ARJUN RAMESH

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EDUCATION

Carnegie Mellon University Cumulative GPA: ***TBD***
MS + PhD, Electrical and Computer Engineering (Honors)
Relevant Coursework: Computer Architecture, Algorithms, Embedded Systems, RTOS, VLSI, Digital Signal Processing, Parallelism and Locality, Unconventional Computation, Probability, Real Analysis, Algebraic Structures

The University of Texas at Austin Cumulative GPA: ***4.00***
BS, Electrical and Computer Engineering (2021)
Relevant Coursework: Computer Architecture, Algorithms, Embedded Systems, RTOS, VLSI, Digital Signal Processing, Parallelism and Locality, Unconventional Computation, Probability, Real Analysis, Algebraic Structures

HONORS AND SCHOLARSHIPS

The Charles W. and Margaret A. Tolbert Scholarship for high merit in engineering *Fall 2020*
Centaur Technology Scholarship on completion of Summer 2019 internship *Fall 2019*
Ray Fisher Memorial Scholarship from *Texas Exes* for high-merit *Fall 2019*
University Honors from *UT Austin* for maintaining a GPA > 3.5 *Fall 2017 - Spring 2020*

ACADEMIC EXPERIENCE

Undergraduate Teaching Assistant – *UT Austin, ECE* | Austin, TX *Aug 2018 – Present*

- Responsible for holding review sessions, office hours, designing assignments and grading.
- Guided ECE students in determining their academic tracks of interest
- List of prior positions:
  - Fall 2020: Computer Architecture under Dr. Yale Patt.
  - Fall 2019: Introduction to Computing under Dr. Yale Patt.
  - Spring 2019: Introduction to Embedded Systems under Dr. Jonathan Valvano
  - Fall 2018: Introduction to Computer under Dr. Ramesh Yerraballi

WORK EXPERIENCE

GPU Design Verification Intern – *Apple Inc.* | Austin, TX *Jun 2020 – Aug 2020*

- Sped up and improved coverage of test set address generation for memory hierarchy.
- Developed a library to save and restore tests based on metrics for targeted constraint testing.

- Assisted in the building, testing, and bringup of graphics memory hierarchy *UVM* testbenches.

CPU Design Verification Intern – *Centaur Technology Inc.* | Austin, TX *May 2019 – Aug 2019*
- Created a real-time debugging tool in Python to visualize chip performance in memory.
- Worked extensively with the ELK stack to aggregate data on interrupt and exception events.
- Tested and debugged Intel AVX-512 instructions using a x86-Ruby DSL for their new chip.

Software Engineering Intern – *Qube Cinema Inc.* | Chennai , India *Jun 2018 – Aug 2018*
- Redesigned the iCount - a commercial product to count the seat occupancy in theaters.
- Reworked the deep neural network in Keras using transfer learning on a *ResNet50* model.
- Sufficient image augmentation was performed since training data was predominantly poorly lit.
- Achieved an accuracy of 92% on uncorrelated test set.

Machine Learning Intern – *Lucid Imaging Pvt. Ltd.* | Bangalore, India *Jun 2018 – Aug 2018*
- Designed a deep-learning model to detect polypropylene in industrial cotton.
- Transfer learning performed on the *VGG-16* deep learning model in Keras.
- Achieved a 96% accuracy on the test set with 100% on positive samples on negative-skewed training dataset.

ACADEMIC PROJECTS

Extending an ISA (Capstone Research Project) – *UT Austin* *Sep 2020 - Present*
- Designing an out-of-order RISC-V CPU from scratch in SystemC and Verilog.
- Adding custom extensions to accelerate operations on linear-probed hash sets and breadth-first-search graph traversal, along with performance benchmarks.
- Worked in a team of 4. Currently in progress and expected to complete in April 2021

XC2064 FPGA Design (VLSI Final Project) – *UT Austin* *Nov 2020*
- Reverse engineering the first FPGA in structural verilog using a standard cell library.
- Consists of an 8x8 grid of CLBs, IO buffers, and switch matrix based interconnect.
- Includes a GUI interface to generate the required bitstream to program it for testing.
- Worked in a team of 3.

1D Cellular Automata (Unconventional Computation Final Project) – *UT Austin* *May 2020*
- Reviewed papers related to local pattern formation in 1-d cellular automata.
- Wrote a condensed paper integrating ideas from various references on the topic.
- Baseline paper: *D. Yamins and R. Nagpal, "Automated global-to-local programming in 1-d spatial multi-agent systems," in Proceedings of the 7th International Joint Conference on Autonomous Agents and Multiagent Systems - Volume 2*

RTOS Design and Remote Battleship – *UT Austin* *May 2020*

- Bare-metal RTOS built on the TM4C123 microcontroller from scratch.
- Includes thread/process management using a priority scheduler, SD card filesystem, and wireless capabilities to support remote procedure calls.
- Developed a battleship game playable over the internet with synchronized gameplay.
- Worked in a team of 2. Received an honorable mention. Youtube video

JASP Cellular Phone (Embedded Lab Final Project) – *UT Austin* *Nov 2019*

- Supports call and text functionality and used the Tiva-TM4C123 microcontroller
- Consists of a LCD screen, numpad, real-time clock, and 2G mobile network
- Uses *LittlevGL*: a lightweight embedded GUI library for designing the UI.
- Won first place in the project showcase by popular vote. Worked in a team of 4. Github

Enrich – *PennApps (Philadelphia, PA)* *Sep 2019*

- Designed a course organization platform to improve the lecture experience and quality for both students and teachers
- Provides live, anonymous lecture statistics, particularly student understanding of a concept and allows professors to organize content accordingly on the application.
- Includes a speech to text transcript conversion in real time
- Worked in a team of 4. Devpost Github

Texas CreateAThon – *UT Austin* *Mar 2020, 2019, and 2018*

- *Spring 2020*: ***Portable POV Display*** (On hold due to Covid-19)
  - Drafted the design and parts for a portable persistence-of-vision display.
  - Consists of a motor, foldable LED strip, and a TM4C123 microcontroller
  - Renders an image stored locally on the device, and potentially over WiFi.
  - Worked in a team of 5. Proposal
- *Spring 2019*: ***RecycleMe***
  - Engineered a prototype for a smart trash-can that automatically classifies and segregates trash into 3 categories: Recycle, Compost, and Landfill.
  - Consists of a compartment with a camera to detect and sort trash in real-time.
  - Trained a CNN to run on Raspberry Pi and control the compartment as trash comes in.
  - Worked in a team of 5. Github Proposal
- *Spring 2018*: **ChairIoT**
  - Designed a prototype for a self-organizing chair that can return to its original position
  - Consists of a movable platform controlled by IMU, which aggregates acceleration data and computes net displacement.
  - Worked in a team of 5. Github Proposal

Home-Unity – *HackDFW (Fort Worth, TX)* *Feb 2019*

- Designed a data visualization web platform for the *City of Dallas*to better serve the homeless.
- Developed a mobile app for users to receive notifications about these provisions in real-time.
- Received 1st place from the *City of Dallas*and *OmniSci* for the social good category.
- Worked in a team of 5. Devpost Github

Robotics – *UT Austin* *Nov 2017 - Mar 2018*

- CURM (Convention for Unconventional Robotic Movement)
    - Designed a 4-legged "spider" robot with motors along two directions to enable lifting of legs and moving legs forward
- Robotathon: Obstacle course racing competition.

Stick Fighter (Intro Embedded Final Project) – *UT Austin* *Nov 2017*

- Created a two-player stick fighting game made from scratch using *TM4C123* microcontroller
- Assembler our own controller hardware with joysticks, music, and real-time layering of graphics
- Presented in the final class-wide tournament. Github

SKILLSET AND HOBBIES

- **Technical:** Experienced with Linux, C/C++, Python, SystemVerilog (UVM), Arm Assembly
- **Languages:** Fluent in Tamil and English
- **Certificates**
    - Machine Learning by Andrew Ng (Coursera)
    - Android App Development (CMS IT Services**)**
- **Co-curriculars**
    - Music: Formally trained for 7 years in Piano and Guitar
    - Sports: High-altitude trekking and Badminton
    - Speedcubing: Participated in national tournaments with college club team (Profile)