AYUSH PANDEY

Graduate Student, Caltech

@ apandey@caltech.edu | 378 S. Catalina Ave | Pasadena, CA | ayush-pandey.github.io

EXPERIENCE

California Institute of Technology

Electrical Engineering

May - Oct 2016 & Present | Pasadena, CA

→ **Information-Performance Tradeoffs in Control. Mentor: Prof. V. Kostina**

- Worked on optimal control design with communication constraints — Rate-limited feedback, stochastic system parameters, noisy feedback channel.

→ **Adaptive Quantizer Design for Fixed Rate-Limited Control. Mentor: Dr. Anatoly Khina, Postdoctoral scholar with Prof. Babak Hassibi**

- Studied adaptive quantizer designs for fixed rate-limited feedback channels.

California Institute of Technology

Laser Interferometer Gravitational Wave Observatory (LIGO)

May – July 2015 | Pasadena, CA

→ **Quantization Noise Analysis in Advanced LIGO Digital Control System. Mentors : Dr. Chris Wipf, Prof. Rana Adhikari**

- Developed a MATLAB tool to analyze quantization noise levels of thousands of digital filters in Advanced LIGO controller. Also, designed a noise shaping filter to reduce noise at low bandwidths.

Indian Institute of Technology, Kharagpur

Autonomous Ground Vehicle (AGV) Research Group

2013-2017 | India

Student Research Group Leader

- Led a team of 40 undergraduate students to various international autonomous robotics competitions. Contributed significantly in the control system design of three different autonomous robots.

PUBLICATIONS

Technical Reports

- Pandey, Ayush, Chirstopher Wipf, et al. (2015). "Quantization Noise Anlysis in Advanced LIGO Digital Control System". In: *LIGO DCC, Presented at LIGO Livingston Laboratory, Louisiana, USA*. LIGO DCC.
- Pandey, Ayush and Victoria Kostina (2016). "Information Performance Tradeoffs in Control". In: *arXiv preprint arXiv:1611.01827*. arXiv.

Conference Proceedings

- Pandey, Ayush, Subhamoy Mahajan, et al. (2015). "Low cost autonomous navigation and control of a mechanically balanced bicycle with dual locomotion mode". In: *Transportation Electrification Conference (ITEC), 2015 IEEE International*. IEEE Xplore.
- Pandey, Ayush, Siddharth Jha, and Debashish Chakravarty (2017). "Modeling and Control of an Autonomous Three Wheeled Mobile Robot with Front Steer". In: *Robotic Computing (IRC), IEEE International Conference on*. IEEE Xplore.

RESEARCH INTERESTS

Control theory, Robotics, Information Theory, Internet of Things

EDUCATION

Ph.D. in Electrical Engineering

California Institute of Technology

2017 - 2023

Advisors - Prof. Victoria Kostina and Prof. John Doyle

M.Tech. in Control Engineering & B.Tech. in Instrumentation Engineering

Indian Institute of Technology, Kharagpur

2012 - 2017

PATENT

"Autonomous Two-Wheeler with Dual Mode of Locomotion" (co-inventor) Indian Patent Pending 201631025904, Filed Oct. 2016
Developed a passively stable autonomous bicycle.

In the media : The Washington Post | Economic Times | India Today TV Report

AWARDS

Research fellowship
Selected for SURF program at California Institute of Technology (2015 and 2016).

Gold award winner
Won a prize of $8000 at national engineering innovation competition organized by KPIT.

Best senior thesis award
For best B.Tech project in Instrumentation Engineering.

COMPUTER SKILLS

Programming Languages
MATLAB, C, Python
C++, HTML, Assembly Lang

Softwares
Atmel Studio, Arduino IDE
Git, SVN, Proteus, Eagle