# Amal Nanavati

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## EDUCATION

#### UNIVERSITY OF WASHINGTON

PhD in Computer Science, Exp. Mar 2025 Faithful Steward Endowed Fellow (2019-20)

#### CARNEGIE MELLON UNIVERSITY

BS in Computer Science, May 2018 Additional Major in Global Studies Dean's List (F14, S15, F15, S16, F16, S17) QPA: 3.96 / 4.0

## OPEN-SOURCE WORK

• pymoveit2: added features for asynch planning & execution, collision scene management, and more

• moveit2: extended Movelt Servo's collision-checker w/ Octomap and user-specified (dis)allowed collisions

• **py\_trees\_ros**: developed behaviors to asynchronously interact with ROS services

• **roslibjs**: Extended the API to allow getting a list of publishers on a topic

• Bug-fixes in pick\_ik and web\_video\_server

## SKILLS

Python • ROS(2) • ReactJS • C++ • PyTorch • R • Tensorflow • Go • JavaScript • AWS

## SELECTED COURSES

CSE 599W: Reinforcement Learning (Sp20) CSE 599I: Interactive Learning (Wi20) CSE 599M: Robustness in ML (Au19) 10-812: Never-Ending Learning (S18) 16-831: Statistics in Robotics (F17)

### HONORS

HRI 2024 Pioneer NSF GRFP Fellow (2021-) Fulbright Fellowship (Japan) (2018-19) Phi Beta Kappa (Fall 2017) K & L Gates Prize (Spring 2018) Senior Leadership Recognition (Spring 2018)

# EXTRACURRICULARS

Teknowledge: cofounded, taught CS at underresourced middle schools (2016-2018) Anti-Racism Advocate: co-created a workshop series for robotics/AI practitioners at UW to reflect on our role in racism (2020) CMU Student Senate: elected, raising awareness about mental health and sexual violence on campus (2016-2017) CMU FORGE: volunteering with local resettled refugee families (2016-2018)

## INDUSTRY EXPERIENCE

#### ROBOT SOFTWARE ENGINEER INTERN | HELLO ROBOT, SU 2024

- Built autonomous features in Stretch's operator interface: click-to-pregrasp; real-time audio; text-to-speech; ergonomic tablet placing. Details in blog post.
- Lowered latency, CPU, and memory usage. (CPU: 904%  $\rightarrow$  172%).
- Deployed the robot & operator interface in a user's home and senior center.

#### USER EXPERIENCE RESEARCH INTERN | ZIPLINE, WI 2023

- Investigated user perceptions of droid motion during delivery. Worked with planning and controls teams to integrate research insights into algorithms.
- Extended a simulation environment to generate realistic delivery videos.

#### SOFTWARE ENGINEER INTERN | THUMBTACK, SU 2016

- Designed & implemented a Go service to send push notifications to Thumbtack's mobile apps. Implemented data analytics for that service.
- Concurrently migrated millions of items between SQL, DynamoDB, and S3.

## RESEARCH EXPERIENCE

#### ROBOT-ASSISTED FEEDING | 2021-

- System design & impl. of a robot arm to feed people w/ motor impairments. It has fed users for **15+ hrs**, incl. in a cafe and a **week-long home deployment**.
- Developed an extensible library for planning and executing robot arm motions using **behavior trees**, **ROS2**, and **Movelt2**.
- Lead a team to develop a **React** web app for users to interact with the robot.
- Implemented an end-to-end pipeline to learn how a robot should skewer food, using multi-modal data (video, haptic) of humans skewering food.
- Papers: "Design Principles for Robot-Assisted Feeding..." (HRI 23 Q), "Towards General Food Acquisition..." (CoRL 23), "An Adaptable..." (HRI 24 Q)

#### ROBOTS ASKING HUMANS FOR HELP | 2019-21

- Developed a model of human help-giving behavior and integrated it into a **POMDP** planner, enabling a robot to **perform 1.5x better** than the state-of-the-art by effectively asking for help.
- Designed & implemented help-seeking behavior on a mobile robot, which enabled error-free navigation for 32 hours.

• Papers: "Modeling Human Help..." (RSS 21), "Not All Who Wander..." (HRI 22)

#### ROBOT SHOPKEEPER: MULTIPARTY INTERACTIONS | 2018-19

- Developed an **attention-based neural network (Tensorflow)** to predict shopkeeper responses to multimodal customer actions. It **outperformed the state-of-the-art by up to 30%** in predicting socially appropriate responses.
- Paper: "Autonomously Learning One-to-Many..." (HRI 20)

#### ASSISTIVE ROBOTS FOR BLIND TRAVELERS | 2016-18

- Implemented autonomous navigation (ROS) for a guide robot for blind users.
- Developed a model of how users follow robots and integrated it into a planner, **bringing users 1.8x closer to their goal**.
- Papers: "Follow the Robot..." (IROS 19), "Coupled Indoor Nav..." (HRI 18)

# TEACHING EXPERIENCE

#### **INSTRUCTOR** | CSE 416, INTRODUCTION TO ML, SU 2022

• Taught 80+ students machine learning: deep learning, regression, matrix factorization, etc. Managed a team of 5 TAs. Instructor Eval: **4.7/5.0**