

VRUSHABH DESAI

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SUMMARY

Senior Software Engineer with 7+ years of experience building computer vision and systems software. Delivered 2D/3D vision tools, and cross-platform SDKs for industrial vision products, and developed real-time embedded systems for automotive and robotics platforms.

EXPERIENCE

Senior Software Engineer – R&D | Cognex Corporation, Natick, MA

Jun 2021 - Present

Vision Tools & SDK

- Developed and optimized 2D and 3D vision capabilities, including 3D object segmentation, side-by-side detection, and image stitching etc, and delivered them via Cognex's unified C++ and Python API for adoption across multiple product teams.
- Designed a synthetic data generation framework using Python, Blender, and TeamCity that produced **350,000+** labeled images, enabling scalable validation of perception algorithms without extensive field-data collection.
- Built and shipped the **Cognex Development Kit (CDK)**, a cross-platform vision SDK that unified Cognex 2D, 3D, and AI tools behind a single C++ API with auto-generated Python and C# bindings, cutting downstream integration time by about **50%**.
- Led modernization planning for the Cognex Vision Library, a product line generating over **\$10M in revenue**, by defining MVP scope, aligning stakeholders, and prioritizing high-impact work, while mentoring teammates as a Scrum master.

Embedded Vision Diagnostics

- Architected a C/C++ remote diagnostics platform for embedded vision systems, enabling engineers to debug Linux-based cameras from Windows and view live graphics and algorithm state, reducing hardware issue resolution time from **4 hours to 15-30 minutes**.
- Built a capture-and-replay framework in C and C++ with encrypted archives and Python DMCC automation that captured production-device state and reproduced customer failures in desktop tools, cutting investigation time from **1 day to 2 hours**.

CI/CD & Infrastructure

- Architected a Python/Flask device orchestration platform that transformed shared embedded readers into an on-demand service for CI pipelines, reducing test execution time **from 36 hours to 9 hours** through automated leasing, health monitoring, and recovery.
- Owned and scaled CI/CD infrastructure for the Cognex Development Kit using TeamCity Kotlin DSL, Docker, and Incredibuild, reducing ARM/x64 build times by **4x** and improving release reliability through automated dependency validation and coverage-gated testing.

Embedded Software Engineer | Jindal Mobilitrics, Mumbai, India

Jun 2018 - Jul 2019

- Led a **team of 4 engineer** building perception and control software for an autonomous delivery robot, using OpenCV and YOLOv3 on a Raspberry Pi for real-time lane-following and obstacle avoidance.
- Designed a custom microcontroller-based Vehicle Control Unit (VCU) for an electric motorbike, developed embedded C firmware and CAN bus communication software to integrate sensor inputs into a real-time vehicle control system.

TECHNICAL PROJECTS

DJS Racing Formula Student Team | Vehicle Systems & Telemetry Lead

Jun 2016 - May 2018

- Led a **team of 7 engineers** to design and deliver the race car's embedded control, telemetry, and real-time data acquisition stack, including ECU, electronic shifting, drivetrain control, and data logging systems, enabling reliable high-performance vehicle operation.

Indoor 3D Mapping with RGB-D SLAM (C++, ROS, RTAB-Map, TurtleBot3)

- Fused RGB-D, LiDAR, and IMU data on a TurtleBot3 to develop a real-time graph-based SLAM system with loop closure & pose optimization.

SKILLS

Programming Languages: C++, C, Embedded C, Python, C#, Bash, Kotlin.

Build & Toolchain: CMake, Conan, Ninja, GCC, Clang, MSVC, Visual Studio.

CI/CD & DevOps: TeamCity, Jenkins, Docker, AWS, JFrog Artifactory, Bitbucket Server, Git, CTest, pytest, Google Benchmark, clang-tidy.

Embedded, Vision & Robotics Tools: ROS2, Gazebo, RTAB-Map, Nvidia Isaac Sim, Raspberry Pi, OpenCV, YOLO, I2C, CAN bus.

Release & Packaging: Debian, Python wheels, NuGet, NSIS, InstallShield.

EDUCATION

MS in Robotics Engineering | Worcester Polytechnic Institute, Worcester, MA | **CGPA: 4.00**

Aug 2019 - May 2021

BE in Electronics Engineering | D. J. Sanghvi College of Engineering, Mumbai, India | **CGPA: 3.7**

Aug 2014 - Jun 2018

C++ Nanodegree | Udacity

June 2020

ACHIEVEMENTS

Awarded **Best Designed Car** at Formula Bharat (2017, 2018), achieved **Second-Best Asian Team** at Formula Student Germany 2017, and **won the Cost Event** at Formula Student Austria 2018.