Alwyn Mathew

Kochumalil (H), Wallardie Jn, Vandiperiyar PO, Idukki Dist, Kerala-685533, India
Email: alwyn.pcs16@iitp.ac.in, alwynmathew.90@gmail.com
LinkedIn: `www.linkedin.com/in/alwynmathew`
Personal page: `https://alwynm.github.io`
Mobile: +91 96452 39304

Ph.D. fellow trained in Computer Vision with areas of expertise in 3D Computer Vision. Passionate about teaching machines to see like we do. I have extensive research experience and the ability to work independently or as part of a team.

EDUCATION

Indian Institute of Technology (IIT) Patna — Patna, India
Ph.D. in Computer Vision — Aug 2021

College of Engineering Karunagappally — Kerala, India
Master's in Technology, Image Processing — May 2016

Tamilnadu College Of Engineering — Coimbatore, India
Bachelor's in Technology, Information Technology — April 2012

SCHOLARSHIPS AWARDED

Spsorship from on **Scheme for Promotion of Academic and Research Collaboration**, Ministry of Human Resource development, Government of India. Grant #P582. April 2020

Three year **Senior Research Fellowship** (SRF) at IIT Patna
Awarded by Ministry of Human Resource Development, Government of India. April 2018

Two year **Junior Research Fellowship** (JRF) at IIT Patna
Awarded by Ministry of Human Resource Development, Government of India. July 2016

Two year **Post Graduate Fellowship** at College of Engineering Karunagappally
Institute of Human Resources Development, Government of Kerala. July 2014

COMPETITIVE AWARDS

Second Place, IoT Grand Challenge, Indian Institute of Technology (IIT) Patna. 2016

Finalist, Bosch DNA Challenge, Bosch India. 2017

Top 35, Patna Ideathon, Government of Bihar. 2018

PROFESSIONAL MEMBERSHIP

IEEE Student Member, IEEE Membership Number: 96850267.

COMPETITIVE EXAMINATIONS QUALIFIED

Department of Higher Education, Ministry of Human Resources Development, India

- Graduate Aptitude Test in Engineering (**GATE**) 2016, All India Rank: 5493 out of 108495 candidates (95 percentile).

RESEARCH EXPERIENCE

Doctoral Research Experience Patna, India
Indian Institute of Technology Patna July 2016–May 2021

- Developed expertise in Camera Models.
- Developed expertise in self-supervised depth estimation from a single camera.
- Introduced direct depth estimation with a distorted camera lens.
- Studied the impact of self-attention in depth estimation network.
- Developed expertise in Adversarial Samples and their effect on deep neural networks.
- Studied the vulnerabilities of monocular depth estimators against Adversarial attacks.
- Introduced an intelligent agent for shifting load from no-peak to off-peak hours in residential grids.
- Studied the complexity of the RL-DSM environment and improved the learning curve of the agent.
- Presented results at departmental seminars to more than 30 attendees.

Ongoing Research works Patna, India
Collaboration with my Thesis supervisor (Dr. Jimson Mathew) Since May 2021

- Dynamic moving object masking for monocular depth estimation with video sequence.
- Handle textureless surface in photometric loss
- Light-weight monocular depth network

Experience in Research Guidance Patna, India
Indian Institute of Technology Patna Since July 2017

Mentored Junior Research Fellows in the group.

- Fisheye cameras are commonly used in applications like autonomous driving and surveillance to provide a large field of view ($> 180°$). We developed per-pixel dense distance estimation on fisheye cameras for automotive scenes.
- Deep learning-based load prediction model on time series data. These models will be used for applications like Demand Side Management in Smart Grid.

- Designed algorithm to adapt classification task on unlabelled data with fewer know labelled data.

Mentored M.Tech. students in Computer Science Department.

- Designed a system that distinguishes familiar/unfamiliar images from EEG (Electroencephalogram) captured using an eight electrode helmet. Extended future to deception detection using deep learning.
- We designed a fast multi-object hybrid tracking system using particle filter and neural network.
- We designed a light-weight deep learning-based facial recognition system.

Mentored B.Tech. students in Engineering Physics.

- An advanced reinforcement learning-based system for load shifting in a residential grid.
- We developed a reinforcement learning-based system for load shifting in a residential grid.
- We developed deep learning-based light-weight object detection for embedded systems.
- We have developed a system that estimates depth from a single uncalibrated camera.

Master's Project Research Experience Kerala, India
College of Engineering Karunagappally May 2015–May 2016

- Investigated super-resolution with Convolutional Neural Networks.
- Super-resolution in gray scale and color.
- Presented the final report to five member evaluation committee.

TEACHING ASSISTANCE EXPERIENCE

Indian Institute of Technology Patna Patna, India
Research Fellow July 2016–July 2021

I have performed the following teaching assistance during my Ph.D. program at Indian Institute of Technology Patna.

- CS 225 Switching Theory Jan-May, 2017
- CS 229 Innovation Laboratory Jan, 2017
- CS 421 Computer Peripherals and Interfacing July-Dec, 2017
- CS 225 Switching Theory Jan-May, 2018
- CS 421 Computer Peripherals and Interfacing July-Dec, 2018
- CS 225 Switching Theory Jan-May, 2019
- EE 541 High Performance Computing Jan, 2019
- CS 421 Computer Peripherals and Interfacing July-Dec, 2019
- CS 225 Switching Theory Jan-May, 2020
- CS 421 Computer Peripherals and Interfacing July-Dec, 2020

- Mid and End-Semester Examination duties 2016–2020

SKILLS

Coding	Python, C++, Java, ASP.NET, C# .NET.
Teaching	Conducted B.Tech and M.Tech classes at IIT Patna
ML Packages	Pytorch, TensorFlow, Keras

PUBLICATIONS

Journal Articles

- **Mathew, A.** and Mathew J., Monocular depth estimation with SPN loss, *Elsevier Image and Vision Computing*, (2020).
- **Mathew, A.**, Roy, A., and Mathew, J., Intelligent Residential Energy Management System Using Deep Reinforcement Learning, *IEEE Systems Journal*, (2020).
- **Mathew, A.**, Jolly, MJ., and Mathew, J., Improved Residential Energy Management System Using Priority Double Deep Q-learning, *Elsevier Sustainable Cities and Society*, (2021).
- **Mathew, A.**, and Mathew, J., MDDNet: Learn Depth and Ego-motion from Videos with Camera Distortion, *Elsevier Computer Vision and Image Understanding*, (2020). *(Under-revision)*
- **Mathew, A.**, Patra, A., and Mathew, J., Monocular Depth Estimators: Vulnerabilities and Attacks, *IEEE Intelligent Systems*, (2020). *(Under-review)*
- **Mathew, A.**, and Mathew, J., Monocular Depth Estimation with Unknown Camera, *Elsevier Image and Vision Computing*, (2021). *(Under-review)*
- **Mathew, A.**, and Mathew, J., Efficient Demand Response in Residential Grid using Q-learning, *IEEE Systems Journal*, (2021). *(Under-review)*
- **Mathew, A.**, Gopugari, B., and Mathew, J., Monocular Depth Estimation with Stereo Assistance Depth Consistency, *IEEE Intelligent Systems*, (2021). *(Under-review)*

Conference Proceedings

- **Mathew, A.**, Patra, AP., and Mathew, J., Self-Attention Dense Depth Estimation Network for Unrectified Video Sequences, *IEEE International Conference on Image Processing*, (2020).
- Sanodiya RK, **Mathew, A.**, Mathew, J., and Khushi, M., Statistical and Geometrical Alignment using Metric Learning in Domain Adaptation, *IEEE International Joint Conference on Neural Networks*, (2020).

- Srivastava, H., **Mathew, A.**, and Mathew, J., A Novel Frame Similarity Based Pedestrian Counting Approach in Surveillance Videos, *IEEE India Council International Conference*, (2018).
- **Mathew, A.**, Mathew, J., Govind, M., and Mooppan, A., An Improved Transfer learning Approach for Intrusion Detection, *International Conference on Advances in Computing Communication*, (2017).

PATENT

- Easa Z., Gupta D., Mathew J., and **Mathew A.**, Automated two wheeler parking system by detecting the location of the vehicle using sensor under the platform Appl.no. 201731036379. (Indian Patent Pending) 2017

TALKS

- **Generative Adversarial Networks and Adversarial Attacks** sponsored by All India Council for Technical Education (AICTE), Government of India. Dec, 2020
- **Adversarial Machine Learning** sponsored by APJ Abdul Kalam Technological University, Government of Kerala. Dec, 2019
- **Machine Learning makes Smart Grids smarter** sponsored by Scheme for Promotion of Academic and Research Collaboration (SPARC), Ministry of Human Resource development, Government of India. Sept, 2019
- **Generative Adversarial Networks** sponsored by Third phase of Technical Education Quality Improvement Programme, Government of India and Institute of Electrical and Electronics Engineers. July, 2019
- **Generative Adversarial Networks and Adversarial examples** sponsored by Third phase of Technical Education Quality Improvement Programme (TEQIP-III), Government of India. July, 2019
- **Introduction to Convolutional Neural Networks** sponsored by Third phase of Technical Education Quality Improvement Programme (TEQIP-III), Government of India. Dec, 2018

PROFESSIONAL ACTIVITIES

- **Subreviewer** of IEEE International Conference on Smart Computingand Communications (ICSCC). 2017
- **Subreviewer** of IEEE International Symposium on Electronic System Design. 2018
- **Reviewer** of IET Computer Vision. 2019
- **Reviewer** of IEEE International Conference on Data Science and Engineering. 2019

OTHER ACTIVITIES

- **Technical committee** of Research Scholars' Day, Indian Institute of Technology (IIT) Patna 2017-2019

REFERENCE

- **Dr. Jimson Mathew**
  Head, Associate Professor
  Department of Computer Science and Engineering,
  Indian Institute of Technology Patna
  Bihar, India
  Email: jimson@iitp.ac.in
  Phone: +91-612-3028347
  Mobile: +91-91109-56262
- **Dr. Samrat Mondal**
  Assistant Professor
  Department of Computer Science and Engineering,
  Indian Institute of Technology Patna
  Bihar, India
  Email: samrat@iitp.ac.in
  Phone: +91-612-3028163
  Mobile: +91-82925-83635
- **Dr. Binu VP**
  Associate Professor
  Department of Computer Science and Engineering
  College of Engineering Karunagappally
  Kerala, India
  Email: binuvp@gmail.com
  Mobile: +91-98473-90760