TAQIYA EHSAN

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Education

Rutgers University — New Brunswick, NJ
B.S. in Electrical & Computer Engineering, GPA: 4.0/4.0 — 2019–Current

Projects

Visual Prompting for Depth Estimation

MIT CSAIL — Summer - Fall 2022

- Studied prompting techniques for computer vision, specifically for depth estimation
- Researched and curated datasets and pre-trained depth estimation models for implementing visual prompting
- Developed training code and fine-tuned hyper-parameters (learning rate, prompt size, loss function, optimizer, evaluation metrics) for training a visual prompt on top of a CNN-based pre-trained model
- Designed experiments to train the most optimal visual prompt that outperforms state-of-the-art in depth estimation
- Adapted prompting to a Vision Transformer model
- Trained and tested a visual prompt on out of distribution datasets to show improvement in evaluation metrics

Domestic Audio Classifier

Rutgers CyberPhysical Intelligence Lab — Fall 2021

- Researched potential datasets for the acoustic scene classifier and testing out different feature extraction techniques for building the most efficient audio classifier.
- Designed an effective pipeline to fetch, process, and extract features from audio clips of daily household activities like cooking, washing, exercising, etc.

Analyzing Social Distancing Based on Sensory Inputs

Rutgers WINLAB — Summer 2021

- Designed multi-step preprocessing pipeline to optimize the results from the final distance estimation algorithm
- Preprocessed a dataset consisting of over 300 million images from Nexar to optimize performance through a Distance Estimation algorithm
- Implemented an object detection CNN model called You Only Look Once (YOLO) to filter out images with people and then used NumPy norm and geometric mean to develop an algorithm that filtered out blurry images which did not meet a designated threshold average-per-pixel brightness

Research

Massachusetts Institute of Technology — Cambridge, MA
Summer Research Intern at MIT CSAIL — Summer 2022

- Led and developed an independent research project in collaboration with a PhD student, under the direct supervision of MIT Faculty
- Attended weekly Professional Development workshops and Research Seminars
- Participated in coffee chats with MIT Faculty to discuss research and graduate school
- Actively participated in journal club meetings for discussions on various social issues

– Completed weekly intern reports and other deliverables (research proposal, abstract, poster, bio-sketch, statement of objectives)

Rutgers University New Brunswick, NJ
Undergraduate Research Assistant at CyberPhysical Intelligence Lab Fall 2021

– Collaborated with another PhD student in building a model for training ambient sensing programs based on sensory inputs and activity patterns.

– Researching potential datasets for the acoustic scene classifier and testing out different feature extraction techniques for building the most efficient audio classifier.

Rutgers University New Brunswick, NJ
Summer Research Intern at WINLAB Summer 2021

– Collaborated with 5 interns to detect if social distancing was being followed by people in New York City based on dashboard and traffic camera image data.

– Processed and maintained image directories and Python scripts on a remote server and designing and updating the project website to establish a timeline, record of progress, and future goals

Selected Publications

[1] T. Chowdhury, A. Bhatti, I. Mandel, **T. Ehsan**, W. Ju, and J. Ortiz, "Towards sensing urban-scale covid-19 policy compliance in new york city", in *Proceedings of the 8th ACM International Conference on Systems for Energy-Efficient Buildings, Cities, and Transportation*, ser. BuildSys '21, Coimbra, Portugal: Association for Computing Machinery, 2021, pp. 353–356, ISBN: 9781450391146. [Online]. Available: https://doi.org/10.1145/3486611.3491123.

[2] **T. Ehsan** and D. Keates, "Self-care in the 21st century: Personal wellness or a capitalist propaganda?", in *Undergraduate Research Writing Conference*, Rutgers, The State University of New Jersey, 2020. [Online]. Available: https://sites.rutgers.edu/nb-senior-exhibits/wp-content/uploads/sites/442/2020/08/Taqiya-Ehsan-final-pdf.pdf.

Teaching

Teaching Assistant at Rutgers University Fall 2022–Spring 2023
Data Structures (CS112)

Learning Assistant at Rutgers University Fall 2020–Spring 2022
Honors College Forum (SAS125)

Scholarships and Awards

- Rutgers James Dickson Clark Scholarship 2019–present
- Dean's List 2019–present
- Honors College Merit Pin 2022
- National Merit Scholarship 2014–2019

Extracurricular Activities

Resident Assistant, Sojourner Truth Apartments 2021–Current

I am responsible for addressing any issues students may have with other residents and acting as a moderator to solve any related problems, helping residents stay informed about campus resources and activities to encourage student involvement on campus, listening to student concerns and communicating those to administration

Secretary, Society of Women Engineers 2022–Current

I send out weekly newsletters to club members, track member attendance, organize shared documents, coordinate the club Slack channels, and track action items during bi-weekly board meetings. I also collaborate with other the Internal VP and President to plan logistics for the Women in Engineering National Conference trip and the Annual Banquet.

First Year Mentor, Honors College Ally 2022–Current

I work with first-year Honors College students to help guide them through their transition into college and prepare them for success. My primary responsibily is to help first-year students gain insight into navigating the diverse social, extracurricular, and academic areas of college life Through teambuilding events, and workshops aimed at fostering curiosity, knowledge, and purpose in them.

Peer Mentor, Society of Women Engineers 2020–Current

I work towards facilitating 1:1 mentorship for underclassman female engineers in the SWE Leaders-Learners Program with a view to providing guidance concerning available resources within the Rutgers School of Engineering and means by which SWE can support their undergraduate and professional careers