Arnav Dhamija

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Education

- **University of Pennsylvania SEAS** — **Philadelphia, PA, USA**
  MSE Robotics, GPA: 3.97/4 — *May 2021*
  Courses: Introduction to Robotics, Machine Learning, Computer Vision & Computational Photography, F1/10 Autonomous Racing, Learning in Robotics, Machine Perception, Linear Systems, Operating Systems, HW/SW Design for ML, MPC
- **BITS Pilani, Hyderabad Campus** — **Hyderabad, TS, India**
  BE (Hons) Computer Science Engineering, CGPA: 8.628/10 — *May 2019*

Experience

Software Engineer — **NVIDIA**
Behavior Planning - Autonomous Vehicles — *July 2021 - Present*

- Working on the trajectory generator of the planning and control stack.

Internships

Acoustic Research Laboratory — **National University of Singapore**
DtnLink - Disruption Tolerant Protocol for Underwater Networks — *January 2019 – May 2019*

- Developed a **disruption tolerant** protocol for underwater networks using UnetStack, supervised by Prof. Mandar Chitre.
- Demonstrated that DtnLink can improve message delivery ratio by 4x in simulations.
- Created an automated test suite and several example simulations. Extensively documented results in my undergrad thesis.

Google Summer of Code: ArduPilot — **Remote**
APStreamline - Adaptive Video Streaming for ArduPilot Robots — *May 2018 – August 2018*

- Developed APStreamline, a **network adaptive** live-streaming solution for ArduPilot robots with companion computers.
- Optimized performance using C++ and GStreamer libraries for **GPU** encoding on the Raspberry Pi and NVIDIA Jetson TX2.
- Added support for multiple cameras, video recording, and automatic quality adjustment based on packet loss.

Google Summer of Code: KDE — **Remote**
kio-stash - Virtual Folders in KIO — *May 2016 – August 2016*

- Successfully implemented a novel idea for Virtual Folder support in the **KDE Input/Output** subsystem.
- Learned automated unit testing, version control, and achieved proficiency with C++11 and Qt.
- Shipped and packaged kio-stash for release in KDE's software repositories.

Projects

1:10 Scale Autonomous Racing — **Philadelphia, USA**
ESE 615 - F1/10 Autonomous Racing — *January 2020 – May 2020*

- Developed a planning and control algorithm for a 1:10 scale car with a planar LIDAR and NVIDIA Jetson TX2.
- Implemented **RRT*** with trajectory smoothing and **Gaussian Processes** for opponent prediction. Used **ROS** extensively.
- Finished **2nd** in class in the virtual final race. Documented our results in the final project report.

RGB-D Tracking — **Philadelphia, USA**
ESE 650 - Learning in Robotics — *March 2020 – May 2020*

- Created a novel algorithm to track arbitrary objects using a **particle filter** on RGB-D camera data.
- Showed reliable position and velocity estimation on tracking arbitrary objects using the Princeton RGB-D benchmark.

Vectors — **Hyderabad, India**
Video Communication Through Opportunistic Relays and Scalable Video Coding — *January 2018 – October 2018*

- Implemented the Spray-N-Wait protocol to opportunistically transfer Scalable Video Coding encoded video in an Android app.
- Demonstrated that SVC video has 2x lower packet loss and 3x the delivery ratio of H.265 video using ad-hoc networks.
- Co-authored and published a paper in the **SoftwareX journal**, under Dr. Abhishek Thakur.

Publications

- A. Thakur, A. Dhamija and Tejeshwar Reddy G. VECTORS — VidEo Communication Through Opportunistic Relays and Scalable video coding. SoftwareX (2019), https://doi.org/10.1016/j.softx.2018.12.006.

Conference Presentations

- **Akademy Conference 2017** — **Almería, Spain**
  Presentation: An Introduction to the KIO Library — *July 2017*
- **QtCon Conference 2016** — **Berlin, Germany**
  Presentation: KIO-Stash - An Introduction and Use Cases — *September 2016*