

# UTSAV BARAL

(575) 571-2675 | [utsavbaral@berkeley.edu](mailto:utsavbaral@berkeley.edu) | [github.com/ubaral](https://github.com/ubaral)

## SKILLS

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- **Programming Languages:** C++, Python, C, Java, SQL, MIPS Assembly, Scheme, JavaScript
- **Other Tools:** NumPy, SciPy, Pandas, Unix, Vim, Sublime Text, LaTeX, HTML, CSS

## EDUCATION

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### University of California, Berkeley – College of Letters and Sciences

May 2014 - Present

B.A Computer Science and Applied Mathematics

- Coursework includes: Machine Learning | Computer Graphics | Operating Systems | Linear Algebra
- Additional Coursework: Artificial Intelligence, Probability and Statistics, Algorithms, Real Analysis

## EXPERIENCE

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### Stroll Health

San Francisco, CA

*Intern: Data Science*

May 2016 – Present

- Scraped healthcare data and used various data libraries in python (NumPy, SciPy, Pandas) to process that data to create predictive and analytic models. For example, predicting prices of procedures at different imaging facilities depending on a patient's insurance plan, which may or may not be in-network at the given facility.
- Developed plots to visualize and analyze the differences in procedure costs across locations, facilities, and insurance.

### University of California, Davis – Department of Computer Graphics

UC Davis, CA

*Intern: Developed Asset Management System*

May 2012 – August 2012

- Designed and implemented an asset management system to import and export data from different computer graphics assets to be used by the graduate students in their projects.
- Learned to work efficiently under a set of guidelines and learn things on the fly while working on a hard project.

## PROJECTS

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### Ray Tracer

September 2016

- Wrote a ray tracer in C++ from scratch, and used it to generate beautiful pictures to an image file. It renders arbitrarily oriented ellipsoids and polygons from .obj files.
- Uses the Phong shading model to compute diffuse and light shading. User can specify multiple point and directional lights
- Computes shadows, reflections, and user input linear transformations to objects

### Threading Features for OS Kernel

June 2016

- My team and I added features in C to the threading system of the educational operating system PintOS:
- An Efficient Alarm Clock: which suspends execution of the calling thread until some amount of time has passed; it executes efficiently without any "busy waiting"
- Priority Scheduler: Implemented a scheduler in the OS which respects threads' priority values so that high priority threads always run before low priority ones. Also implemented priority donation alongside this.
- Multi-level Feedback Queue Scheduler: A more advanced scheduler, which contains many queues of threads of different priorities and chooses threads to run accordingly. (Priority of each thread also decays with time)

### Multi-Layer Feed Forward Neural Network

March 2016

- Created a single hidden layer neural net from scratch with a closed form backpropagation calculation on hyperbolic tangent and sigmoid functions. It is written in python using the NumPy and SciPy libraries
- Implemented batched stochastic gradient descent for faster back prop computations.