Aman Singh

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EDUCATION

Indian Institute of Science — Bengaluru, India
Doctor of Philosophy in Cyber-Physical Systems — *August 2022 – Present*

Indian Institute of Technology Roorkee — Roorkee, India
Bachelor of Technology in Mechanical Engineering — *July 2015 – May 2019*

PROFESSIONAL EXPERIENCE

Project Associate — Jan 2021 – July 2022
RBCCPS, Indian Institute of Science — *Bengaluru, India*
- Developed a high torque density actuator with applications in robots like biped, quadruped etc
- Developed a chain-sprocket based 2R manipulator leg using the above actuators
- Developed a 12 DOF highly dynamic quadruped robot named Stoch-3

Verfication Engineer — July 2019 – Jan 2021
Oski Technology — *Gurugram, India*
- Verified an AXI interconnect connecting 10 AXI masters and 18 AXI slaves
- Verified the resource management functionality of a block that receives custom instructions from 2 RISC-V cores
- Verified a Bus Interface Unit for Link layer of the CHI Interface with clock domain crossing, partially

PUBLICATIONS

Dynamic Mirror Descent based MPC for Accelerating Robot Learning — ICRA 2022
*U A Mishra,S R Samineni,P Goel,C Kunjeti,H Lodha,**A Singh**,A Sagi,S Bhatnagar,S Kolathaya* — *Accepted*

Force control for Robust Quadruped Locomotion: A Linear Policy Approach — ICRA 2023
*A Shirwatkar,V Kurva,D Vinoda,**A Singh**,A Sagi,H Lodha,B Goswami,S Sood,K Nehete,S Kolathaya* — *Accepted*

PATENTS

Low-cost sandwiched robotic leg design for legged locomotion — Indian Patent Office (IPO)
Aman Singh, Shishir Kolathaya — *Accepted*

PROJECTS AND COMPETITIONS

Human inspired biped walking — August 2018 – April 2019
Project Assistant — *Dr. M. M. Joglekar, MIED, IIT Roorkee*
- Designed a human inspired, control law partitioning based controller for a 2-D biped robot
- Designed and fabricated a 2D biped robot test-bed, restricted to walk on a circular trajectory
- Implemented the controller on the test-bed to achieve 2D bipedal walking

Design and fabrication of a legged robot prototype: Phase II — May 2018 – July 2018
Research Intern — *Dr. Lionel Birglen, Polytechnique Montreal*
- Designed a compliant leg mechanism, based on a Hoeken's Pantograph mechanism based rigid leg design
- Developed a simulation to analyze the leg design in MATLAB
- Optimized the link lengths and thickness of compliant joints to meet the required end effector trajectory
- Built the leg mechanism using Delrin material with the help of a laser cutting machine for experimental validation

NEM CON: ABU Robocon 2018 — June 2017 – March 2018
Team Leader — *Dr. Shailesh Ganpule, MIED, IIT Roorkee*
- Developed a manually operated and an autonomous robot, for solving a problem statement named NEMCON
- Developed a 3 omni wheel based navigation and two ball transferring mechanisms for the manually operated robot
- Developed a 4 mecanum wheel based navigation and 3 ball collect and throw mechanisms for the auto robot
- Achieved 7th position among 109 teams across the country and also won the "Best Innovative Design" award

Frisbee throwing robot: ABU Robocon 2017 — June 2016 – March 2017
Technical Team Member — *Dr. Avinash Kumar Swain, MIED, IIT Roorkee*
- Designed and built a frisbee throwing robot to navigate, throw and land frisbees on 7 different elevated platforms
- Designed a 4 wheel Mecanum drive robot with two independent frisbee throwing mechanisms
- Designed a reloading mechanism for each throwing mechanism with maximum capacity of 25 Frisbees

Technical Skills

Software tools: Matlab, Solidworks, Ansys, ROS, Gazebo, Pybullet;

Programming Languages: C++, Python, LaTeX