Nitish Nagesh

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RESEARCH INTERESTS

Causal Inference, Applied Machine Learning, Recommendation Systems, Knowledge Graphs.
Applications: Food, Nutrition, Wellness, Integrative Health

EDUCATION

University of California, Irvine   Irvine, CA
Ph.D. in Computer Science   *Sep. 2021 – Jun. 2026 (expected)*

University of California, Irvine   Irvine, CA
M.S. in Computer Science; GPA: 3.83/4.0   *Sep. 2021 – Jun. 2023*

- **Relevant coursework**: Machine Learning, Artificial Intelligence, Natural Language Processing, Information Retrieval, Algorithms and Data Structures, Causal Inference, Innovation and Product Development, Computer and Communication Networks, Embedded and Ubiquitous Systems

University of California, San Diego   San Diego, CA
M.S. Study Abroad, Computer Science and Engineering; GPA: 3.73/4.0   *Sep. 2019 – Jun. 2020*

Technical University of Munich   Munich, Germany
M.S. in Power Engineering, Dept. of Electrical and Computer Engineering; CGPA: 3.70/4.0   *Oct. 2018 – Dec. 2020*

R.V. College of Engineering   Bengaluru, India
B.E. in Electrical and Electronics Engineering; GPA: 3.65/4.0   *Aug. 2012 – July. 2016*

RESEARCH EXPERIENCE

iHealth Labs   San Jose, CA, USA
Research and Strategy Data Scientist   *June 2023 – Present*

- De-identify, aggregate and analyze health records for 5000 patients to manage diabetes and hypertension.
- Lead retrospective data analysis to evaluate efficacy of disease management interventions on clinical outcomes.
- Develop machine learning strategies to personalize health recommendation towards preventative healthcare.

University of California, Irvine   Irvine, CA, USA
Researcher, Institute for Future Health, Supervisors: Prof. Ramesh Jain, Prof. Amir Rahmani, Prof. Nikil Dutt *Sep. 2021 – Present*

- Build personal models and recommendation systems for 4 year N-of-1 food, nutrition, sleep, activity dataset.
- Formulate causal graphs, validate robustness of causal estimates and estimate counterfactuals for time series data.
- Develop open-source food and well-being database for users to navigate their health journey.
- Design data collection schema and knowledge graphs for standardize food, recipes, ingredients and health effects.
- **Research Output:** 2 paper publications

University of California, San Diego   San Diego, CA, USA
Researcher, System Energy Efficiency Lab, Supervisor: Prof. Tajana Rosing   *Sep. 2019 – Feb. 2021*

- Developed novel reliability-aware task allocation strategies for IoT networks using Python to reduce overall maintenance cost.
- Built a real-world IoT mesh network communicating via MQTT and Wi-Fi to measure impact of resource constraints on reliability.
- Achieved 90% accuracy while validating a reliability simulation framework for IoT networks using Python and C/C++.

- **Research Output:** Master's thesis and 2 paper publications

University of California, San Diego San Diego, CA, USA

Independent Research, Supervisor: Prof. Dr. Pat Pannuto Jan. 2020 – Jun. 2020

- Developed a remote monitoring tool to infer relationship between soil pH, soil conditions and ambient environment unlike traditional stand-alone systems
- Effectuated targeted fertilizer application by calibrating a soil pH sensor with an average accuracy of 75%
- Researched sensing techniques and machine learning approaches to measure and predict nitrate concentration in large scale deployments
- Researched collaboratively on reproducibility for cyber-physical systems and IoT with case studies while referencing machine learning.
- **Research Output:** 1 paper publication

Technical University of Munich Munich, Germany

Young Academy Scholar, Supervisor: Prof. Winfried Petry Nov. 2018 – Mar. 2020

- Developed *MUCTrail* - an online tool to teach young children about the scientific method in the context of climate change
- Led software development and scientific writing efforts while working in an interdisciplinary team of researchers from the Economics, Medicine, and Biology departments
- **Research Output:** Publication in project book and social media visibility

R.V. College of Engineering Bengaluru, India

Undergraduate Researcher, Supervisor: Prof. Dr. K Uma Rao Jan. 2016 – Jun. 2016

- Developed a real-time cloud-based diagnostic tool for detecting faults in a micro-grid using MATLAB Simulink
- Effectuated an online alert generation system based on fault criticality allowing targeted maintenance of micro-grid
- **Research Output:** Bachelor's thesis and 1 paper publication

PUBLICATIONS

- **Nitish Nagesh**, Iman Azimi, Tom Andriola, Amir M. Rahmani, Ramesh Jain. **Towards Deep Personal Lifestyle Models using Multimodal N-of-1 Data.** 29th International Conference on Multimedia Modeling, 9-12 January 2023, Bergen, Norway.

- Ali Rostami, **Nitish Nagesh**, Amir M. Rahmani, Ramesh Jain. **World Food Atlas for Food Navigation.** 7th International Workshop on Multimedia Assisted Dietary Management, 30th ACM International Conference in Multimedia (ACMM2022), Lisbon, Portugal, October 10th, 2022.

- **[2nd Best Presentation Award]**. Alex Yen, Bryse flowers, Wenshan Luo, **Nitish Nagesh**, Peter Tueller, Ryan Kastner, Pat Pannuto **"A UCSD View on Replication and Reproducibility for CPS & IoT"**, 4th Workshop on Benchmarking Cyber-Physical Systems and Internet of Things (CPS-IoTBench) 2021.

- Kazim Ergun, Xiaofan Yu, **Nitish Nagesh**, Ludmila Cherkasova, Pietro Mercati, Raid Ayoub, and Tajana Rosing. **"RelIoT: Reliability Simulator for IoT Networks."** In International Conference on Internet of Things, pp. 63-81. Springer, Cham, 2020

- Kazim Ergun, Xiaofan Yu, **Nitish Nagesh**, Ludmila Cherkasova, Pietro Mercati, Raid Ayoub, and Tajana Rosing. **"Simulating Reliability of IoT Networks with RelIoT."** In 2020 50th Annual IEEE-IFIP International Conference on Dependable Systems and Networks-Supplemental Volume (DSN-S), pp. 25-28. IEEE, 2020.

- K. Uma Rao, Akash G. Parvatikar*, S. Gokul*, **N. Nitish***, and Pramod Rao*. **"A novel fault diagnostic strategy for PV micro grid to achieve reliability centered maintenance."** In 2016 IEEE 1st International Conference on Power Electronics, Intelligent Control and Energy Systems (ICPEICES), pp. 1-4. IEEE, 2016. *equal contribution

PROFESSIONAL EXPERIENCE

Qualcomm   Austin, TX
Platform Integration Engineer   *Mar. 2021 – Aug. 2021*

- Developed a Python tool to parse test data from 5000+ manufacturing logs of QAIC100 AI accelerator saving 3x cycle time.
- Triaged and debugged failures in QAIC100 SDK using Linux scripting leading to a system-wide process change in the test methodology.
- Involved in setting up proprietary server platforms in the corporate research and development lab for performance tests.

General Electric, Healthcare Division   Bengaluru, India
Operations Management Leadership Program (OMLP) Intern   *Jun. 2015 – Jul. 2015*

- Conceptualized single piece flow in an assembly line of X-Ray devices increasing productivity by 60%
- Created a data monitoring template using Failure Mode Effect and Criticality Analysis (FMECA) tool which led to a reduction in equipment downtime by 30%
- Designed a new layout for the high voltage (HV) tanks equipment area enabling undisturbed access to personnel and allowing a smoother flow of materials

SKILLS

- **Programming:** MATLAB, Python, C, Embedded C, C++, Java, Tcl
- **Software Tools and Packages:** PyTorch, Keras, TensorFlow, Pandas, NumPy, Scikit-learn, SciPy, Simulink, Arduino IDE, Git, Vivado HLS, SQL, HTML, CSS, Dash, I2C, UART, SPI, Code Composer Studio, Matplotlib, QAIC100 SDK
- **Hardware:** Oscilloscope, Logic Analyzers, JTAG, Arduino, Raspberry Pi, NodeMCU, PYNQ-Z2
- **Languages:** English (Native/Bilingual proficiency), German (Limited working proficiency), Spanish (Elementary Proficiency), Telugu (Native/Bilingual proficiency), Kannada (Native/Bilingual proficiency), Hindi (Limited working proficiency), Tamil (Elementary proficiency)

PROJECTS

Food Mood Buddy   Irvine, CA
Independent Research Project, Supervisor: Prof. Dr. Ramesh Jain   *Jan. 2023 – Present*

- Develop personalized AI-driven food recommendation system to improve mood through dietary interventions.
- Built dataset to track and analyze food, exercise, sleep, physiology, circadian rhythm and mental health state.

Image Segmentation using Deep Learning   Irvine, CA
Course Project, Supervisor: Prof. Dr. Pierre Baldi   *Mar. 2023 – Jun. 2023*

- Implemented and evaluated image segmentation pipeline using TensorFlow and Segment Anything (SAM).
- Achieved IoU=0.31 for optic disk and IoU=0.08 for fovea segmentation for automated retinal anomaly detection.

Natural Language Processing Implementation   Irvine, CA
Course Project: Natural Language Processing , Supervisor: Prof. Dr. Sameer Singh   *Apr. 2022 – Jun. 2022*

- Classified presidential candidate speeches via supervised and semi-supervised learning in Python/TensorFlow.
- Built n-gram language models on the Brown, Gutenberg and Reuters corpuses. Analyzed in-domain and out-of-domain perplexities to compare language models and individual sentences.
- Developed a part-of-speech (POS) and named entity recognition (NER) tagger for twitter data using Conditional Random Fields (CRF) and incorporated Viterbi algorithm to improve CRF accuracy.
- Implemented top-K sampling, nucleus sampling, beam search decoding algorithms and evaluated summarization models qualitatively and quantitatively using Python/TensorFlow.

Slot Descriptions in Self-Attentive Dialogue State Tracking (DST)   Irvine, CA
Course Project: Natural Language Processing , Supervisor: Prof. Dr. Sameer Singh   *Apr. 2022 – Jun. 2022*

- Implemented full-shot and zero-shot dialogue state tracking on MultiWoz 2.1 dataset with 5 domains and 8438 dialogues using Python/TensorFlow to transfer knowledge from resource rich domains to unknown domains
- Deployed BERT base model and evaluated accuracy for inserting slot descriptions in zero-shot and full-shot DST

Web Crawler and Search Engine Builder Irvine, CA

Course Project: Information Retrieval, Supervisor: Prof. Pramit Choudhary *Jan. 2022 – Mar. 2022*
- Crawled 50,000 URLs from ics.uci.edu domain using Python to find page similarity and subdomains
- Built search engine using Flask, HTML, CSS to query and retrieve top twenty matches from crawled databases

Fashion MNIST Classification using Covolutional Neural Networks Irvine, CA

Course Project: Machine Learning , Supervisor: Prof. Dr. Roy Fox *Sep. 2021 – Dec. 2021*
- Classified fashion-MNIST dataset running convolutional neural networks (CNN) on Google Colab using Python
- Achieved 95.88% training accuracy and 93% test accuracy after hyperparameter tuning and cross-validation

Reinforcement Learning and Machine Learning Algorithm Design Irvine, CA

Course Project: Artificial Intelligence, Supervisor: Prof. Dr. Roy Fox *Sep. 2021 – Dec. 2021*
- Programmed reinforcement learning agent using Monte Carlo Tree Search in Python to solve Sokoban puzzle
- Designed and implemented machine learning algorithms using kNN, Naïve Bayes classifiers, linear regression, cross-validation, logistic regression, shattering, nearest neighbor, decision trees, neural networks, and clustering

Interactive global energy consumption dashboard San Diego, CA

Lab Project: Renewable and Sustainable Energy, Supervisor: Prof. Dr. Thomas Hamacher *Apr. 2020 – July. 2020*
- Developed first-of-its-kind energy parameter visualization platform for 200+ countries using Dash
- Deployed scalable and globally accessible website using Heroku sourcing data from a structured SQL database using SQLite
- Actualized user-friendly interface for parameters with customizable checkboxes and predictions using logistic regression in Python

Algorithm design and benchmarking for FPGA San Diego, CA

Course Project: Validation and Testing of Embedded Systems, Supervisor: Prof. Dr. Ryan Kastner *Jan. 2020 – Mar. 2020*
- Achieved average 85% throughput for FIR filter, DFT, FFT using Vivado High Level Synthesis (HLS)
- Added a new benchmark to Spector HLS, a benchmark suite for FPGA by implementing canonized Huffman Encoding in C++
- Optimized design space with 15% higher throughput range and 60% greater pareto points compared to baseline

Real-time soil environment monitor with pest deterrence San Diego, CA

Course Project: Introduction to Embedded Computing, Supervisor: Prof. Dr. Tajana Rosing *Jan. 2020 – Mar. 2020*
- Outperformed traditional sensing techniques with remote soil sensing and active real-time pest deterrence using Linux, C/C++
- Introduced predictive capabilities within 10% sensing range based on linear regression using the Scikit-learn library in Python
- Visualized soil vitals on an interactive online dashboard developed using HTML, CSS, Flask, and JavaScript

Contactless trash weight estimator San Diego, CA

Course Project: Embedded Computing and Communication, Supervisor: Prof. Dr. Aaron Schulman *Sep. 2019 – Dec. 2019*
- Attained 70% accuracy in determining an unknown amount of grocery waste using C/C++ and principles of RF attenuation
- Observed less than 25% standard deviation during prototype testing using received signal strength indicator (RSSI) metric
- Realized hands-off food waste estimation without modifying existing trash bin structure by simple retrofitted add-ons

Real-time wireless ambient temperature sensing Munich, Germany

Lab Project: Sensor Node, Supervisor: Prof. Dr. Markus Becherer *Jun. 2019 – Aug. 2019*
- Developed wireless temperature sensing framework using a resistance temperature detector (RTD) sensor with less than 0.2 variation between sensed and actual values
- Achieved 20% less external noise interference using a Sallen-Key low-pass filter in read-out circuit built using PSoC creator
- Executed real-time secure communication with less than 5% latency using C/C++ with data encapsulation and visualization

Competitive Edge Summer Research Program Peer Mentor   Irvine, CA
University of California, Irvine   *July. 2023 – Present*
- Peer mentor for incoming underrepresented computer science graduate student with diverse academic and cultural background

Lead Mentor, Artificial Intelligence Club   Irvine, CA
University of California, Irvine   *Sep. 2021 – Present*
- Designed and executed a 10-week long comprehensive coding interview preparation program for 15 students to prepare them for software engineering and machine learning internships and jobs in the industry
- Led weekly paper discussion sessions on seminal and trending topics in AI/ML/Data Science for 10 students in Spring 2022
- Initiated How to apply to Grad School series for 50+ students and reviewed 5+ Statement of Purposes leading to successful admits in top schools such as CMU
- Presented a talk on How to apply for research opportunities in UCI for 20 + students leading to 5+ students pursuing UROP and other on-campus research roles
- Hosted panel discussion on AI startups with 5 leading founders/CEOs at the ANTrepreneur center attended by 50+ students from diverse backgrounds.

ANTrepreneur Center Graduate Venture Consultant Fellow   Irvine, CA
University of California, Irvine   *Sep. 2022 – Dec. 2022*
- Assisted Director with ANTrepreneur Center programming, research and assessment, and student venture consultations.
- Led 20+ 1:1 coaching sessions with an average consulting time of 40 min for aspiring student entrepreneurs offering expertise in market research, customer discovery, and business model canvas with a focus on food and well-being ecosystems.
- Facilitated in-person startup training presentations and fostered research collaborations between student teams.
- Represented the ANTrepreneur Center at campus events such as ANTeater involvement fair and the innovation and product development class.
- Initiated strategic partnerships with the AI@UCI club and UCI ICS Alumni chapter leading to hosting joint events.

Graduate Interconnect (GIC) Peer Mentor   Irvine, CA
University of California, Irvine   *Jun. 2022 – Dec. 2022*
- Assisted staff at the International Center in helping 20 incoming graduate students to transition smoothly into their graduate program
- Mentored graduate student 1:1 after arriving at UCI on aspects related to finding advisors, logistics, and program specific questions
- Empowered students towards professional development during graduate school through creating content via blogpost for the Graduate Postdoctoral Scholar Resource Center (GPSRC).
- Assisted lead peer mentor in planning and executing on-campus graduate student walks leading to increased camaraderie and school spirit.

Undergrad Research Mentor   San Diego, CA
University of California, San Diego   *Jan. 2020 – Mar. 2020*
- Interacted biweekly with rising undergraduate junior introducing my research, busting myths about research, explaining research projects in the lab, and pointing student toward resources for undergraduate research.
- Motivated student to carry out research that led him to pursue research assistant and undergrad researcher positions during his senior year

Buddy for Practical Research Experience Program (PREP) Students   Munich, Germany
Technical University of Munich   *May. 2019 – Aug. 2019*
- Assisted undergraduate student from UC Berkeley in overcoming logistical and cultural challenges while in Munich.

Mentor for International Exchange Student   Munich, Germany
Technical University of Munich   *May. 2019 – Aug. 2019*
- Supported junior undergraduate student from National Chiao Tung University, Taiwan with specific questions related to the Electrical and Computer Engineering Program

TEACHING

Teaching Assistant   Irvine, CA
University of California Irvine   *Sep. 2021 – Present*

- Tutor and mentor 200+ students in the upper division course *Critical Writing on Information Technology*
- Critically evaluate students elevator pitches, technical resumes, presentations and persuasive letters by providing constructive feedback preparing them to excel in corporate and academic roles
- Led weekly discussion sessions for 40+ students in Winter 2023 and Spring 2023 enabling mentees to draft better technical documents for proposing changes to existing communication and wellbeing platforms such as Gmail, Instagram, TikTok, Headspace etc.

LEADERSHIP

Student Representative, Diverse Educational Community and Doctoral Experience   Irvine, CA
Department of Computer Science, University of California Irvine   *Sep. 2021 – Present*

Member, Torrey Pines Toastmasters Club   San Diego, CA
University of California San Diego   *Oct. 2019 – Present*

Finance Lead, U2Q (University to Qualcomm) Board   Austin, TX
Qualcomm   *May. 2021 - Aug. 2021*

Secretary, Torrey Pines Toastmasters Club   San Diego, CA
University of California San Diego   *Jun. 2020 – Dec. 2020*

Member, Association of Indian Graduate Students (AIGS)   San Diego, CA
University of California San Diego   *Sep. 2019 – Jun. 2020*

Organizer, Young Academy Science Hackathon   Munich, Germany
Technical University of Munich   *Dec. 2020*

HONORS AND AWARDS

Bob & Barbara Kleist Endowed Graduate Fellowship US $2,500   Irvine, CA
Donald Bren School of Information and Computer Sciences, University of California Irvine   *May. 2023*

University of California Grad Slam Semi Finalist (1 of 50) for 3-min research pitch   Irvine, CA
University of California Irvine   *Jan. 2023*

Best Social Media Reporter   Lisbon, Portugal
ACM Multimedia Conference 2022   *Nov. 2022*

Student Travel Grant US$2,000 for ACM Multimedia Conference 2022   Lisbon, Portugal
ACM SIGMM (Associated Computing Machinery Special Interest Group in Multimedia)   *Aug. 2022*

Entrepreneurial and Technical Lead, Wayfinder UC-affiliated Start-up Incubator   Irvine, CA
University of California Irvine Beall Applied Innovation   *Jun. 2022 – Present*

Mental Health Hackathon Winner US$3,500 (1 of 30)   Irvine, CA
University of California Irvine ANTrepreneur Center and Sigma Computing   *May. 2022*

Elevator Pitch Competition Winner US$100 (2nd out of 10)   Irvine, CA
Graduate Professional Success for PhD students and Postdocs in STEM, University of California Irvine   *Dec. 2021*

University of California Grad Slam Semi Finalist (1 of 40) for 3-min research pitch   Irvine, CA
University of California Irvine   *Feb. 2022*

Graduate Student Fellowship US$2,500 (1 of 350) for academic excellence and future promise   Irvine, CA
Graduate Division, University of California Irvine   *Sep. 2021*

Richard Newton Young Fellow Grant (1 of 80)   San Diego, CA
57th Design Automation Conference (DAC) (Remote)   *Jun. 2020*

International Student Scholarship US$2,500 (1 of 200) for academic excellence   Munich, Germany
Government of Bavaria and Technical University of Munich   *Nov. 2019 – Dec. 2020*

Masters Thesis Scholarship US$2,000 (1 of 50) for writing masters thesis abroad   Munich, Germany
German Academic Exchange Service (DAAD) and Technical University of Munich   *Nov. 2020 – Feb. 2021*

Young Academy Scholarship (1 of 40) for passion towards science   Munich, Germany
Government of Bavaria and Technical University of Munich   *Nov. 2018 – Dec. 2020*

Most Innovative Thesis Award (2nd in 70) for entrepreneurship excellence | Bengaluru, India
R.V. College of Engineering | *Jul. 2016*

Academic Excellence Award (2nd in 70) for highest overall GPA | Bengaluru, India
R.V. College of Engineering | *Aug. 2012 – Jul. 2016*

Best Outgoing Student (1st in 70) for all round excellence | Bengaluru, India
R.V. College of Engineering | *Aug. 2012 – Jul. 2016*

INVITED TALKS

Scientific Writing for Information Technology | Online
Host – Maija Kale, University of Latvia | *Feb. 2023*

Personalized Wellbeing Recommendation Systems for Human and Environmental Health | Delhi, India
Host – Prof. Ganesh Bagler, IIIT-Delhi | *Dec. 2022*

World Food Atlas and Building Personalized Food Recommendation Systems | Haryana, India
Host – Prof. Partha Pratim Das, Ashoka University | *Dec. 2022*

Towards Building Personalized Food and Wellness Recommendation Systems | Paris, France
Host – Prof. Lionel Bretillon, INRAE - National Research Institute for Agriculture, Food and the Environment | *Oct. 2022*

Youth Action Assembly - Regional Roundtables for Asia, Pacific and North America | Rome, Italy
World Food Forum, United Nations Food and Agricultural Organization (UN FAO) | *Oct. 2022*

Building Personalized Food and Wellness Recommendation Systems | Barcelona, Spain
Host – Prof. Petia Radeva, University of Barcelona | *Oct. 2022*

World Food Atlas for Food Navigation | Lisbon, Portugal
7th International Workshop on Multimedia Assisted Dietary Management | *Oct. 2022*

SERVICE

Reviewer | Bergen, Norway
29th International Conference on Multimedia Modeling | *Jan. 2023*

Volunteer | Lisbon, Portgual
30th ACM International Conference on Multimedia | *Oct. 2022*

Volunteer | Bengaluru, India
SMVA Trust, NGO | *Aug. 2016 – Sep. 2018*

- Actively engaged in "Feeding the Hungry" project for 20 hours/month where my team and I distributed freshly cooked meals to 10+ orphanages and senior centers to alleviate poverty and hunger
- Organized personal hygiene awareness campaigns for impoverished youth toward long-term health.
- Involved in visiting villages, distributing clothes, environmental stewardship, and offering humanitarian assistance during natural calamities

CERTIFICATES

Improv for Teaching Certificate | Irvine, CA
Graduate Division, University of California Irvine | *Mar. 2023*

Public Speaking Certificate Program | Irvine, CA
Activate to Captivate, University of California Irvine | *Aug. 2022*

Mentoring Excellence Program | Irvine, CA
University of California Irvine | *May. 2022*

Mini Law School | Boulder, CO
University of Colorado Boulder | *Oct. 2020*

Micro MBA, Rady School of Management | San Diego, CA
University of California San Diego | *Aug. 2020*

REFERENCES

Dr. Amir Rahmani
Associate Professor
UC Irvine
Ph.D. Advisor
a.rahmani@uci.edu

Dr. Ramesh Jain
Distinguished Professor Emeritus
UC Irvine
Ph.D. Mentor
jain@ics.uci.edu

Shannon Alfaro
Continuing Lecturer
UC Irvine
Writing Instructor
alfaro@uci.edu