Shubhendra Pratap Singh

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SUMMARY

Research Engineer with 8+ years of experience in advanced manufacturing, product development, design automation, and mechanical systems innovation. Proven ability to translate conceptual research into pilot-scale demonstrations, integrate multidisciplinary technologies, and lead collaborative engineering initiatives. Experienced in working across academia, industry, and government-funded projects with emphasis on rapid prototyping, FEA, DFMEA, IoT systems, and digital modeling.

TECHNICAL SKILLS

CAD & Simulation: SolidWorks, Autodesk Inventor, Fusion 360, MATLAB Simulink, ANSYS, D2T Morphee
Programming & Tools: MATLAB, Python, C++, Visual Studio, Visual Basic, R, Git Hub
Analysis & Testing: FEA, DFMEA, Tolerance Analysis, Spectrum Analysis, Thermal Modeling, NVH Testing
Prototyping & Manufacturing: 3D Printing, Jig/Fixture Design, Engine Dyno, Chassis Dyno, Climate Chambers, HIL Systems
Platforms: ETAS INCA, Cummins Calterm, Horiba MEXA, AVL FTIR, SCADA, PLC, Arena PLM
Other: IoT-based Systems, Rapid Prototyping, Product Lifecycle Management, Embedded Systems

PROFESSIONAL EXPERIENCE

Clemson University – TA | Graduate Student | Aug 2023 – Present | Clemson, SC

- Leading development of bio-inspired analogy framework using LLMs for critical chain-based product design innovation.
- Designed a novel whale-tagging prototype aligned with humane, scalable wildlife tracking systems.
- Developed SolidWorks designs and automation concepts for a vitrification system to enhance tissue sample preservation.
- Built custom MATLAB-based FEA solver for stress-strain analysis and validated theoretical predictions.
- Served as a Teaching Assistant for 8 months, supporting undergraduate and graduate courses in mechanical engineering.

FEV India – Project Engineer | Nov 2017 – Apr 2023 | Pune, India

- Managed testing and calibration of Euro-6 diesel engines, hybrid powertrains, and SCR emission systems for major OEMs.
- Designed and implemented macro-based automation tools reducing emission testing cycle by 20%, saving ~$180,000/project.
- Coordinated cross-functional collaboration for emissions, NVH, and regulatory compliance using AVL and Horiba systems.
- Gained extensive exposure to large-scale pilot facilities, high-altitude testing, and thermal/mechanical validation.
- Led end-to-end technical documentation and testbed system integration, enhancing throughput and project scalability.

Club First – Research Associate | Jul 2016 – Nov 2017 | Jaipur, India

- Developed over 12 products including Instant Water Purification & Vending Systems deployed in rural areas.

- Designed mechanical and control systems for serving robots, emphasizing modularity, FEA validation, and 3D printing.
- Led project planning, vendor engagement, field testing, and deployment in challenging environments.
- Applied embedded systems, SCADA, and lean prototyping to deliver cost-effective and sustainable technology solutions.

Honda Cars India – Engineering Intern | Jan 2016 – Jun 2016 | Greater Noida, India
- Designed universal jig/fixture for petrol/diesel engine lines, reducing assembly time by 2 minutes per unit.
- Conducted FEA and DFMEA, enabling lean process optimization and fixture durability assurance.
- Contributed to PERT-based project scheduling, rapid prototyping, and manufacturing planning.

EDUCATION

Clemson University – M.S. Mechanical Engineering | Aug 2023 – Aug 2025 (Expected) | GPA: **3.83**

JECRC University – B.Tech Mechanical Engineering | Aug 2012 – Aug 2016

SELECTED PROJECTS & RESEARCH

- **Bio-Inspired Design Tool:** Developed a framework using black-box models and LLM-based analogy extraction for design exploration.
- **Whale-Tagging Device:** Prototyped humane, long-duration marine tracking systems with cross-institutional collaboration.
- **ECU IP Theft Detection:** Designed proof of concept (PoC) methodology with Georgia Tech to highlight security flaws in ECU reverse engineering.
- **Emission Testing Optimization:** Created automation tools for data processing/reporting, cutting cycle time by 20%.
- **IWPVS System:** Designed IoT-enabled rural water dispensers, addressing voltage fluctuation, filtration speed, and humidity resilience.
- **Serving Robot:** Engineered kinematics and structure using CAD/FEA; integrated modular designs for healthcare and hospitality.
- **Lithium-ion Battery Diagnostics**: Modeled thermal-electrical BMS faults using EKF in Simulink for early fault detection.
- **2D-FEA Solver**: Coded a solver in MATLAB for stress analysis with custom mesh processing and visualization tools.

RELEVANT COURSEWORK

Advance Design Methodology, Engineering Optimization, Statistics with R, Data Visualization, On-Board Diagnostics, Material Selection, Design of Automation, Modeling and Simulation, Design for Manufacturing, Finite Element Formulation

Visit my webpage at: https://ceoss625.github.io/Shubhendra/