

ABHAY SHUKLA

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EXPERIENCE

FRC 604: Quixilver Robotics

Controls/Software Lead (10-11)

2022 - Present

California

- Develop team's competition data collection application, enhance robot capabilities with computer vision and sensor integration, contribute to SOTA team software (particle filter localizer, time-optimal trajectory optimizer, yearly robot control architecture).
- Lead subteams in design, manufacturing, and programming of team robot while training new members to contribute to robot development. Attend/host 20+ STEM community outreach events.
- Develop a progressive web app for TheBlueAlliance, modernizing the universally used platform and enabling effective, real-time access for FRC competition data and insights internationally.

UCLA COSMOS (CA Summer School for Mathematics & Science)

Brain-Inspired Computing Cohort Member

2024

California

- Conducted deep analyses of the computational principles and neurological correlations of 20+ key machine learning advancements (attention, visual processing, recurrent systems, reinforcement, etc).
- Developed StereoSampleGAN with UCLA funding to display viability of high quality audio sample generation without excessive computational cost.

Bay Area STEM Academy

Cofounder

2023 - Present

California

- Develop engaging curricula, recruit mentors, plan and effectively deliver in-person and online camps encompassing diverse STEM fields.
- Impacted 700+ students and raised \$6000+ to support organization costs, local STEM outreach initiatives for underrepresented communities, and children health foundations.

PROJECTS

StereoSampleGAN

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

- Introduces a novel WGAN based approach to high fidelity stereo audio sample generation that utilizes attention, loss optimization, and effective signal processing to maintain a reasonable computational cost.
- Evaluated numerous approaches to high fidelity audio image representation generation, creating an approach that challenges existing standards of sacrificing audio quality and highlighting need for further research in stereo audio generation. Partially funded by UCLA, paper pending publishing.

Quicksout

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 strategic decisions, drives team's international success.
- 130+ users on FRC604, data collected for 700+ team robots. Trained 10+ team members in webdev to build app and adapt to yearly games.

Domotron

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

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

EDUCATION

Leland High School

Junior

4.00 UW A-G

San 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

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| • FRC604: World Championship Milstein Division Winner (12/3500 Internationally + 4/300 in CA) | 2024 |
| • NextFlex FlexFactor: Entrepreneurship Competition Winner (1/260 in CA) | 2024 |
| • OneHacks III Hackathon: Third Place (3/120 Internationally) | 2023 |
| • SCU/SVUDL Invitational: PF Debate Finalist (2/140 Internationally) | 2022 |