Pranav Prashant Ladkat

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Education

University at Buffalo, The State University of New York, USA Aug 2013 - Jun 2015

Master of Science, Mechanical Engineering *(Computational Sciences)* **GPA: 3.74/4.0**

University of Pune, India 2007 - 2011

Bachelor of Engineering, Mechanical Engineering **First Class with Distinction**

Relevant Coursework:

High Performance Computing	Data Structures & Algorithms	Optimization
Machine Learning	Applied Mathematics	Computational Geometry
Finite Element Methods	Computational Moving Interfaces	Computational Fluid Dynamics

Technical Skills

Computer Skills	- C++(11/14), C, Python, Java, Bash, Linux, Git, CMake, LaTeX, Matlab
HPC, Parallel prog.	- MPI, OpenMP, CUDA, Pthreads, Intel TBB, SSE/AVX Intrinsics
Libraries & Tools	- Boost, Eigen, PETSc, Blas, Lapack, gdb, Valgrind, Paraview
CAE/CAD Tools	- ANSYS' CFD Tools, STAR-CCM+, Abaqus, CATIA, Solidworks

Work Experience

Member of Technical Staff, Skytree August 2015 - Present

- Part of *High Performance Computing, Machine Learning Algorithms Team*
- Optimizing ML algorithms to scale on a distributed parallel framework using MPI and OpenMP

Graduate Researcher, Scientific Computing Lab, University at Buffalo June 2014 - May 2015

- **Master's project**: Development of '3D Unsteady Vortex Panel Method' code to study aerodynamics of streamlined bodies such as airfoils
  - Developed C++ code of 4000+ lines, uses OOP & C++11 features. Code runs in parallel using OpenMP
  - Method solves for inviscid flow around a body and calculates pressure distribution on body's surface
  - Aerodynamic loads such as lift, drag, moment, torque are then calculated by post-processing
  - Simulated flow over *Wind Turbine Blade*, successfully validated code results with experimental data
- Provided Teaching Assistance for undergraduate *Fluid Mechanics* course

CFD Engineer, ANSYS Inc., India Nov 2011 - Jul 2013

- Provided technical support for ANSYS Fluent, Fluent Meshing, ICEM, ANSYS Meshing
- Collaborated with development team to develop new meshing algorithms
- Worked on several projects related to *Aerodynamics, Heat Transfer* and *Multiphase flows*
- Delivered on multiple projects at once, collaborated with teams across countries

Academic Projects

- **Parallel Successive Over Relaxation (SOR) Solver using OpenMP, MPI and CUDA** Fall - 2014

Developed an object oriented C++ code to solve generic Poisson equation using Red-Black SOR. The code is made parallel with OpenMP, MPI and CUDA. CUDA code achieved speed-up of 5 compared to 16 CPU cores. The code tries to mimic a behaviour of a numerical library. Code lets you set up a Poisson Equation, Grid, Boundary Conditions and then solves it.

- **Genetic Algorithm to solve Sequencing-type Problem (C++)** Spring-2015

  Developed a C++ code to minimize trip distance of travelling salesman given the destination cities using Genetic Algorithm. A greedy crossover and swap type mutation operators are used which does not alter cities and are considered only once. Code could find shortest path consisting of 10 cities in 40 generations.

- **Multiphase Incompressible Flow Solver using Level Set Formulation (C)** Summer-2014

  Developed a C code to solve a two-phase flow equations. The code utilizes second order Projection Method to solve variable density and viscosity Navier-Stokes equation on collocated grid. Used level set method to track interface between phases. Code is validated by simulating classical problem of rising bubble.

- **Plane Stress Analysis using Finite Element Method (C++)** Fall - 2014

  2D Finite Element Method is implemented in object oriented C++ code to solve plane stress problem. A bilinear quadrilateral element with 2 point Gaussian quadrature rule is implemented in the current work. Code reads an unstructured mesh file with boundary conditions, and then solves it.

- **2D Incompressible Navier-Stokes flow solver in Curvilinear Coordinates (C++)** Spring - 2014

  Developed a C++ code to solve Navier-Stokes equations using Artificial Compressibility Method with 4th order Runge-Kutta time stepping. Also implemented implicit residual smoothing and adaptive time stepping for faster convergence. Code can successfully simulate solution over stretched and curved grids.

- **Numerical Methods for capturing shocks (Matlab)** Fall - 2013

  Developed a Matlab code to solve shallow water equation with several shock-capturing methods such as Godunov Method with MUSCL scheme, Runge-Kutta with TVD, 2^{nd} order ENO, 5^{th} order WENO.

- **SAE BAJA** Fall-2010

  Have hands-on experience in designing and manufacturing of All-Terrain-Vehicle. I have primarily contributed to designing and analysing vehicle's roll-cage. Our Team secured $4^{th}/80$ position nationwide.

◇ **Hobbies**: Photography, Cooking, Trekking, Cycling, Travelling