VARUN KAPOOR

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R&D Software Engineer · 3 years shipping Android, HoloLens, ARCore & Unity at Daimler's innovation lab · USC MS CS · Led cross-cultural teams across India, Germany & Japan · Active AR+AI researcher

SKILLS

XR & Spatial: ARCore, HoloLens (MRTK), Unity, spatial mapping, depth sensing, hand/gaze tracking, OpenGL ES / EGL
Android: Kotlin, Java, Jetpack Compose, Android SDK, MVVM, Room, Coroutines/Flow, Retrofit, OkHttp, Hilt/Dagger, Firebase/FCM, DataStore
Graphics & Rendering: HLSL/GLSL shaders, real-time rendering, rasterization pipelines, Blender, After Effects
Full-Stack: React, .NET Core, Node.js, REST/JSON, MongoDB, Django, Python
Tooling & Quality: Git, Gradle, Jenkins CI, Azure, Play Vitals, Perfetto, StrictMode, R8/ProGuard, JUnit/Espresso/Mockito

EXPERIENCE

Research Assistant | University of Southern California | Los Angeles, CA *Apr 2026 – Present*

- Collaborating with faculty on applied AR+AI research for Android, combining ARCore depth sensing with generative AI for real-time spatial understanding and environment classification.

Course Producer | USC Viterbi School of Engineering — CSCI 526 | Los Angeles, CA *May 2024 – Jul 2024*

- Supported instruction for Advanced Mobile Devices & Games (Unity, C#, OpenGL) for graduate students; reviewed grading across 9 assignments.

Software Engineer (R&D) | Mercedes-Benz R&D India (MBRDI) | Bengaluru, India *Aug 2019 – Nov 2021*

- Built Android client for Truckonnect (BharatBenz/Daimler, live on Google Play) — real-time GPS map with dynamic marker clustering for 10,000+ vehicles, telemetry dashboards (speed, fuel, AdBlue, DTC diagnostics), chunked Excel/PDF report generation, OAuth login, multi-parameter fleet filtering, and trip analysis pipelines.
- Sole Android developer on Daimler4You — migrated full codebase Java→Kotlin, integrated 6 Jetpack features, shipped Compose migration; collaborated directly with Daimler partners in Germany across sprints.
- Built MyWork Maps UI for German users; handled complex nested REST/JSON integrations; problem-solving led to India team gaining ownership of the application.
- Built ARCore burst-view for truck maintenance — spatially explode 3D assemblies, inspect components, and access procurement data for replacement parts.
- Built HoloLens (MRTK/Unity) factory floor training app — spatial interaction and real-time guidance overlaid on physical workspace, reducing worker time-to-productivity.
- Built multi-user collaborative XR design tool (HoloLens/Unity) for FUSO vehicle prototyping — shared 3D clay models, spatial annotations, real-time design review; reduced physical prototyping cycles by ~60%.
- Implemented enterprise OAuth/IAM auth and R8/ProGuard obfuscation across all production builds. Built JUnit/Espresso/Mockito test suites in Jenkins CI, preventing pre-release regressions.

Software Engineer (R&D) | Daimler Truck Innovation Center (DTICI) | Bengaluru, India *Nov 2021 – Aug 2022*

- Tech lead (team of 4) for FUSO TCO Simulator — architected and shipped full-stack app (React + .NET Core) from scratch to production in ~4 months.
- Led cross-cultural delivery across teams in India and Japan — sustained sprint planning and direct stakeholder communication with FUSO partners in Tokyo throughout the engagement.
- Implemented Unity AssetBundle streaming pipeline loading 3D vehicle assets on-demand from cloud, reducing memory footprint ~40% on HoloLens and mobile.
- Drove ANR/crash reduction and startup optimisation (Perfetto, StrictMode) — ~10% cold start improvement, 40% fewer main-thread I/O violations. Mentored 4 junior engineers.

PROJECTS

SenseDev — AI Codebase Explorer — *Kotlin, Gemini API, Gradle* *Nov 2025 – Present*

- Architected a static analysis engine that parses Gradle module graphs and generates interactive dependency visualisation maps for multi-module Android projects, helping developers onboard onto unfamiliar codebases faster.
- Integrated Gemini AI for natural language codebase Q&A. Applied to Y Combinator W26. Owned packaging, release iteration, and developer feedback loop.

ARCore Depth API — Spatial AR+AI App — *ARCore, Kotlin, Jetpack Compose, Firebase* *Apr 2026 – Present*

- Building an Android application combining ARCore depth sensing with generative AI for real-time spatial environment understanding; exploring on-device depth data fusion with cloud AI inference for environment classification and overlay.

SenseMap — Ambient Sensor Visualisation — *Kotlin, Jetpack Compose, Android Sensor APIs* *Oct 2025 – Nov 2025*

- Built an Android app combining real-time multi-sensor data (accelerometer, gyroscope, environment sensors) with generative visual design using Jetpack Compose, implementing data-driven reactive UI patterns.

3D Graphics Rasterisation Pipeline — *C++* *2024*

- Built a complete software rasterizer from scratch: vertex processing, matrix transformations, lighting (Phong), view-frustum clipping, and projection — deepening understanding of GPU-level rendering and performance trade-offs.

PrimeEngine Extensions — *C++, Python* *Aug 2024 – Dec 2024*

- Extended a bare-bones C++ game engine with physics integration, AABB collision detection with spatial debugging, engine-level frustum culling, and a node-based shader editor (Python/Tkinter) with live parameter updates and material authoring panel.

Multimedia Systems — Computer Vision Pipeline — *Java, Python* *2024*

- Built image processing and CV systems including vector quantisation compression, multi-frame video stitching with denoising/sharpening/alpha masking, and logarithmic quantisation for perceptual image quality optimisation.

Beyond Time — Unity Game — *Unity, C#* *2024*

- Team-based Unity game shipped through structured alpha/beta/gold phases — custom shaders, full Game Design Document, original music composition.

Tiler — Procedural Strategy Game — *Unity, C#* *2026*

- Solo-developed procedural strategy game shipped on itch.io — raycasting-based interaction, tile generation algorithms, and full game loop.

INTERNSHIP

AR Developer Intern | Trillbit | Bengaluru, India *Apr 2018 – Jun 2018*

- Built an ARCore for Unity application enabling customers to visualise store discounts and coupons for 20+ retail locations using Data-over-Sound technology — integrated Trillbit's proprietary sound-based data channel into Unity, personalising AR experiences from ambient audio signals.
- Integrated the AR application into Trillbit's existing Android app, shipping to production as a sole developer intern.

EDUCATION

Master of Science, Computer Science · University of Southern California *Jan 2024 – Dec 2025*

Courses: 3D Graphics & Rendering (C++), Game Engine Development (C++), Advanced Mobile Devices & Games, Multimedia Systems Design, Web Technologies, Information Retrieval

Bachelor of Technology · Christ University, Bengaluru *Jun 2015 – Apr 2019*

GPA: 9.3/10

PUBLICATION

Augmented Reality Enabled Education for Middle Schools — Springer SN Computer Science, May 2020 · DOI: 10.1007/s42979-020-00155-6

First-authored peer-reviewed research on AR-based K-12 education systems. Companion Android app (ARCore, Firebase) reached 1,000+ Play Store downloads.