Dr. Shravan Vudumu, Ph.D.

Technical Manager, Controls and Systems Engineering, Data Analytics
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Summary

Technical Manager with a doctorate degree in Mechanical Engineering and master's degree in Management. Over thirteen years of work experience in a multinational corporation developing control algorithms for complex systems and implementing model based designs. Proven ability to coach, lead and manage teams to perform engineering data analysis, simulation based product development, optimize electromechanical devices with embedded software and in resolving technical challenges. Successfully coached engineers globally. Expanding skill set with a master's degree in Data Analytics specializing in business analytics and machine learning.

Education

Georgia Institute of Technology, USA
Master of Science in Data Analytics *Aug 2023 - Present*
- Specialization: Business Data Analytics, Machine Learning

University of Illinois, Urbana - Champaign, USA **GPA: 4.0/4.0**
Master of Science in Management *Aug 2022 - July 2023*
- Specialization: Business Data Management and Communication

Missouri University of Science and Technology, USA **GPA: 4.0/4.0**
Ph.D. Mechanical Engineering *Aug 2006 - July 2010*
- Dissertation title: "Experimental and Computational Investigations of Hydrogen Safety, Dispersion and Combustion for Transportation Applications"

Indian Institute of Technology - Madras, India **GPA: 8.0/10.0**
M.Tech Energy Technology and B.Tech Mechanical Engineering *Aug 2001 - May 2006*
- Thesis title: "Modeling of a Diesel Engine for Speed Control". Minor: Industrial Engineering

Work Experience

Cummins Inc., Columbus, Indiana, USA Aug 2010 - Present
- Controls, Software and Electronics Engineering - Technical Manager
- Dynamic Systems and Controls (DS&C) - Technical Manager
- Dynamic Systems and Controls (DS&C) - Technical Advisor

Management and Technical Coaching Experience
- Managed a team of engineers, group leads and contractors to successfully deliver Cummins' Controls Performance and Features deliverables for multiple diesel and spark ignition engine programs for on-highway and off-highway applications with wide range of engine displacement sizes and air handling architecture complexities.
- Supervised multiple engine development programs by managing deadlines and prioritizing tasks. Handled technical challenges by identifying root cause and following the robust seven-step problem solving process. Guided the team by coordinating with stakeholders. Skilled in project leadership and execution.
- Coached and developed local Brazil and China DS&C calibration and validation engineering resources that was needed to maintain Cummins' technology leadership in critical international markets. Built communication bridges with global engineering teams (China, India, UK, and Brazil). This included on-site support at East Asia Research and Development Center in China and at Cummins-Dongfeng joint venture research facilities.
- Aided in the development and restructuring of Cummins' technical documents, requirements and engineering practices to ensure wider global use and to integrate into engine development. Promoted adherence to the process.
- Co-ordinated Simulation Based Product Development and next generation engine architecture evaluation efforts in Cummins' East Asia Research and Development Center in China. Provided technical support to define scope, review model capability, evaluate engine architectures and to resolve technical challenges.
- Led the development of Cummins' AUTOSAR air handling controller by understanding stakeholder voices, developing technical requirements, being liaison for cross functional engineering tasks, analyzing results and by participating in the delivery of the embedded software. Managed engineers for design calibration and validation.
- Worked with human resources, recruiters, university professors and consultancy firms to address resources gaps by hiring new employees (technical contributors and group leads), interns and contractors as needed and avoided delays on key Cummins' DS&C deliverables. On-boarded multiple engineers on a successful career path.

Technical Contributions and Experience

- Engineered improvements and calibrated model-based air handling controller for multiple Cummins engines to achieve higher fuel economy, optimal transient performance, and reduced emissions in various driving conditions.
- Proven track record in development and calibration of model-based controllers for complex systems, virtual sensors, electromechanical devices and diagnostics algorithms for different engine architectures.
- In-depth experience in collecting data from test cells and prototype vehicles with data acquisition systems, analyzing data for performance and on-board diagnostic analysis, and reporting outcomes to stakeholders.
- Developed MATLAB tools to analyze data and visualize key findings from vehicles, test cells and emission cycles.
- Expertise in engine simulations to develop new controller design concepts for various advanced air handling system architectures using GT-POWER engine simulation software and Simulink tools.
- Skilled in applying engineering analysis principles to evaluate the performance of intake air systems, EGR systems, heat exchangers, turbomachinery, sensors, device drivers, combustion, and engine emissions.
- Experience in developing embedded software designs and in creating ECM builds. Successfully tested prototype software at unit and system level for validating functionality on open-loop and closed-loop test benches.
- Designed a new model-based on-board diagnostic (OBD) algorithm for the air handling subsystem to detect failures on low-cost engine platforms (a six-sigma project).
- Developed a model-based turbocharger protection design to prevent engines from failure (a six-sigma project).
- Leveraged diverse perspectives from cross functional teams to diagnose and effectively resolve challenges.

Research Experience

- Characterized the fluid dynamics of new/alternative transportation fuels to ensure their safe and proper use. **Research was funded by US Department of Transportation** (through Research and Innovative Technology Administration's National University Transportation Center) and the **Department of Defense' Defense Logistics Agency** (through Air Force Research Laboratory).
- **Played a key role in setting-up Missouri's first hydrogen fueling station** together with operating a hydrogen powered commuter bus to develop, demonstrate, and evaluate safe use of hydrogen-based technologies.
- Performed research on internal combustion engines powered by alternative and conventional fuels to characterize their unique performance, combustion, and emissions characteristics.
- **GM PACE** (General Motors - Partners for the Advancement of Collaborative Engineering Education) sponsored project for the integration of simulations into engineering curriculum.
- Developed mathematical diesel engine models for optimization of engine controllers and a critical data acquisition system to acquire real time engine data for model validations.

Publications

- As doctoral researcher, **published six international journal and conference papers** (IJHE, ASME, Energy).
- Published research documents for US DOT's repository and Cummins' internal technical documents for engineers.

Software Skills

- **Data Analytics Software**: R, Python, Power BI, Tableau, SQL, Git and version control, Excel, Arena
- **Data Analytics Skills**: Data cleansing, modeling, statistical analysis, interpretation, optimization, visualization
- **Engineering Software**: MATLAB & Simulink, GT-POWER, Data Acquisition tools, Minitab

Data Analytics Projects

- Data analysis of Divvy bikes, a ride sharing system in Chicago | *Python*
- Machine learning algorithms for evaluating credit applications | *R programming*
- Shortest path evaluations in road networks | *SQL, Python*
- Remote diagnostics of vehicle data to predict maintenance issues | *Power BI, Tableau*
- Simulation of traveler's check-in at airports | *Arena simulations*
- Financial modeling and capital budgeting of firms | *Excel*

Certifications, Honors and Achievements

- Selected in **"Outstanding Under 35 Young Scientists Committee"** at "HySyDays 2007, Second World Congress of Young Scientists on Hydrogen Energy" organized by the Inter-University Research Center for Sustainable Development, Sapienza University of Rome, Italy.
- Recipient of the prestigious US Department of Transportation's (Research and Innovative Technology Administration) **National University Transportation Center (NUTC) assistantship.**
- Merit scholarship and tuition waiver (2001-06). Member of ASME, SAE, AIAA, IJHE (2009-10).
- Received **Six Sigma Green Belt** certification (July 2015).
- Completed **Systems Engineering Certification** sponsored by Cummins and University of Detroit-Mercy.
- Recipient of Cummins' **Business Impact Award for Leadership and Contributions** from Vice President.