Praveen Kumar POKALA

PERSONAL DATA

PHONE:	9966876260, 8073548489
EMAIL:	praveenkumar.pokala@gmail.com, praveenkumar@iisc.ac.in
GOOGLE SCHOLAR ACCOUNT	https://scholar.google.com/citations?hl=en&user=tgz2F38AAAAJ
LINKEDIN	https://www.linkedin.com/in/praveen-kumar-pokala-73509014/

EDUCATION

PH.D (GOLD MEDALIST) (2015 - 2021)	**Electrical Engineering, IISc**, Bangalore, India Thesis Topic: "Robust Non-convex Penalties for Solving Sparse Linear Inverse Problems and Applications to Computational Imaging" Advisor: Prof. Chandra Sekhar SEELAMANTULA **Best PhD Thesis Award & Prof. D J Badkas Gold Medal**
M.TECH (2007-2009)	**Signal Processing, IIT**, Guwahati, India Thesis: "Secure Biometric System" Advisor: Prof. Kannan KARTHIK GPA: 8.54/10
B.TECH (2003-2006)	**JNTU**, Hyderabad PERCENTAGE: 72.77/100

CURRENT RESEARCH FOCUS

- Currently focused on developing data-driven (AI based) intelligent video analytic (IVA) solutions.

- Building Innovative and real-time AI based solutions for vision applications.

- In broader-sense, my research interests lie in the intersection of convex/non-convex optimization and machine/deep learning with application to inverse problems in Image processing, Computer vision, Compressive sensing, Biomedical image processing, Seismic signal processing, etc.

RESEARCH PROJECTS IN INDUSTRY

- Context-driven Object Detection for real-time specific use-cases (In Progress).

- Establish the baselines for foreground extraction based on UNet and it's advanced variants.

- Worked on novel **motion-guided foreground extraction** architecture with temporal embeddings as attention.

- Developed **video-based foreground extraction** to incorporate temporal cues based on multi-encoder with late fusion and feature amplification.

- Worked on **Background-Aware Foreground segmentation** based on attention.

- Generating **foreground maps based optical-flow** with the help of methods like Global Motion Aggregation.

- Worked on low-power and low latency camera models - 1. worked on **AI face detection system** with an objective of improved detection performance with reduced false alarms.

- Worked on **Gaze detection** for screen on/off use cases for capturing attention.

SCHOLARSHIPS AND CERTIFICATES

GATE 2014	**Rank = 251** out of **2,16,367** candidates.
PhD Fellowship	"**VISVESVARAYA**" fellowship, MeitY, Govt. of India.
Qualcomm Innovation Fellowship-2020	Our team is one of the finalist.
Best Presentation Award	EECS Research Students' Symposium 2021.

ACCEPTED RESEARCH PROPOSALS OUT OF THESIS WORK

- Constrained *Fenchel* conjugate approach for *Adaptive Low Rank Plus Sparse Decomposition for Low-vision Applications*, **Mathematical Research Impact Centric Support**, SERB, Government of India.

- Robust Non-convex optimization for analysis/synthesis sparse models — Application to computational imaging, SERB-CORE, Government of India .

SKILLS

Programming:	PYTHON, MATLAB, C/C++, LATEX
Deep and machine learning frameworks:	TENSORFLOW, PYTORCH

WORK EXPERIENCE

JUNE, 2022 - PRESENT	*Role: Sr. Research Scientist, Designation: Sr. Data Science Manager*, JIO-AICoE (COMPUTER VISION GROUP), RELIANCE, Hyderabad Currently, my focus is on developing real time motion aided segmentation framework that works on noisy surveillance video data.
SEPTEMBER, 2021 - MAY, 2022	*Sr. Lead Engineer*, QUALCOMM (CORP. R & D GROUP), Bangalore Machine Learning Camera Systems research group: Worked on low-power and low latency camera models - 1. worked on AI face detection system with an objective of improved detection performance with reduced false alarms. 2. Worked on Gaze detection for screen on/off use cases for capturing attention.
NOVEMBER, 2020 - AUGUST, 2021	*Senior Research Associate*, IISc Bangalore Working on non-convex optimization and machine learning for solving inverse problems in computation imaging applications.
JULY, 2015 - AUGUST, 2021	*PhD Scholar*, IISc Bangalore Working on non-convex optimization and machine learning for solving inverse problems in computation imaging application.
JULY, 2009 - NOV, 2014	Worked as Assistant Professor in GITAM University, Hyderabad and LPU university, Jalandar, and also as subject matter expert in THINKCELL Learning Solutions Pvt. Ltd, Hyderabad – Taught various courses like Probability and Random Process, Statistical Signal Processing, Electromagnets, Solid State Electronic Devices, Signals and Systems, Digital Signal Processing....etc to graduates and post-graduates.

Journal Publications

- Iteratively Reweighted Minimax-Concave Penalty Minimization for accurate low rank plus sparse matrix decomposition **IEEE Transactions on Pattern Analysis and Machine Learning (PAMI) on October 12, 2021. (Impact Factor = 17.861)**
  Praveen Kumar Pokala, Raghu Vamshi Hemadri, Chandra Sekhar Seelamantula

  (Online Link: https://ieeexplore.ieee.org/abstract/document/9585422/).

- Introducing Nonuniform Sparse Proximal Averaging Network for Seismic Reflectivity Inversion (**Accepted to IEEE Transactions on Computational Imaging, 2023**)
  Praveen Kumar Pokala, Swapnil Mache, Kusala Rajendran and Chandra Sekhar Seelamantula

Journal Drafts Under Preparation

- Dual projected wirtinger proximal gradient-descent optimization for complex-domain analysis-sparse model.

- Non-convex analysis-sparse coding - Projected proximal gradient-descent optimization and Moreau regularization.

- Generalized Minimax Concave p-Norm Minimization with Application to Sparse Interferometric Phase Estimation

Conference Publications — Deep Learning

- **FIRMNET: A Sparsity Amplified Deep network for Linear Inverse Problems**,
  Praveen Kumar Pokala, Amol G Mahurkar and Chandra Sekhar Seelamantula
  IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP) (2019).

- **CONFIRMNET: Convolutional FirmNet and Application to Image Denoising and Inpainting**,
  Praveen Kumar Pokala, Prakash Kumar Uttam and Chandra Sekhar Seelamantula
  IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)(2020) (**Invited Paper**).

- **CoRNet: Composite-Regularized Neural Network For Convolutional Sparse Coding**,
  Praveen Kumar Pokala, Dhruv Jawali, and Chandra Sekhar Seelamantula
  IEEE International Conference on on Image Processing (ICIP) (2020).

- **Sparsity Driven Latent Space Sampling for Generative Prior Based Compressive sensing**,
  Praveen Kumar Pokala, Vinayak Killedar, and Chandra Sekhar Seelamantula
  IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), 2021.

- **Explainable Deep Neural Networks for Seismic Reflectivity Inversion**,
  Praveen Kumar Pokala, Swapnil Mache, Kusala Rajendran and Chandra Sekhar Seelamantula
  AGU Fall Meeting Abstracts, 2021.

- **Ensemble Proximal Networks for Sparse Coding**,
  Kartheek Kumar Reddy Nareddy, Praveen Kumar Pokala, Chandra Sekhar Seelamantula
  IEEE International Conference on Acoustics, Speech and Signal Processing, ICIP, 2022.

- **Quantized Proximal Averaging Networks for Compressed Image Recovery**,
  Kartheek Kumar Reddy Nareddy, Mani Madhoolika Bulusu, Praveen Kumar Pokala, Chandra Sekhar Seelamantula
  Efficient Deep Learning for Computer Vision, 2023.

ArXiv Drafts – Deep Learning

- **DuRIN: A Deep-unfolded Sparse Seismic Reflectivity Inversion Network**,
  Praveen Kumar Pokala, Swapnil Mache, Kusala Rajendran and Chandra Sekhar Seelamantula
  (Online Link: http://arxiv.org/abs/2104.04704).

- *Nu*SPAN: A Proximal Average Network for Nonuniform Sparse Model − Application to Seismic Reflectivity Inversion *[arXiv version yet to Appear Online]*,
  Praveen Kumar Pokala, Swapnil Mache, Kusala Rajendran and Chandra Sekhar Seelamantula
  (Online Link: https://arxiv.org/abs/2105.00003).

- **Quantized Proximal Averaging Network for Analysis Sparse Coding**,
  Kartheek Kumar Reddy Nareddy, Mani Madhoolika Bulusu, Praveen Kumar Pokala, Chandra Sekhar Seelamantula
  (Online Link: http://arxiv.org/abs/2105.06211).

Conference publications – Non-convex Optimization

- **SAMIR: Sparsity Amplified Iterative Reweighted Beamforming for High Resolution Ultrasound Imaging**,
  Praveen Kumar Pokala, Amol G Mahurkar and Chandra Sekhar Seelamantula
  IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP) (2019).

- **Iteratively-Reweighted Beamforming for High-Resolution Ultrasound Imaging**,
  Amol G Mahurkar, Praveen Kumar Pokala and Chandra Sekhar Seelamantula
  IEEE International Symposium on Biomedical Imaging (ISBI) (2019).

- **Adaptive Weighted Minimax-Concave Penalty Based Dictionary Learning for Brain MR Images**, (Link: https://www.youtube.com/watch?v=bHhDpKs-kAQt=17s).
  Praveen Kumar Pokala, Satvik Chemudupati and Chandra Sekhar Seelamantula
  IEEE International Symposium on Biomedical Imaging (ISBI) (2020)

- **PGFIRST: Generalized Fast Iteratively Reweighted Soft-Thresholding Algorithm for Sparse Coding Under Tight Frames in Complex Domain**,
  Praveen Kumar Pokala, Satvik Chemudupati, and Chandra Sekhar Seelamantula
  IEEE International Conference on Image Processing (ICIP) (2020).

- **PIFISTA:Projected IFISTA With Application to Image Deblurring**,
  Praveen Kumar Pokala and Chandra Sekhar Seelamantula
  IEEE International Conference on Image Processing (ICIP) (2020).

- **Non-convex Optimization for Sparse Interferometric Phase Estimation**,
  Praveen Kumar Pokala*, Satvik Chemudupati*, and Chandra Sekhar Seelamantula
  IEEE International Conference on Image Processing (ICIP) (2020).

- **Accelerated Weighted ℓ_1 Minimization for MRI Reconstruction Under Tight Frames in Complex-Domain**,
  Praveen Kumar Pokala and Chandra Sekhar Seelamantula
  IEEE International Conference on speech and communications (SPCOM) (2020)

Relevant Courses credited at Indian Institute of Science

1. Pattern Recognition and Neural Networks
2. Machine Learning for Signal Processing
3. Linear Algebra & Applications
4. Matrix Analysis and Computations
5. Computational Methods of Optimization
6. Stochastic models and Applications
7. Data Structures & Algorithms
8. Image Processing
9. Signal Quantization & Compression
10. Speech information Processing.

Workshops & Online Certifications

1. NVIDIA Deep Learning workshop at IISc.

2. Introduction to ML in Production.

3. Introduction to Git and Github.

4. Linux Fundamentals.

5. Managing Linux Systems

6. DevOps & MLOps Certifications (In progress)

7. Advanced AI Transformers for Computer Vision

8. Artificial Intelligence for Students

9. Computer Vision Deep Dive in Python

10. Docker for Data Scientists

11. Next Generation AI An Intro to GPT3

12. Self-Supervised Machine Learning

References

Chandra Sekhar Seelamantula
Professor
Department of Electrical Engineering, Indian Institute of Science, Bangalore
Mobile: +91 9620943428
Landline: +91 80 2293 2695 (office); +91 80 2239 2376 (assistant)
Email: css@iisc.ac.in
Website: http://www.ee.iisc.ac.in/faculty/chandra.sekhar/index.php