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**Skills:**

- Expertise in developing software for driving, testing and validating display performance
- Working knowledge of color spaces and image processing and instrument qualification process
- Hands on experience developing test tools for display technologies such as uOLED, OLED and LCD
- Optical calibration and defect detection Algorithm development using Objective C and Matlab
- Test station software development using python and Objective C
- Vendor management - Close collaboration with vendors and CMs to bring up, deploy and debug EE and ME issues on testers, experience supporting onsite at factory as well as remote
- PCB schematic and layout experience for low speed/low density designs using Altium
- C firmware development for AVR (Atmega32) and ARM (NXP LPC2148) MCUs
- Versioning and Bug tracking tools (Git, JIRA, Confluence)

**Projects:**

- ➔ Developed In Field display calibration for Apple Studio display and M4 Macbook Pros
  - ➔ worked with display hardware, firmware and display panel teams to deliver a cohesive first party display calibration feature, targeting professional workflows such as movie production and photography
  - ➔ Link: https://support.apple.com/guide/mac-help/calibrate-your-display-mchlp1109/mac
- ➔ End to end development of spectroradiometer based display quality tester to quantify display Luminance, Color and Uniformity performance at the end of the Display calibration line for Vision Pro (at Apple, Inc)
  - ➔ work closely with internal XFN teams to define ERS requirements, implement test sequence for driver boards and imaging systems
  - ➔ Develop scalable test algorithms and test SW for fast evolving module testing requirements
  - ➔ Analyze data to feedback to display team and suggest module and test improvements
- ➔ Developed LCD Display Yellow Mura characterization tester for iPhone 11, to help internal team to characterize the formation of visible blemish on the display (at Apple, Inc)
- ➔ Consistently delivered low cost, retrofittable reliability stress tester for Display module reliability testing for stress testing modules for Electromigration and corrosion, modules used in iPhones Model years 2018-2023 and Apple Watch Series 5-8 (at Apple, Inc)
  - ➔ Motivated tester vendor and drove them to achieve the a low cost retrofittable and modular solution, reducing deployment cost and improving reusability as DUT design was updated
  - ➔ Directly responsible individual to lead vendors' engineering team and ensure that their key deliverables and targets were achieved
  - ➔ designed processes to streamline information gathering, exchange, design review and tester validation before deployment, reducing internal resource requirements as project scope expanded to include more display and touch modules
  - ➔ this tester is responsible for validating display level reliability, directly impacting iphone users
  - ➔ tester allows for critical testing that ensures most robust display designs that can survive device drop and moisture ingress, these features allow long device life and are a key Apple brand attribute
- ➔ Developed detailed hardware specifications (and test plans to validate them) for electrochromic glass controller hardware, understand the requirements from internal teams, prototyping and maintaining internal Wikis (at View, Inc)

- ➔ Developed advanced algorithms, which were coded into device firmware for driving novel electrochromic architectural glass
- ➔ prototyped and analyzed device failure improving hardware and firmware design
- ➔ prototyped advanced energy saving and efficiency boosting features such as using Li-Ion based supercapacitor energy storage devices, using python and C based software and firmware control

➔ Lead development of setup for PCBA level test and calibration setup for use in hardware production, developed test SW, process flow documents and usage instructions documents(at View, Inc)

- ➔ analyzed test data using python scripts, improving process and working with contract manufacturing vendor to reduce cost while improving throughput

➔ Lead Engineer on Consumer Bluetooth Medical device hardware and firmware development(at Diabe.to)

- ➔ Hardware prototype enabled receiving critical funding, leading to eventual acquisition by Livongo, Inc (now part of Teladoc, Inc)

➔ PCB and Firmware development in C/C++ for ARM and Atmel AVR based microcontrollers using GNU based toolchains(developed low level drivers, LCD based GUI, drivers for motor control, state machines) (at Automata Systems)

- ➔ end product was a low cost (10% cost of leading automation hardware brand) industrial automation platform for motion control applications
- ➔ full ownership of hardware and firmware for the automation platform
- ➔ implemented scalable software development techniques allowing reuse and simplified debugging

➔ Developed a low power microcontroller based capacitive touch activated LED toy (Hobby Project , Link: http://murli-shenoy.com/?p=606)

➔ Understanding Fast charging technology used for smartphones (Hobby Project, Link http://murli-shenoy.com/?p=633)

**Work Experience:**

**Sr. Software Engineer (Instrumentation and Test Development) Apple Inc, Cupertino, CA** (November 2017 to present)

- in field display calibration for Apple Studio Display (2022 model) and Apple MacBook Pro (late 2024 model)
- Near Eye uOLED Display characterization tester for factory OQC for Apple Vision Pro
- iPhone LCD Yellow Mura Characterization tester (for iPhone XR and iPhone 11)
- Lead for iPhone (2018-2021 models) Reliability tester development - developing processes and transferring to external vendors for scaling up, managing EE and ME engineers to set expectations and meet high quality standards

**Electrical Engineer at View Inc, Milpitas, CA** (May 2014 to November 2017)

- Research and development of control electronics for Electrochromic windows.
- Modelling Electrochromic device behaviour, development of automated functional test, verification, calibration procedures for the factory.
- Lead hardware reliability test effort.
- Prototyped new device concepts

**Hardware Lead at Farasbee Labs/Diane.to , Mumbai, India** (Feb 2012 to Dec 2012)

- Hardware lead for Bluetooth Medical device
- Developed prototypes and optimized device for production
- Worked closely with industrial designer and UX team to finalize hardware concept

**Embedded Systems Developer at Automate Systems, Mumbai, India** (October 2010-January 2012)

- Schematic Capture/PCB design for industrial motion control applications

- Developed scalable and reusable firmware for multiple ARM and Atmel AVR microcontrollers
- Interface with end customers to understand application needs and create usage guides

**Academics:**

San Jose State University - Master's in Electrical Engineering (Dec 2014).
Mumbai University - Bachelor of Engineering (Instrumentation) (Feb 2011)

**Achievements**:

- Won first place at Integrate Hackathon 2015 for IoT project 'Intelligent Energy saving smart-plug', Project based on Intel Edison IoT platform