MOKSHAGNA PRATTIPATI

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EDUCATION

Indian Institute of Technology Kanpur — B.Tech, Computer Science & Engineering **2021 – 2025**

- CPI 7.7/10 | Minor in Control Systems | JEE Advanced AIR 1837 (top 0.1%)

EXPERIENCE

Graduate Software Engineer (Systems) — Jaguar Land Rover, TBSI **Jul 2025 – Present**

Digital cockpit platform: QNX + Android (AOSP) on ARM Exynos

- Drove multi-OS cold-boot optimization across QNX and Android on ARM Exynos, meeting the **4.8 s boot-time KPI** by profiling init dependency chains and re-sequencing service bring-up
- Reverse-engineered the **lk bootloader** to map the early-boot handoff path and eliminate serialization stalls in multi-OS bring-up
- Authored **SELinux policy** (domain transitions, type enforcement) for platform services on production AOSP builds
- Implemented workload resource isolation with **LXC containers and cgroup hierarchies** via libprocessgroup on the Android side of the cockpit
- Owned **Yocto/BitBake** build layers for the Linux guest — recipes, layer maintenance, and CI build integration

PROJECTS

Ultra-Low-Latency IPC Engine — C++ **github.com/[HANDLE]/[repo]**

- Built a message-passing engine sustaining **1.18 billion msgs/sec** on a single core using a cache-line-aligned, lock-free SPSC ring buffer with mechanical-sympathy layout (no false sharing, batched cursor updates)
- Added an **AF_XDP kernel-bypass** transport for zero-copy network I/O, bypassing the kernel network stack on the hot path
- Exposed a Python API via **pybind11** with zero-copy buffer views for cross-language consumers

GemOS — Operating Systems Kernel (CS330, IIT Kanpur) **C, x86-64**

- Implemented **mmap/munmap/mprotect** with lazy allocation over 4-level x86-64 page tables, and a page-fault handler covering demand paging and protection faults
- Built **copy-on-write fork (cfork)** with per-page reference counting, plus an in-kernel syscall trace buffer for debugging

Python → x86-64 Compiler **Flex, Bison, C++**

- End-to-end compiler for a Python subset: lexer/parser (Flex/Bison), AST construction, symbol tables, and x86-64 code generation with a runtime for functions and recursion

TECHNICAL SKILLS

- **Languages:** C++ (primary), C, Python, x86-64 & ARM assembly, Bash, JavaScript
- **Systems:** Linux internals, QNX, AOSP internals, SELinux, LXC/cgroups, Yocto/BitBake, lock-free & cache-aware design, virtual memory
- **Tools:** perf, GDB, CMake, git, pybind11, Google Benchmark

ACHIEVEMENTS

- JEE Advanced 2021: All-India Rank 1837 among ~150,000 candidates (top 0.1% of ~1M JEE Main aspirants)
- LeetCode contest rating 1760 — top 10% globally