Jacobus Lock, **PhD**

COMPUTER SCIENTIST · MECHATRONIC ENGINEER

Lincoln, UK

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Education

University of Lincoln
Lincoln, UK

PHD, COMPUTER SCIENCE
April 2016 – March 2020

- Google-funded project which investigated the efficacy of active vision techniques when applied to human tasks to provide assistance to visually impaired users
- Integrated an object detector and POMDP policy framework onto a mobile app to collect and analyse data from human participants
- Achieved an 8-fold time performance improvement over remotely-driven alternatives
- Published several academic papers with international collaborators and presented my work at various conferences
- App code and thesis document available at `https://bit.ly/38TJHPv` and `https://bit.ly/3vCo3ZX` respectively
- Assisted lecturers during tutorial sessions for various undergraduate subjects throughout my PhD research

Stellenbosch University
Stellenbosch, South Africa

M.ENG BY RESEARCH, MECHATRONIC ENGINEERING
Jan. 2014 – Dec. 2015

- Devised a computer vision-based method to easily measure a drone's pose estimation error in flight so that they can more effectively calibrate mirrors in a solar thermal power plant
- Methodologies included using a camera and OpenCV determine a drone's pose and train a neural network model to give error bounds
- Took several optional modules: Advanced control systems, Advanced dynamics, Advanced numerical methods, Computer vision, Machine learning
- Assisted lecturers during tutorial sessions for various undergraduate subjects throughout my masters studies
- Lead the research group's social committee, successfully arranging 2 end of year and various smaller events for approx. 35 people

Stellenbosch University
Stellenbosch, South Africa

B.ENG, MECHATRONIC ENGINEERING
Jan. 2010 – Dec. 2013

- Volunteered as a student mentor for 2 years to help new students acclimatise to campus life
- Nominated for best dissertation presentation in my final year

Work Experience

University of Lincoln
Lincoln, UK

POST-DOCTORATE RESEARCH FELLOW
April 2020 – Present

- Implemented a ROS-based sensor fusion and vehicle localisation system for a sprayer vehicle
- Built surface modelling software to estimate the shape of crops and the terrain 40m in front of a vehicle to within 5cm using LiDAR data
- Designed a controller that uses localisation and surface data to keep sprayer booms 30cm from the surface to avoid hitting crops
- Built a temporal dataset of developing crops to investigate the feasibility of LiDAR-based crop monitoring software
- Project deliverables described as 'exemplary' by funding body

SAGA Robotics Ltd.
Lincoln, UK

ROBOTICS ENGINEER
Jan. 2020 – April 2020

- Coordinated with a colleague to translate their robot arm path planning software into a ROS-compatible simulation plugin
- Built a Gazebo simulation environment to test the arm on different platforms via MoveIt
- Achieved my stated objectives 2 months ahead of schedule

University of Lincoln
Lincoln, UK

RESEARCH ASSISTANT
April 2019 – Jan. 2020

- Designed and built a robust solution to mount 2 Panda 7-DoF arms onto a 'Thorvald' robot platform
- Collaborated with project team and built a ROS-friendly robot model of the complete robot system
- Integrated MoveIt path planning into simulation environment

Skills

Programming	C\C++, Rust, Java, Python, Kotlin, Latex, Git, Agile development
Data Analysis	Matlab, NumPy, Pandas
Embedded systems	Arduino, Android, ROS
Language	Afrikaans, English, German (learning), Dutch (learning)
Web hosting	Bare metal VPS, Django, REST API, Docker

Extracurricular Activity

Personal Tinkering Projects   *Lincoln, UK*

Personal   *2020 – Present*

- Built Django-based site to host my personal web page and back up my personal data, currently migrating the server to a home-based machine
- Designing an Arduino-controlled meat drying box to make biltong

Freelance Software Engineer   *Lincoln, UK*

Upwork.com   *2017 – 2019*

- Made an Android app that geo-references locations where sounds of a specific frequency are detected using an FFT
- Built a Raspberry Pi-controlled model train town than can be controlled globally from a web interface I built
- Designed and implemented a vending machine that allows cashless purchases to be made using QR codes, NFC or student ID authentication
- Made an app-controlled lock management system where a user can set the status of a group of locks from their mobile

Academic Paper Reviewer   *Lincoln, UK*

Academic Journals   *2020 – Present*

- Reviewed multiple paper submissions to technology-focussed journals

Hobbies and Interests

- Learning about, travelling to and exploring historic areas
- Studying basic economics, particularly those of developing regions
- Outdoor exercise and running (completed 3 half-marathons)