conference on Industrial Cyber-Physical Systems*, 2020.
1. [AAAI'20 - Poster Session] Imane Lamrani, Ayan Banerjee, and Sandeep K.S Gupta. "Toward Operational Safety Verification of AI-Enabled CPS (student abstract)." *AAAI Conference on Artificial Intelligence*, 2020.

PATENTS

Systems and methods for hybrid automata mining from input-output traces of CPS. U.S. Patent No. 11054807.

Systems, methods, and apparatuses for utilizing co-simulation of a physical model and a self-adaptive predictive controller using hybrid automata. U.S. Patent Application No. 16/593,337.

INVITED TALKS

9. “Ensuring Safety and Establishing Trust for AI enabled Cyber-Physical Systems”, IEEE Industrial Cyber-Physical Systems (*Victoria, Canada (Zoom Conference)*), May, 2021.
8. “AI Enabled Tutor for Accessible Training”, Apple Education Team (*Cupertino, California (Webex Conference)*), August, 2020.
7. “Operational Safety Verification of AI enabled Cyber-Physical Systems”, IST Austria (*Vienna, Austria (Zoom Conference)*), July, 2020.
6. “Ensuring Safety and Establishing Trust for AI enabled Cyber-Physical Systems”, IEEE Industrial Cyber-Physical Systems (*Tampere, Finland (Zoom Conference)*), June, 2020.
5. “Operational Safety Verification of AI enabled Cyber-Physical Systems”, Long Island University (*Long Island, NY (Zoom Conference)*), June, 2020.
4. “Toward Operational Safety Verification Via Hybrid Automata Mining Using I/O Traces of AI-Enabled CPS”, AAAI Conference(*Hilton New York Midtown, New York*), February, 2020.
3. “Generation of Movement Explanations for Testing Gesture Based Co-operative Learning Applications”, AITest Conference(*Doubletree by Hilton Newark - Fremont, California*), April, 2019.
2. “HyMn: Mining Linear Hybrid Automata from Input/Output Traces of Cyber-Physical Systems”, IEEE Industrial Cyber-Physical Systems(*Saint Petersburg, Russia (Virtual)*), May, 2018.
1. “Robust Controller Software Synthesis for Non-linear Safety Critical Cyber-Physical Systems”, FADEX-CPS’16 Seminar Auditorium, bâtiment IMAG(*Grenoble, France*), July, 2016.

RECOGNITIONS, SCHOLARSHIPS, AND AWARDS

Arizona State University, CIDSE- Doctoral Fellowship Award	Spring and Fall 2020
Oak Ridge Institute for Science and Education (ORISE) Research Fellowship	2017
French-American Doctoral Exchange(FADEX)-CPS Laureate	2016
Jacksonville State University- International House Program Scholarship	2012
Faculté des Sciences de Kénitra- Merit Scholarship	2011

SKILLS AND LANGUAGES

Python, Java, C/C++, Matlab, Simulink, Git, Vector CANalyzer, SQL, PL-SQL

Arabic, English, and French: fluent writing, reading and speaking