Kalpit **Borkar**

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Education

Indian Institute of Technology Bombay 2020-2024

Bachelor of Technology in Electrical Engineering

Pursuing Minor in Computer Science

Skills

Languages:	C++, Python, C, Assembly, VHDL
Technologies:	Git, Linux, Docker, CI/CD
ML Frameworks:	TensorFlow, Keras, OpenCV, Matplotlib, Pandas

Experience

Python Interpreter | [link]

- Built a virtual stack machine to manipulate several stacks and perform its operations purely in Python.
- Implemented virtual machines, frames, functions and blocks to create the interpreter.

Unix Shell | [link]

- Developed a Unix Shell written in C from scratch.
- Implemented 13 commands including cd, help, cls, cat, frem, fmk, copy, path, time, history, etc.

AES Encryption | [link]

- Encryption and decryption programs written in C++ to improve understanding of 128-bit AES cipher.

Chip-8 emulator | [link]

- Created an 8-bit microcomputer VM by enforcing opcodes, cycles, stack, audio & visuals in C++.
- Applied SDL2 library to provide low level access to keyboard to interact with the programs

Python Git Implementation | [link]

- Developed Git version control system implementing all fundamental features of git from scratch.
- Implemented commands like add, cat-file, checkout, commit, hash-object, init, log, ls-tree, merge, rebase, rev-parse, rm, show-ref and tag.

RISC Microprocessor | [link] [link]

- Designed a 16-bit multicycle processor with 6-stage pipeline implementing 17 instructions.
- Improved efficiency by implementing fetching, decoding, and register reading in VHDL.

Face Anti-Spoofing System | [link]

- Built face anti-spoofing system by implementing Resnet 50 V2 feature vector using TensorFlow.
- Increased accuracy of the system by 17% integrating Haar Cascade model and data augmentation.

2D Physics Engine | [link]

- Created a 2D Physics Engine to simulate particle collisions, gas cloud, soft body and springs in C++
- Designed algorithms to simulate particle collision, attraction, combination, acceleration, bounce, etc

Relevant Courses

Logic in Computer Science, Computer Networks, Computer Architecture, Probability and Random Processes, Linear Algebra, Complex Analysis, Differential Equations, Microprocessors