

Tanay Choudhary

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

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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

GPA: 3.2 / 4

LINKS

Portfolio: tanay-choudhary.github.io

Github: github.com/tanay-bits

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

COURSEWORK

GRADUATE

Advanced Mechatronics

Embedded Systems in Robotics

Feedback Control

Robotic Manipulation

Machine Dynamics

Machine Learning

Computer Vision

Artificial Intelligence

Optimal Control of Nonlinear Systems

UNDERGRADUATE

Engineering Optimization

Computer Aided Design

Kinematics & Dynamics of Machines

Machine Design & Drawing

Production Techniques

Production Planning & Control

SKILLS/TOOLS

ROS

Python

Embedded Programming

(PIC, AVR, ARM)

C/C++

MATLAB

OpenCV

Mathematica

Linux

Git

CAD (Solidworks, Pro/E)

Rapid Prototyping

(3D Printing, Laser Cutting)

EXPERIENCE

VECNA TECHNOLOGIES | ROBOTICS SOFTWARE ENGINEER

Mar 2017 – present, Cambridge, MA

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 for a new kind of headphones with ungrounded force actuators to provide instinctive, non-visual and non-auditory feedback to the wearer.

TECHNICAL UNIVERSITY OF DARMSTADT | BACHELOR'S THESIS

Lauflabor Locomotion Lab | Feb 2015 – May 2015, Germany

Project: Gait Analysis and Control Design for Stair Ambulation with Lower-Limb Powered Prostheses | Advisors: Prof. André Seyfarth, Dr. Martin Grimmer

- Performed motion-capture gait experiment on an instrumented staircase, processed the raw data, contributed two new control insights for gait intent and gait percent detection in wearable lower-extremity robots which are not available in the existing literature
- Obtained significant savings in SEA motor peak power and energy requirements

INDIAN INSTITUTE OF TECHNOLOGY HYDERABAD | SUMMER

RESEARCH INTERN

Mechatronics Design Lab | May 2014 – July 2014, India

Project: Development of a Series Elastic Actuator (SEA) for Robotic Applications

- Reviewed existing SEA designs and theory, acquired components and fabricated a low cost, scalable prototype of a rotary SEA
- Performed various experiments (force sensing, manual homing, torque control, spring stiffness measurement) and achieved desirable results

OTHER RECENT 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 sensor fusion. Reverse engineered the new SteamVR Lighthouse tracking technology (used in HTC Vive) for localizing the robot.

INTUITIVE TELEOPERATION OF A 14 DoF 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

OPTIMAL CONTROL OF KINEMATIC CAR MOTION

Implemented start to goal motion on the iRobot Roomba while avoiding obstacles. Programmed iLQR algorithm on Mathematica to determine optimal control and state trajectories.

PYTHON LIBRARY FOR ROBOTIC MANIPULATION

Created a library of robotics functions such as calculating Jacobians, implementing forward and inverse kinematics, trajectory optimization, and simulated them on the UR5 and WAM industrial robot arms using ROS/rviz.

NONLINEAR DYNAMICS OF THE TUMBLING TOY

Modeled and simulated the impact-driven nonlinear dynamics of a wooden case containing a metal ball, which tumbles down an inclined saw-toothed rail. Employed Lagrangian dynamics in Mathematica to solve for this 4 DoF motion.