Aneesh Durg

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EDUCATION

BS in Computer Science & Mathematics Aug 2015 - May 2019

University of Illinois at Urbana-Champaign

- GPA: 3.57/4.00
- Graduated with High Distinction
- Was included in the Dean's List in Fall '15 and Fall '16

WORK EXPERIENCE

Software Engineer Feb 2021-Present

KatanaGraph Inc. — Austin, TX

- Implementing and optimizing distributed graph pattern matching and implementing support for the **cypher** query language.
- Redesigned pattern matcher to not require replication of edges across hosts in distributed mode
- Designed and implemented a variable length edge matching algorithm that improved performance by up to 25% in queries against the **LDBC** dataset.
- Proposed and implemented a bounded memory usage pattern matcher to avoid crashes due to exhaustion of memory
- Redesigned datastructures storing intermediate representations of pattern matching results to save up to 75% of memory usage in some benchmarks.

Member of Technical Staff Aug 2019-Feb 2021

Qumulo Inc. — Seattle, WA

- Extended platform support for two new hardware configurations
- Designed a solution for eliminating server downtime during upgrades from 5 minutes to under 30 seconds in a team of four
  - Used containerization to avoid potentially slow boot times
  - Used a **dbus**-based mechanism to allow processes to break out of the container and control the host
- Implemented **SMB** server-side copy and **SMB**'s encryption protocol
- Refactored the **SMB** implementation to reduce memory usage and make object lifetimes more explicit.
- Helped lead migration of **python2** code to **python3**
  - Modernized python code by adding types via **mypy**
  - Proposed and implemented a python dependency verification tool for customer and cloud deployments

Software Engineering Intern May 2018-Aug 2018

Qumulo Inc. — Seattle, WA

- Worked on migrating an on-prem filesystem to work in AWS
- Helped implement a new hardware abstraction layer to interact with AWS resources
- Designed and developed an IP failover solution in **AWS**.
- Used **linux namespaces** to speed up testing time by up to 5x.

Machine Learning Intern May 2017-Aug 2017

Intel Corporation — Austin, TX

- Evaluated performance of **Intel Movidius Neural Compute stick (NCS)**.
- Proposed and built a tool to split large networks across multiple **NCS** devices
- Developed a browser plugin to demonstrate real-time image recognition on Raspberry PIs using **NCS**.
- Developed a benchmarking suite to demonstrate a 1.5x speedup on **CNNs** (**GoogLeNet**, **AlexNet**, **Age-Gender Net**) by using **NCS**. Compared against CPU/GPU using **Caffe**.
- Improved performance of **libSVM** on intel CPUs by using **OpenMP** for parallelism and **MKL** BLAS libraries to use intel CPU specific BLAS instructions. Achieved a 4x speed on the "Up squared" development board (Apollo Lake SoC).

Software Developer May 2016-Dec 2016

Hacklab Innovations — Bangalore, India

- Built AAMI - a wearable reading assistant for the blind and visually impaired.

- Developed and optimized a real-time imaging solution to find text in images and synthesize audio using **OpenCV**, **tesseract-ocr**, and **Caffe**.
- Designed and built a tactile feedback mechanism to help visually impaired users navigate lines of text.

TEACHING EXPERIENCE/PROJECTS

What Is a Filesystem?
http://aneeshdurg.me/what_is_a_filesystem

- An interactive book/vizualization for students learning filesystem concepts.
- Implements a ext2-esque filesystem with animations to illustrate how a disk accesses occur.
- Features a terminal simulator which implements some standard `GNU/Linux` utilities and interactively visualizes how they interact with filesystems and disk IO.

Visual Malloc
https://aneeshdurg.me/visual-malloc/

- An interactive vizualization for students implementing a memory allocator to visualize how various memory allocation schemes might work

Systems Programming Course Lead
Jan 2017-May 2019

CS241 @ UIUC — Urbana, IL

- Development lead for assignments, Lab/Office hours assistant, Honors mentor.
- Designed and created assignments (and associated infrastructure) to allow students to implement and explore concepts such as filesystems, containers, and cooperative scheduling.
- Mentored honors students to complete projects exploring areas such as distributed systems, compilers and linux kernel development.
- Wrote and gave lectures on additional topics such as containerization, and kernel developement for the honors section
- Held review sessions for assignments with low average score by creating slides and handouts that demonstrated concepts through hands-on guided exploration of topics

Illinois-CS241 Coursebook
https://github.com/illinois-cs241/coursebook

- Helped write and review portions of the free coursebook, which covers a superset of all content from UIUC's CS241
- Contributed chapters on filesystems, containers, and basic kernel developement.

PROJECTS

Bash Raytracer
bash

https://github.com/aneeshdurg/bash-raytracer

- An implementation of a raytracer in bash
- Inspired by the CMake raytracer, this project aims to use bash implement a raytracer that uses fixed point arithmetic. The purpose was to test my bash skills and learn about raytracing.

Video Synthesizer
Javascript/GLSL

https://aneeshdurg.me/video-synth

- A GPU accelerated interface to build complex generative visual effects that achieve real-time manipulation of audio and video input.
- Features modules that can be chained and combined with various operators

SignalApps
Rust/Python

https://github.com/aneeshdurg/signalapps

- A platform to build secure and anonymized chatbot based applications on top of the **Signal** protocol

Ephemeral
Typescript/React

http://aneeshdurg.me/ephemeral

- A distributed, peer-to-peer, twitter-inspired social media platform
- Uses **RSA** encryption and signing to prove identity

CameraTheremin
JavaScript/GLSL

https://aneeshdurg.me/CameraTheremin

- In-browser webcam gesture-based theremin (a musical instrument)
- Implemented all image processing functions required in Javascript and again in **WebGL** to compare performance.