KASHISH GOYAL

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PROFESSIONAL SUMMARY

I am a Robotics graduate from Northwestern, currently employed at Kindred AI. I have been working in the capacity of Full Stack Developer 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

Kindred AI, *Toronto, ON* **May, 2021 - Present**
Robotics Software Developer

Siemens CT, *Princeton, NJ* **Jan, 2019 - Apr, 2021**
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

Siemens CT, *Princeton, NJ* **Jul, 2018 - Sep, 2018**

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