Arnav Dhamija

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Education

- **University of Pennsylvania SEAS** — **Philadelphia, PA**
  MSE Robotics, GPA: 4.00/4 — *May 2021*
  Courses: Introduction to Robotics, Machine Learning, Computer Vision & Computational Photography
- **BITS Pilani, Hyderabad Campus** — **Hyderabad, India**
  BE (Hons) Computer Science Engineering, CGPA: 8.628/10 — *May 2019*
  Courses: Digital Image Processing, Computer Graphics, Machine Learning, Data Mining, Database Systems, Data Structures & Algorithms, Operating Systems, Computer Networks, Compilers, Discrete Structures, Logic in CS, Theory of Computation, Computer Architecture

Skills

- **Software:** C++, C, Java, Groovy, Python, CMake, Qt, Node.JS, Javascript, Bash, MATLAB, ROS, Wireshark, Git
- **Hardware:** Raspberry Pi and NVidia Jetson, Arduino, Pixhawk, Sensors, Wireless modules, Soldering, Quadcopters

Internships

Acoustic Research Laboratory — **NUS, Singapore**
DtnLink - Disruption Tolerant Protocol for Underwater Networks (Undergraduate Thesis) — *January 2019 – May 2019*

- Developed a network protocol for adding **disruption tolerance** to 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, several example simulations, and extensively documented results in my undergrad thesis.

Google Summer of Code: ArduPilot — **Bangalore, India**
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 streaming performance using C++ and GStreamer libraries for **GPU** encoding on the Raspberry Pi.
- Added support for multiple cameras, video recording, and automatic quality adjustment based on packet loss.

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

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

Projects

Human Computer Interaction — **Hyderabad, India**
Web-based Control for a Robot — *August 2018 – December 2018*

- Designed an HTML5 web dashboard for controlling a **Holonomic** drive based cleaning robot.
- Integrated **ROS** libraries in the web dashboard for mapping, localization, and navigation.

Machine Learning — **Hyderabad, India**
ID3 Decision Tree — *September 2017*

- Implemented an ID3 classifier using C++ and SQLiteCpp for predicting income from the 1994 US Census.
- Extended the ID3 algorithm by using **Random Forests** and **Reduced Error Pruning** extensions and achieved 81% accuracy on test data.

Research

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 (SVC) 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.

Study Oriented Project — **Hyderabad, India**
Literature review of Challenges in 3D Printing — *January 2018 – April 2018*

- Conducted a **literature review** of the challenges involved in **Fused Deposition Modeling** 3D Printing under Prof. Tathagata Ray.
- Studied contemporary algorithms for improving the **print quality** and strength of 3D printed models.

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*