

Arun Kumar

Robotics Engineer



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Education

M.S. Robotics Engineering
Northwestern University
Expected December 2021
GPA: 4.00/4.00

B.S. Mechanical Engineering
Space Minor
University of Colorado Boulder
Class of 2020
GPA: 3.64/4.00

Relevant Skills

Programming

Proficient: Python, ROS, MATLAB
Intermediate: C++
Novice: C, C#

Design & Manufacturing

Proficient: CAD, Rapid Prototyping
Intermediate: Mill, Lathe, Saws

Other

Proficient: Windows, Linux, Git
Intermediate: MS Office, PC Builds
Novice: Unity

Certifications

SolidWorks - CSWA

Publications

A. Kumar, M. Bell, B. Mellinkoff, A. Sandoval, W. B. Martin and J. Burns, "A Methodology to Assess the Human Factors Associated with Lunar Teleoperated Assembly Tasks," *2020 IEEE Aerospace Conference*, Big Sky, MT, USA, 2020, pp. 1-12, doi: 10.1109/AERO47225.2020.9172667.

Extra-Curricular

Guitarist, Hiker, Snowboarder,
Kayaker, Dog Trainer, Body Builder

Professional Engineering Experience

Telerobotics Lab Manager

Mar. 2018 - July 2020

Center for Astrophysics and Space Astronomy

Boulder, Colorado

- Led a team of engineers creating robotic hardware and software for research in advancement of the NASA proposed FARSIDE mission
- Team integrated a rover, robotic arm, stereo camera, and VR headset to create an immersive VR Telerobotic Simulation System (TSS)
- Coded, tested, and integrated Python, C++, and C# scripts focused on computer vision, motion planning, and UI design
- Developed test procedures using simulations and physical hardware
- Designed and executed an experiment to assess human factors associated with lunar telerobotic assembly tasks
- Created data processing applications in MATLAB and Python
- Prepared publications, presentations, and abstracts for NASA and professional conferences

Weather Detection and Response UAVs

Sep. 2019 - May 2020

Design Center Colorado

Boulder, Colorado

- Worked as a software systems engineer on a team of 6 engineers to develop a flight management computer (FMC) for UAVs
- Designed software system architecture for an autonomous UAV
- Developed, tested, and integrated Python and C++ scripts enabling FMC to autonomously sense, analyze, and respond to weather conditions along flight path
- Managed team's software version control using Git
- Created test procedures to ensure the product met all design requirements
- Prepared a detailed concept of operations for the client (Boeing)

Undergraduate Researcher

Oct. 2016 - Apr. 2018

Precision Laser Diagnostics Lab

Boulder, Colorado

- Assisted construction of a high pressure cell (HPC) used to collect spectroscopy data at high pressures and temperatures
- Wrote and implemented a PID temperature controller for the HPC using C++
- Designed safety equipment in SolidWorks and manufactured it in a machine shop

Project Engineer Intern

May 2017 - Aug. 2017

Logoplaste ILAB

Plainfield, Illinois

- Created 3D models of plastic bottles in SolidWorks to meet desired specifications
- Worked directly with clients such as P&G and SC Johnson to perfect bottle designs
- Tested bottles in the quality control lab to ensure client's specifications were met

Engineering Projects

Robotic 3D Scanning

- Collaborated with 4 students to create an autonomous 3D scanner using a depth camera attached to a robotic arm and a differential drive robot as a turntable
- Designed and implemented infrastructure for multi-robot collaboration
- Wrote Python and C++ scripts for the point cloud processing pipeline
- Pipeline collected, fused, and cropped background from point clouds

Physics Simulator from Scratch

- Created a Python physics simulator of a 6 DOF system (a toy jack bouncing in a box)
- User can specify all initial conditions and external forces on the system
- Simulator produces an animation of the result

Drill-Powered Vehicle

- Worked as a CAD engineer on a team of 4 students to design and fabricate a motorcycle powered by a hand drill