# Pradnesh Sanderan

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Master's in Computer Science student at the University of Edinburgh with a strong interest in software engineering and machine learning. I enjoy tackling complex problems, particularly in backend development and algorithms, and I am passionate about building efficient and scalable solutions. I aim to secure a software engineer position where I can contribute to innovative projects that challenge my problem-solving skills and technical curiosity.

## EDUCATION

**MSc Computer Science** Sep 2024 – Aug 2025
The University of Edinburgh, Edinburgh, United Kingdom

**BSc (Hons) Computer Science,** Upper Second-Class Honours Sep 2019 – May 2023
The University of Edinburgh, Edinburgh, United Kingdom

- Honours thesis: Tool to explore finite categories. (PDF) (code)
- Research Advisor: Dr Chris Heunen, Jesse Sigal

## EXPERIENCE

**Research Assistant Intern** May 2022 – Aug 2022
Laboratory for Foundations of Computer Science, Edinburgh, United Kingdom

- Engaged in research under the guidance of Dr Paul Jackson, focusing on enhancing the visualisation of proof in theorem provers, notably the Lean Theorem Prover.
- Explored methods to transition from a procedural formal proof style to a more dynamic declarative style.
- Collaborated with researchers from various global institutions to exchange insights and gather diverse perspectives.

**Tutor** Sep 2020 – May 2021
The University of Edinburgh, Edinburgh, United Kingdom

- Delivered academic assistance and assessment oversight for a cohort of 30 first-year students enrolled in the Introduction to Computation course at The University of Edinburgh.
- Achieved notable success, with 50% of students attaining A grades (above 70%) under my mentorship.

## PROJECTS

**End-to-end Human Activity Recognition and Monitoring System (code and report)**

- Developed an end-to-end Human Activity Recognition (HAR) system through a mobile application capable of identifying and categorizing 14 different physical activities. Leveraging accelerometer and gyroscope sensors from RESpeck and Thingy devices, the system captures real-time data to analyse user movements.
- Implemented dimensionality reduction using Sparse Principal Component Analysis (SPCA) to preprocess sensor data efficiently. Employed machine learning classifiers such as RandomForest and LightGBM to train on a labelled dataset of various activity patterns. Conducted comprehensive experiments to evaluate the system's offline and online performance, demonstrating its ability to achieve high accuracy in real-time activity prediction.

**Drone delivery system (code and report)**

- Formulated an algorithmic model to simulate drone flight paths for efficient delivery operations, aiming to assess system feasibility and optimise battery usage for timely order completion.
- Implemented a comprehensive algorithm combining greedy heuristic, Dijkstra's algorithm, and Christofides algorithm to determine efficient flight paths. Used synthetic test data to simulate real-world scenarios and rigorously tested the system's performance under various conditions to validate effectiveness.

**Tool for Exploring Finite Monoidal Categories (Code and report)**

- Designed and implemented a Java-based tool with a graphical user interface to validate multiplication tables of strict finite monoidal categories.
- Utilised object-oriented programming and Java Swing for intuitive input and visualisation of results.
- Designed robust algorithms to validate category and monoidal properties, offering precise feedback for corrections, supporting advancements in cryptography and programming language research.

## SKILLS, AWARDS, AND INTERESTS

**Programming languages:** Java | Python | Haskell | JavaScript | C | HTML | CSS | SQL | Lean3 | Lean4

**Frameworks and Technologies:** AWS | TensorFlow | MongoDB | Pytorch | Docker | Kubernetes | Git | Firebase | ReactJs | React Native

**Awards:** Hack the Burgh 2020 (2nd Place) | Hello World Hack 2020 (2nd Place)

**Volunteering:** Kechara Soup Kitchen | Rumah Hope children's home | SPCA Selangor