Suraj Kumar

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Education

B.Tech in Computer Science and Engineering (AI & ML), Galgotias University, Greater Noida 2023 – 2027

Experience

UAV Programmer – Drone Tech Lab Feb 2026 – Present
Remote

- Built onboard software for a GPS-free indoor search-and-rescue drone (Python asyncio, ROS 2, ArduPilot), isolating SLAM in its own process; a sensor-loss failsafe cut drift from **0.30 m to 0.04 m**.
- Built 3D frontier exploration and mapping informed by research (FUEL, FALCON): **98.8% room coverage**, **3 cm** median map error, **0 crashes** in simulation.
- Cut position latency on a Jetson from **744 ms to 40 ms** by moving GIL-bound mapping into a subprocess with parallel workers sharing immutable snapshots.
- Designed pipelined transfer over a lossy MAVLink radio link (burst requests, out-of-order reassembly, gap retries), raising throughput from **˜30 KB/s to ˜1 MB/s**.

Projects

Orvia — Anonymous Video & Chat Rooms — *Next.js, TypeScript, mediasoup, WebRTC, Redis, AWS* orvia.live

- Solo-built and operate a no-signup video/voice/chat platform: **12K+ unique visitors** and **3K+ meeting hours** in 30 days.
- Built group calls on a self-hosted **mediasoup SFU** with simulcast and adaptive per-tile layer selection, a coturn TURN server for restrictive NATs, and end-to-end encrypted text chat.
- Root-caused production call drops and one-way audio to a reconnect race (a dead socket's late close tore down the new media session) and shipped the fix.

ORBIT — Low-Latency Remote Desktop — *Rust, QUIC, NVENC, D3D11* github.com/gitsurajkr/orbit

- Built a GPU streaming pipeline (DXGI capture -> NVENC H.264 -> QUIC datagrams -> HW decode -> D3D11) with **12–20 ms** capture-to-display latency at 1080p.
- Added per-frame **Reed-Solomon FEC** and adaptive bitrate (RTT, loss, send-queue backpressure) over BBR-paced QUIC.
- Fixed a keyframe death spiral by moving backpressure ahead of the encoder (**0 dropped frames** over WAN); shipped as a portable exe with SHA-256-verified self-update.

NexTick — On-Chain Prediction Market — *Rust (Anchor), Go, Solana, PostgreSQL, Next.js* nextick.xyz

- Solo-built a Solana prediction market (devnet) for 5-minute UP/DOWN crypto rounds: Anchor program, Go services, Postgres indexer.
- Trustless settlement: only Wormhole-verified **Pyth** prices accepted; a Go keeper posts price, settles and opens rounds in **one atomic transaction**, with auto-refunds on missed rounds.
- Built a Go **matching engine** (price-time priority, on-chain settlement across 64 parallel settlers) run as an **active/standby pair** via a Postgres leader lease, with risk limits and a kill switch.

Achievements

- **IMC Prosperity 2026** (global algorithmic trading challenge): ranked **#552 of 18,803 teams** (top 3%).
- **Smart India Hackathon 2026**: led our team to **1st of 500+ teams** in the qualifier, building autonomous drone software and a ground control station.
- **Full-Stack Development Hackathon**: led our team to **1st of 100+ teams** with Orvia.

Technical Skills

Languages: TypeScript, Rust, Go, Python
Real-Time & Networking: WebRTC, mediasoup (SFU), QUIC, WebSocket, coturn, MAVLink
Systems & Video: H.264/NVENC, Direct3D 11, Win32, Tokio, asyncio, ROS 2, ArduPilot
Backend & Infra: Node.js, Express, Redis, PostgreSQL, Docker, Nginx, AWS (EC2), Cloudflare, GitHub Actions
Other: Solana (Anchor), React, Next.js
Concepts: Data Structures & Algorithms, OOP, System Design, REST APIs, Distributed Systems, CI/CD, Git, Linux