Vishal Sharma

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GitHub: vxsharma-14 (Vishal) (github.com)

Summary

A recent graduate with a PhD degree in Aerospace Engineering and academic research experience in high fidelity CFD studies. Skilled in scientific code development using object-oriented programming with multiple years of experience in Fortran, Python, Matlab and C++ programming languages. I am passionate about CFD coding for structured meshing, numerical methods, post-processing, and visualization. I have demonstrated exceptional interpersonal, teamwork and leadership skills in previous roles.

I am interested in roles in CFD research where I can contribute to an organization's technological advancements.

Education

Wichita State University, Wichita, KS, USA
Ph.D., Aerospace Engineering with core coursework in Aerodynamics & CFD, *2014 - 2020*

Amity University, Noida, India
Master of Science, Automobile Engineering, *2012 - 2014*

Rajiv Gandhi Technical University, Bhopal, India
Bachelor of Science, Mechanical Engineering, *2004 - 2008*

Skills

Programming	: Python, Fortran, C++ and Matlab
Numerical Techniques	: Finite difference methods, finite volume methods, structured meshing
CAE Softwares	: Catia, SolidWorks, Fluent (Ansys), Tecplot, Paraview
Office Tools	: Microsoft - Word, PowerPoint, Excel, and Google - Docs, Sheets
Operating Systems	: Windows, UNIX
IDEs	: Spyder, Eclipse, Python IDLE, Jupyter Notebook

Current Project

Project nanpack (Numerical Analysis Package in Python)
December 2020 – Present
GitHub repo – https://github.com/vxsharma-14/project-nanpack
Owner, Original code author and sole contributor at present

Description:

- Developing an open-source package- nanpack in Python for CFD research applications using object-oriented approach.
- Objective of nanpack software is to save development time for researchers to conduct research in CFD.
- Another objective is to impart learning in numerical methods to those interested in simulation and modelling.
- Pre-release version (currently 1.0.0-alpha4) available on Python Packaging Index (PyPI) and GitHub.
- Documented technical specifications using module docstrings and code comments.
- Prepared markdown documents on Jupyter Notebook for software tutorials.

Research Experience

➢ **Texas A&M University, College Station, TX**
Postdoctoral Research Fellow *June 2020 – September 2020*

- Conducted research on numerical methods for CFD of hypersonic flow around space re-entry vehicles.
- Utilized second-order finite volume method to solve an existing problem related to inaccurate simulation results.
- Developed functions/subroutines and added capabilities and improved accuracy of the legacy software in FORTRAN for CFD hypersonic flow simulation.

- Debugged, troubleshoot, and optimized the legacy code and wrote tests for efficient development.
- Collaborated with the funding agencies to find opportunities of new research.
- Documented technical specifications and added code comments when required.

➢ **Wichita State University, Wichita, KS**
Graduate Research Assistant *August 2016 – May 2020*

- Performed literature survey on the numerical methods in CFD for aerospace engineering applications.
- Developed and validated a computer solver from ground up in FORTRAN and Python.
- Wrote scripts in Python for generating visualizations/animations of simulation outputs.
- Wrote subroutines for structured, non-uniform meshes for canonical geometries and airfoils.
- Created test plans for conducting numerical experiments, document test results/reports.
- Communicated results and reports to the Principal Investigator and the team in a timely manner.
- Investigated the interaction of electromagnetic waves with airfoil structures.
- Performed code debugging, troubleshooting and optimization for performance and accuracy.
- Investigated the accuracy, stability, and grid convergence of the proposed finite difference method.

➢ **Sanden Vikas India Limited, Faridabad, India**
Research Engineer Intern *December 2013 – May 2014*

- Conduct literature review in car cabin heat transfer and thermal comfort simulation.
- Collaborate with various departments and gather data and tools required for the research.
- Developed a simulation model in MATLAB for performing transient analysis of car cabin heat loads for different cabin geometries, driving scenarios and ambient conditions which affect the thermal environment of the cabin.
- Suggest HVAC design improvements to the R&D team
- Achieved an increase in calculation accuracy by 50% as compared to the company's MS Excel-based Thermal Calculation Software.

Other Professional Activities

Shock-Tech, Wichita, KS - President (Founder) *Dec 2016 – Nov 2017*

Wichita State University Libraries, Wichita, KS – Graduate Library Assistant *June 2015 – August 2017*

Tata Motors Limited, India, - Summer Intern *May 2013 – July 2013*

Yes Bank Limited, India – Banking Analyst *August 2011 – March 2012*

ICICI Bank Limited, India – Banking Analyst *May 2009 – August 2011*

Publications

- Sharma., V., and Hoffmann, K.A., "Solution of Maxwell's Equations Using Fourth-Order Modified Runge-Kutta Scheme on Transformed Coordinates," *2020 AIAA SciTech Forum*, Orlando FL, AIAA 2020-2155, January 2020.
- Sharma, V., "Numerical Solution of Maxwell's equations on transformed coordinates for non-rectangular electromagnetic applications," Ph.D. Dissertation, Wichita State University, May 2020.
- Sharma, V., and Hoffmann, K.A., "Solution of Maxwell's Equations for Non-Rectangular Electromagnetic Applications," *AIAA Journal of Thermophysics and Heat Transfer*, September 2020.