V A Kandappan

Education

Indian Institute of Technology Madras(IITM) Chennai,TN
Ph D (Interdisciplinary - Mathematics(Computational Science)) *Sep 2017- May 2023*
Guide: Dr. Sivaram Ambikasaran
Research Title: Accelerating Sparse Finite Element Solver through Low Rank Approximations
Remark: Sucessfully defended Thesis on July 20, 2023.
Relevant Coursework: Differential Equations, Computer Modelling and Simulation, Dynamical Systems, GPU Programming

Indian Institute of Science Bangalore(IISc) Bangalore,Karnataka
Ph D (Interdisciplinary - Computational and Data Science) *Jul 2016-Aug 2017*
Guide: Dr. Sivaram Ambikasaran
Remark: Joined at IISc and Shifted to IITM
Relevant Coursework: Numerical Linear Algebra, Approximation Theory, Numerical Methods

College of Engineering Guindy, Anna University Chennai, TN
Master of Engineering in Power Systems Engineering *Aug 2013 - May 2015*
Thesis: Power system state estimation using PMUs with imperfect synchronization
Guide: Dr. V. Gomathi
Relevant Coursework: Power System Analysis, Power System Dynamics and Control, Smart Grids, Power System Economics, Power Quality, Wind Energy Conversion systems

Mepco Schlenk Engineering College, Anna University Sivakasi, TN
Bachelor of Engineering in Electrical & Electronics Engineering *Aug 2009 - May 2013*

Research Interests

- Scientific Computing, Low-Rank Approximations of Matrices, Rank structured Matrices, High-Performance Computing
- Applications of Machine Learning, Soft computing techniques, Sparse Linear Algebra

Skills

- **Programming Languages**: C++, MATLAB, Python, Julia
- **Libraries/Platform**: CUDA C, OpenMP, MPI, Eigen, SIMULINK,Tensor Flow, LATEX

Work Experience

IBM India Pvt Ltd Chennai, TN
Graduate Engineer - Software Testing and Automation *July 2015 - July 2016*
- Trained in Automation tools for Black box testing
- Trained in Test Management tools
- Developed and Implemented Test cases for middle-ware systems

Publications

- **Kandappan, V. A., Vaishnavi Gujjula, and Sivaram Ambikasaran. "Hodlr2d: A new class of hierarchical matrices." SIAM Journal on Scientific Computing 45, no. 5 (2023): A2382-A2408.**Oct 2023
- **Khan, Ritesh, V. A. Kandappan, and Sivaram Ambikasaran. "Numerical rank of singular kernel functions." arXiv preprint arXiv:2209.05819 .**(2022)
- **Kandappan, V. A., Vaishnavi Gujjula, and Sivaram Ambikasaran. "HODLR3D: Hierarchical matrices for N-body problems in three dimensions." arXiv preprint arXiv:2307.16303 (2023).**2023
- **Kandappan, V.A., Rekha, A.G. (2021). Machine Learning in Finance: Towards Online Prediction of Loan Defaults Using Sequential Data with LSTMs. In: Sharma, T.K., Ahn, C.W., Verma, O.P., Panigrahi, B.K. (eds) Soft Computing: Theories and Applications. Advances in Intelligent Systems and Computing, vol 1381. Springer, Singapore.**Apr 2021

Internships

ATATRI Coimbatore, TN
AAutonomous bots on a constrained environment *Dec 2021 - Jan 2022*
- Developing Machine learning models, Optimization of algorithms

State Bank of India Limited Virtual
Applications of Machine Learning in Finance: Loan default prediction *Jun 2020 - Oct 2020*
- Exploratory Data Analysis, Developing Machine Learning Models on Loan Default Prediction

Conferences Attended

SIAM Annual Meeting (AN22)
Presentation titled "A New Preconditioner for Covariance Kernels and Green's Function in 2D" *July 2022*

24^{th} **Conference of the International Linear Algebra Society** NUIG, Ireland
Presentation titled "A Domain Decomposition-based Preconditioner for Discretised Integral Equations in Two Dimensions" *June 2022*

17^{th} **Copper Mountain Conference On Iterative Methods**
Presentation titled "HODLR2D - A new class of Hierarchical Matrices with application to Lippmann Schwinger Equation" *Apr 2022*

SIAM Conference on Applied Linear Algebra (LA21)
Presentation titled "Accelerating Multi-frontal Method for Finite Element Matrices through Low Rank Approximation" *May 2021*

International Conference on Soft Computing Theories and Applications (SoCTA'20)
Presentation titled "Machine Learning in Finance: Towards Online prediction of Loan Defaults using LSTMs" *Dec 2020*

Invited/Seminar Talks

- **Hands-on session on Low-rank approximations and Hierarchical matrices** - (Invited Talk) March,2022, IITDM Kanchepuram
- **Hierarchical Matrices through Low rank Algebra** - (Seminar Talk) May 2019, IIT Madras

Teaching Assistance

- **Functions of Several Variables** - Aug - Dec 2018, Aug - Dec 2019
- **Probability and Statistics** - Jan - May 2019, Jan-May 2020
- **Numerical Linear Algebra** - Aug - Dec 2019
- **Computer Modeling and Simulation** - Jan - May 2019

Workshops Attended

How teachers can make difference Teaching Learning Center, IIT Madras
14 hour workshop *September 2022*
- Framing Course objectives
- Creative ways of teaching and learning

OpenACC Bootcamp CDAC and NVIDIA, India
Two Day Workshop *June 2020*
- Basics and working with HPC architectures
- OpenAcc Applications and Examples

Mathematics for Data Science IFCAM - IISc Bangalore
Two Week Workshop *Jul 2019*
- Analysis and Probability for Machine Learning
- Analysis of Machine Learning Algorithms

An Introduction to High Performance Computing IIT Kanpur
A five Day workshop *Feb 2019*
- Hands on Experience in Various parallel computing architechtures

Performance and potential of Wind Energy systems in India IISc Bangalore
A two day workshop *Aug 2017*
- Recent advances in wind energy harvesting and Forecasting through Machine learning

Power System State Estimation SRM University
A four Day workshop *Mar 2015*
- Various practical methods available for Estimating states

Additional Experience & Achievements

- **COURSERA Specialization/courses**: Machine Learning, Deep Learning, TensorFlow Developer
- Presented paper on *Smart Wind Turbines* at SASTRA University **THETA 2012**
- Selected as an **Executive Council Member of IEI MSEC chapter** to organize various activities to strengthen technical knowledge of peers from 2010-2013
- Active member in the **Graph Theory Research Forum** from 2009 to 2012
- Been a part of conducting the national level symposium **ZWITTERION-12**
- Won *Management Merit Scholarship* award at **MSEC Annual Day 2010**
- Won *third place* in the District Level Science Exhibition for my exhibit on the theme Science and Technology. (Erode, 2006)
- Active team player of Department and Hostel basketball team

Projects

- **k-Means Classifier** - Developed a clustering algorithm based on k-means in C++
- **LAPLACE Solver** - Developed a parallel finite difference Laplace solver accelerated through CUDA
- **Damping Power system Disturbances using Fuzzy based controller using STATCOM**
    - Implemented a Fuzzy controller that identifies the disturbances and dampens the oscillations.
    - Implemented a toy scaled down model using Micro-controller
- **Line Following bot** - A line following bot that navigates through different mazes