

Alwyn Mathew

RESEARCH ASSOCIATE, UNIVERSITY OF CAMBRIDGE

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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 bachelor 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.
