

KASHISH GOYAL

Princeton, NJ

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PROFESSIONAL SUMMARY

I am a Robotics graduate from Northwestern, currently employed at Siemens in Princeton, NJ. I am a part of the Sustainable Automation group where my primary work is to bring automation to both Brownfield and Greenfield applications in the industry. I have worked in the capacity of Full Stack Developer for Automation Edge Devices while developing software technologies for Robotic and other Automation systems..

EDUCATION

Northwestern University, Evanston, IL

Aug, 2017 - Dec, 2018

Master of Science in Mechanical Engineering, Specializing in Robotics and Control, GPA: 3.92/4.00

Thapar University, Punjab, India

Aug, 2011 - June, 2015

Bachelor of Engineering in Mechanical Engineering, GPA: 8.83/10.00

EXPERIENCE

Siemens CT, Princeton, NJ

Jan, 2019 - Present

Specialist Engineer, Robotics and Full Stack Development

- **ARM Automated Robotic Spraying and Disinfection in Shipyards and Warehouses**

Objective: Developing an autonomous mobile robot for disinfecting industrial environments. The robot, mounted with an arm will detect and spray areas such as door knobs, handrails, etc at a FedEx shipping/sorting warehouse facility

Skills: System Design, SLAM, Motion Planning, ROS, Angular, C++, Python Flask

- **ARM Interoperability and Orchestration of Autonomous Mobile Robots**

Objective: Developing a platform to promote interoperability of Autonomous Ground Vehicles (AGV) with added features such as fleet management, map merging, and waypoint management.

Skills: System Design, Runtime Systems, ROS, ROS2, DDS, OPC-UA, C++

- **ARM Multi-Robot Multi-Machine Interoperability ([Link](#))**

Objective: Mitigated commissioning costs of robotic systems by development of inter-ecosystem gateways and modular connectors between components typical to a real world manufacturing scenario.

Skills: OPC-UA, DDS, ROS, ROS2, MTConnect

- **Digital FME Attendant**

Objective: Developed a web based tool for industrial operators that automatically recognizes tools and facilitates check-in/out. The tool also allows collection and annotation of new data.

Skills: Docker, Python Flask, Angular, CI/CD

- **App Composer**

Objective: Supported development of a low code workflow management tool to design and create industrial process workflows. The tool contains several building blocks which can be sequenced together.

Skills: Distributed Systems, Code generation, runtime systems, C, C++, ROS, ROS2, bash

- **Abstraction Layer**

Objective: Contributed towards design and implementation of a runtime framework to ease multi-ecosystem, multi-language and multi-platform integration of applications. The framework is based on modular architecture with plug and play components and auto generated glue code.

Skills: C, C++, Python, Scada Systems, PLCs, ROS, ROS2, Snap7, CI/CD

- **High Performance Edge**

Objective: Developed a scalable pipeline based on stream processing analytics with full feedback control, gathering data from low level sensors and sending control inputs to the controllers.

Skills: Distributed Systems, Apache Kafka, Apache Flink, Python, Docker, CI/CD

Intern, Automation and Robotics Researcher

- Worked in Siemens Future of Automation (FoA) lab to integrate UR collaborative robots and vision systems
- Implemented task planning for Pick and Place type Intelligent Industrial Robotics System
- Contributed in Siemens AgPods project, using grasp quality neural networks (GQ-CNN) to plan parallel jaw grasps
- Skills: Python, C++ , Data structures, ROS, OpenCV, Deep Learning, Runtime Systems, UR robots

ACADEMIC PROJECTS

- [Autonomous Aircraft for Ag Application](#), Northwestern University, IL
 - Working with Parrot Bebop2 developer drone, loading it with Ardupilot
 - Using MAVROS package with custom scripts for controlling the aircraft
 - Coverage planning and execution for a geographic bounding Box
 - Skills: GPS RTK, Ardupilot, ROS, Optimal Control, Visual Odometry
- [Camera Smear Detection for Street View](#), Northwestern University, IL
 - Calculated average difference between images followed by adaptive histogram equalization (CLAHE)
 - Generated contours from the output image
 - Filtered out the actual smear based on area constraint
 - Skills : Python, OpenCV
- **Autonomous Quadrotor Flight**, Northwestern University, IL
 - Computed roll and pitch angles from raw IMU data using complementary filters
 - Used HTC VIVE as external motion capture system for autonomous mid-air position hold
 - Added joystick control for mixed autonomy
 - Skills : Raspberry Pi, IMU, HTC VIVE, C , PID control
- [Brushed DC motor control](#), Northwestern University, IL
 - Programmed PIC32 microcontroller for motor control circuit - C programming
 - Used cascaded control loops (using interrupt sequences) for current and position control
 - Interfaced with Matlab using serial communication over UART
 - Skills: PIC32, Matlab, Interrupts, PID Cascade control, C
- [Robotic Manipulation](#), Northwestern University, IL
 - Simulated manipulation of KUKA youBot along a given trajectory in V-Rep
 - Implemented closed loop PI control to correct initial and odometry error
 - Skills: VRep, Mathematica, Robotic Manipulation
- [Starbax](#), Northwestern University, IL
 - Created a ROS package, written in Python, to use Baxter arm for making coffee
 - Used color and AR tags to detect the poses of cups and Keurig
 - Used inbuilt inverse kinematics for Baxter to solve for target poses
 - Skills: Baxter, ROS, Python, OpenCV, Robot Kinematics