ABHAY SHUKLA

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EXPERIENCE

FRC 604: Quixilver Robotics

2022 - Present *California*

Controls/Software Lead (10-11)

- Enhanced robot capabilities with computer vision and sensor integration, contributed to SOTA team software (particle filter localizer, time-optimal trajectory optimizer, annual robot control architecture). Developed team's competition data collection application Quickscout.
- · Developed a progressive web app for TheBlueAlliance, modernizing the universally used platform and enabling effective, real-time access for FRC competition data and insights globally.
- · Led subteams in design, manufacturing, and programming of team robot while training new members to contribute to robot development.

UCLA COSMOS (CA Summer School for Mathematics & Science)

2024

Brain-Inspired Computing Cohort Member

California

- · Conducted deep analyses of the computational principles and neurological correlations of 20+ key machine learning mechanisms (attention, visual processing, recurrent systems, reinforcement, etc), gaining a comprehensive understanding of their capabilities and limitations.
- · Developed StereoSampleGAN with UCLA funding to generate high quality stereo audio samples with a 99.5

Bay Area STEM Academy

2023 - Present

Cofounder

- California
- · Impacted 700+ students with free STEM education, raised \$6000+ to support local STEM outreach initiatives for underrepresented communities and children health foundations.
- · Developed engaging curriculum for elementary to high school students, recruited mentors, planned and effectively delivered numerous inperson and online camps covering Robotics, Engineering, Machine Learning, and Programming Fundamentals.

PROJECTS

StereoSampleGAN

GitHub Repo: https://github.com/shuklabhay/stereo-sample-gan

- · Introduces a novel, computationally efficient WGAN-based approach for generating high-fidelity stereo audio samples. Leverages attention mechanisms, optimized loss functions, and effective signal processing while achieving a 99.5
- · Overcame existing low-quality and monophonic limitations of audio generation methods by evaluating numerous approaches to stereo, high-fidelity audio generation. Research partially funded by UCLA and pending publication.

Quickscout

GitHub Organization: https://github.com/frc604

- · Led development of large scale, flexible robot performance analysis application for multimodal FRC event data collection and real-time visualization. Facilitates informed partnership decisions at high stakes competition and drives team's international success.
- · 130+ users on FRC604, data collected for 700+ team robots over 1 year. Trained 10+ team members in webdev to build app and expand application capabilities to fit annual challenges.

Domotron

Robot Website: https://604robotics.com/2023-2024-crescendo/

· Developed computer vision and physics-based shot calculations, driver control automation, and competitive autonomous routines for world championship division winning robot. Designed climber winch mechanism and robot vertical elevator.

EDUCATION

Leland High School4.00 UW A-GJuniorSan Jose, CA

SKILLS

Technical Fields AI/ML, Robotics, Signal Processing, CAD, 3D Printing, Webdev/Appdev

Other Digital Audio Production, Graphic Design, Video Editing

HONORS & AWARDS

• FRC604: World Championship Milstein Division Winner (12/3500 Internationally + 4/300 in CA)

• NextFlex FlexFactor: Entrepreneurship Competition Winner (1/260 in CA)

2024 2024

• OneHacks III Hackathon: Third Place (3/120 Internationally)

2023

• SCU/SVUDL Invitational: PF Debate Finalist (2/140 Internationally)

2022