Divya Shah

Roboticist | PostDoc

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About me

I was born an brought up in Mumbai, India. The childhood fascination of robots lead to my involvement with the robotics club in my undergrad. That nascent exposure of designing robots motivated me to move to Europe and pursue higher education. Continuing the same passion, I obtained a PhD in robot design with the iCub Tech Facility at IIT in Genova, Italy in 2021. My doctoral research focused on mechanism design for wrist and forearm dexterity. Currently, I am continuing as a postdoctoral fellow working on mechatronic design and development of high power humanoid joint modules.

Skills

- Testing
- Rapid Prototyping
- Optimization Techniques
- Trajectory Planning
- Computer-Aided Design
- Mechanism Design

Education

2017-2021 Ph.D. in Bioengineering and Robotics — Genova, Italy
iCub Tech Facility, Italian Institute of Technology & DIBRIS, University of Genova.

2015-2017 Erasmus+ European Masters on Advanced Robotics (EMARO+) — Genova, Italy & Nantes, France
University of Genova &
Ecole Centrale de Nantes.

2011-2015 B.Tech in Mechanical Engineering — Mumbai, India
Sardar Patel College of Engineering, University of Mumbai.

Research Experience

07/2021-present Towards Design & Development of ergoCub Humanoid — PostDoc Fellow
The postdoctoral research activity mainly focuses on mechatronic design and development of compact and high power humanoid joint modules for the new *ergoCub* project aiming towards human-robot collaboration in warehouse and hospital scenarios.

11/2017-06/2021 Design of Wrist & Forearm Mechanisms for Enhanced Humanoid Dexterity — PhD Fellow
The Ph.D. project aimed towards design and development of a 2-DOF mechanism for wrist application on humanoids such as iCub. It focused on employing parallel orientational mechanisms for increasing the range of motion, payload-to-weight ratio and mechanism isotropy of the wrist, thus enhancing the manipulation dexterity [J2, B1, C2].

07/2019-10/2019 Design of Constant Length Tendon Routing Mechanism for Decoupled Motions — Visiting Researcher
Collaborative project for idea generation, concept design and prototyping of a novel tendon routing mechanism through the pronation/supination (forearm) joint for multiple wrist actuating tendons in order to allow decoupled motions between the wrist and the forearm [C3].

02/2017-08/2017 Increased Productivity of Automated Tape Winding System — Master Thesis Intern
Collaborated on increasing the productivity of a kinematically redundant industrial platform for automated tape winding process. Focused on developing robust collision detection within workcell components and implementing time-optimal trajectories previously developed using dynamic programming principle. The simulations promised to reduced the overall processing time to one-third [C1].

Publications

2020 [C3] Constant Length Tendon Routing Mechanism through Axial Joint

2019 [J2] A Comparison of Robot Wrist Implementations for the iCub Humanoid

2018 [B1] Comparison of Workspace Analysis for Different Spherical Parallel Mechanisms

2018 [C2] Workspace Analysis and the Effect of Geometric Parameters on Parallel Mechanisms of the N-UU Class

2017 [C1] Computer-Aided Design and Optimization of Redundant Robotic System for Automated Fiber Placement Process

2017 [J1] Detection of Bimanual Gestures Everywhere: Why it Matters, What we Need and What is Missing?

Interests

Swing Dancing; Hiking; Cricket; Ukulele