Construction Information Technology Laboratory
Department of Engineering, University of Cambridge, UK
alwynmathew.90@gmail.com
Webpage: alwynm.github.io
Linkedin: linkedin.com/in/alwynmathew
Github: github.com/alwynmathew
+44–7442–585335
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Alwyn Mathew

Research Associate, University of Cambridge

Work Experience

University of Cambridge, England, United Kingdom — *Feb 2022–present*
Research Associate (Mobile mapping)
Construction Information Technology Laboratory

***University of Dundee**, Scotland, United Kingdom* — *Dec 2021–Jan 2022*
Postdoctoral Research Assistant (3D Computer Vision)
Division of Imaging Science and Technology

Education

Ph.D. in 3D Computer Vision — *Aug 2021*
Indian Institute of Technology (IIT) Patna, Bihar, India

Master of Technology in Image Processing (M.Tech) — *May 2016*
College of Engineering Karunagappally, Kerala, India

Bachelor of Technology in Information Technology (B.Tech) — *April 2012*
Tamilnadu College of Engineering, Coimbatore, India

Skills

Programming	Python, C/C++, Java, ASP.NET, C# .NET
Frameworks	Pytorch, TensorFlow, Keras
Leadership & Management	Co-lead EU projects, grant proposals

Research Interests

Computer Vision, 3D Computer Vision, Robotic Vision
Medical Robotics, Autonomous Robots
Adversarial Machine Learning, Adversarial Attacks

Research Experience

Research Associate, University of Cambridge — *Since Feb 2022*

- *Enhancing an in-house **multi-sensor 3D scanning system** for infrastructure inspection, improving data accuracy and usability.*
- *Engineered and optimized **SLAM** algorithms for real-time navigation and mapping in complex environments.*
- *Developed **construction progress monitoring** from 3D inspection data.*
- *Developed **Scan-to-BIM** software to convert raw scans to digital models.*
- *Developed software to **detect and segment** objects from construction inspection scans.*

Post-Doctoral Research Assistant, University of Dundee — *Dec 2021 – Jan 2022*

- *Developed real-time **lumen detection** model for autonomous colonoscopy.*
- *Developed **supervised depth estimation** models for endoscopy monocular camera.*
- *Developed self-supervised depth estimation models for **high FOV** endoscopy monocular camera.*
- *Developed expertise in **integrating** deep learning models with soft robot.*
- *Developed expertise in **real time** deep learning models.*

Doctoral Research, IIT 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.*

Research Mentorship, IIT Patna *July 2017 – May 2021*

Mentored Junior Research Fellows

- *Fisheye cameras are commonly used in applications like autonomous driving and surveillance to provide a large field of view. 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 B.Tech. students in Computer Science Department

- *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.*

Awards & Achievements

Scholarships & Sponsorship

Sponsorship from ***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, Ministry of Human Resource Development, Government of India.* *April 2018*

Two year ***Junior Research Fellowship*** *(JRF) at IIT Patna, 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*

References

Available on request.