

# Tanay Choudhary

<https://tanay-choudhary.github.io>  
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## SUMMARY

Senior Robotics Software Engineer with 5+ years of industry experience across robot navigation, manipulation, localization, sensing, and perception. I intend to contribute to meaningful emerging applications of robotics in the real world.

## EDUCATION

### NORTHWESTERN UNIVERSITY

#### MS IN ROBOTICS

Dec 2016 | Evanston, IL

GPA: 3.89 / 4

### BITS PILANI UNIVERSITY

#### BE (HONS) IN MECHANICAL ENGINEERING

Aug 2015 | Goa, India

## LINKS

LinkedIn: [linkedin.com/in/tanayc](https://www.linkedin.com/in/tanayc)

Portfolio: [tanay-choudhary.github.io](https://tanay-choudhary.github.io)

Github: [github.com/tanay-bits](https://github.com/tanay-bits)

## COURSES/

## CERTIFICATIONS

Data Structures and Algorithms

Nanodegree (Udacity)

Robotic Manipulation

Machine Learning

Computer Vision

Artificial Intelligence

Controls

## SKILLS/TOOLS

### Meta-Skills

- Agile Software Development
- Critical Thinking • Resilience

### Programming Languages

- C++ • Python • Java

### Operating System

- Linux

### SW Libraries and Tools

- ROS • Gazebo • PCL
- OpenCV • Git • Gerrit
- Jenkins • Ansible

## EXPERIENCE

### VECNA ROBOTICS | SENIOR ROBOTICS SOFTWARE ENGINEER

Robot Autonomy | Oct 2018 – present, Waltham, MA

- Responsible for developing, integrating, testing, deploying, and maintaining the autonomy stack of Vecna's suite of mobile heavy material handling robots
- As the module owner for navigation, developed best-in-class path planning and obstacle avoidance features which significantly improved speed and robustness in tight, dynamic spaces
- Brought key improvements to pallet docking behaviors which increased pallet handling reliability and throughput in long, densely packed lanes
- Led autonomy software design, development, and integration for a new, low-cost, collaborative robot product
- Unlocked an untapped use-case by leading a team which developed autonomy SW for a completely new platform for robotic shelf picking
- As the C++ domain expert, discussed and documented best practices, encouraged their use via code reviews, emphasized removal of tech debt

### VECNA TECHNOLOGIES | ROBOTICS SOFTWARE ENGINEER

Robot Autonomy | Mar 2017 – Sep 2018, Cambridge, MA

- Implemented 3D teleoperation, control, and path planning modules for a dual arm mobile manipulator using C++, ROS, RViz and MoveIt
- Integrated a grasp pose detection library for autonomous picking of arbitrary objects using CNN on point cloud data from a depth sensor

### HARMAN INTERNATIONAL | SUMMER INTERN, FUTURE EXPERIENCE

Corporate Technology Group | Jun 2016 – Sep 2016, Mountain View, CA

Exploratory R&D and rapid end-to-end prototyping of a new kind of headphones with ungrounded force actuators to provide instinctive, non-visual and non-auditory feedback to the wearer. I designed and created fully working prototypes, and showcased them to the broader research and business teams.

### TECHNICAL UNIVERSITY OF DARMSTADT | BACHELOR'S THESIS

Lauflabor Locomotion Lab | Feb 2015 – May 2015, Germany

Thesis title: Gait Analysis and Control Design for Stair Ambulation with Lower-Limb Powered Prostheses | Advisor: Prof. Andre Seyfarth

Performed motion-capture gait experiments on an instrumented staircase, processed the raw data in MATLAB, contributed two new control insights for gait intent and gait percent detection in wearable lower-extremity robots, and obtained significant savings in Series Elastic Actuator peak power and energy requirements

## OTHER PROJECTS

### MOBILE ROBOT CONTROL AND LOCALIZATION ON FRICTIONLESS SURFACE

- Built a lightweight robot which can float on an air-hockey table, and control its orientation using reaction wheels and IMU
- Reverse engineered the SteamVR Lighthouse tracking technology (used in HTC Vive) for localizing the robot

### INTUITIVE TELEOPERATION OF A DUAL ARM MANIPULATOR

- Created a ROS package for the Baxter robot, which uses skeleton data from a depth camera to track user's hand movements via joint velocity control
- Developed a custom numerical inverse kinematics solver which finds the optimum set of joint angles to minimize joint travel in addition to reaching target end-effector position
- Featured in National Robotics Week exhibit at the Chicago Museum of Science & Industry