Cris Lovell-Smith

Computer Vision and AI Engineer – Germany

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Profile

AI and Computer Vision Engineer with 25 years of experience in research projects to series production, spanning embedded systems to cloud deployments. Proven ability to develop and deploy cutting-edge ML models. Strong technical leadership in startups and multinational corporations from concept to commercialization. Living in Southern Germany.

Recent Experience

HARVEST HUB | Head of AI
2023 – Present | Nelson, New Zealand

Leading AI development for aquaculture startup, optimising shellfish assessment with machine learning and computer vision.

→ Head of AI at aquaculture startup Harvest Hub (a spin off of the Nelson AI Institute). Responsible for delivery of technical roadmap and leadership of technical team.
→ Development of machine learning (ML) training, validation, and deployment pipelines (cloud and Android native).
→ Development of ML/CV algorithms for shellfish condition and morphometrics.

NELSON AI INSTITUTE | Head of AI
2020 – 2022 | Nelson, New Zealand

AI research and technical leadership. Played a key role in the creation of spin-off CarbonCrop. Developed deep learning models for classification, segmentation, object detection and image embeddings, deployed in the cloud and on mobile devices.

2022-2023

→ Pitching for investment into the startup Harvest Hub.
→ Project plan and budget for initial investment into Harvest Hub.
→ Technical supervision of Masters student in AI.
→ Model optimisation and deployment using ONNX to Android Flutter/Dart.

2020-2022

→ Leadership of technical team at Nelson AI.
→ Product definition, refinement, and AI proof-of-concept development.
→ Collaboration with scientific and industry partners, academics, internal teams, and boards of directors.
→ Deeply involved in the incubation and spin-off of AI tech company CarbonCrop, including growing the technical team, development of technical roadmap, and defence of technical strategy during investor due diligence phase for initial raise.
→ Senior Machine Learning Engineer at CarbonCrop.
→ Development of deep learning models in classification, semantic segmentation, object detection and object identification including custom models based on FasterRCNN, SSD, U-Net, DeepLabv3, and siamese networks.
→ Model deployment to Amazon Web Services.

Skills

MACHINE LEARNING
Object detection • segmentation • classification • 3.D. monocular depth estimation• image embeddings • self supervised learning

DEVELOPMENT
Python • Modern C++ • C • Embedded

FRAMEWORKS
PyTorch • Tensorflow/Keras • MLFlow • ONNX

TOOLS/PLATFORMS
Git • Atlassian • CMake • Linux

LANGUAGES
English (Native) • German (Fluent)

Education

DEEPLEARNING.AI
Deep Learning Specialisation
2019 | Online Coursera

STANFORD ONLINE
Machine Learning
2017 | Online Coursera

UNIVERSITY OF CANTERBURY
Master of E&E Engineering
2010 | Christchurch, N.Z.

UNIVERSITY OF CANTERBURY
Bachelor of Electrical and Electronic Engineering with Honors
2004 | Christchurch, N.Z.

Awards

Foundation for Research, Science and Technology Masters scholarship 2007

FRST student scholarship 2003

CONTINENTAL | AI AND CV SPECIALIST (CONTRACT)

2022 – 2023 | Lindau, Germany
Computer vision based series production project for Volvo's next generation vehicles.

- → Feature development on production ADAS head light assist (HLA) algorithm.
- → Consulting on neural network architectures for object detection for HLA function for next generation product.
- → Development of production grade CV/ML algorithms in C/C++.

DENSO ADAS/ADASENS AUTOMOTIVE | RESEARCH AND DEVELOPMENT ENGINEER

2015 - 2019 | Lindau, Germany
Vision-based advanced driver assistance system (ADAS) initiatives, designing and implementing computer vision algorithms for collision warning, lens obstruction detection, and assisted parking.

- → Technical lead in vision based autonomous driving functions.
- → Concept, implementation and validation of computer vision algorithms.
- → Concept and development of in-house deep learning framework including custom single stage object detector for embedded platforms in MISRA C.
- → Development and demo to customer of vision based collision warning system.
- → Concept, implementation, and demonstration of lens obstruction algorithms. Concept was taken to production and sold to two large automotive manufacturers (Audi, Volkswagen).
- → Evaluation of deep learning based 3.D. monocular depth estimation algorithms for vision based autonomous driving.
- → Enhancements to 3.D. structure from motion technology for assisted parking.
- → Design and implementation of validation framework, since used across multiple projects within the company.

UNIVERSITY MEDICAL CENTRE, FREIBURG GERMANY | RESEARCH SCIENTIST

2010 – 2013 | Freiburg, Germany
Research into patient motion correction for MRI.

- → Motion correction research in Magnetic Resonance Imaging.
- → Design and implementation of algorithms in MATLAB and C++ on Siemens MRI scanners.
- → Development of system calibration algorithms requiring 3D mathematical constructs.
- → Handling of software releases and maintenance of source repositories.
- → Design and implementation of multiple scanner coordinate system calibration approaches.
- → Attendance and presentation at MRI research conferences.
- → Co-authored research papers in the field.
- → Worked with a startup formed to commercialise research.

APPLIED RESEARCH ASSOCIATES NZ, CHRISTCHURCH NEW ZEALAND | MASTERS STUDENT

2007 – 2009 | Christchurch, New Zealand
Design of a novel 6.D. optical tracking system for NZ company while studying towards Masters of Engineering.

- → Design of camera module for 6-DoF optical pose estimation.
- → Design and firmware implementation of real time 2.D. optical tracking algorithms.
- → Design and implementation of novel 6-DoF optical tracking algorithm.
- → Collaboration with company stakeholders and Masters supervisors.

PATENT APPLICATIONS AND PUBLICATIONS

PCT Patent Application No: PCT/NZ2023/050093 - DEVICES AND METHODS FOR BIVALVE HARVEST OPTIMISATION (2023)

NZ Provisional Patent 773998 - LAND SEGMENTATION AND CLASSIFICATION (2022)

US Patent No. 9 746 540 B2, "Device and Method for Calibrating Tracking Systems in Imaging Systems" (2013)

Zahneisen, Benjamin **Lovell-Smith, Cris** Herbst, Michael Zaitsev, Maxim Speck, Oliver Armstrong, Brian Ernst, Thomas. (2014). Fast Noniterative Calibration of an External Motion Tracking Device. Magnetic resonance in medicine : official journal of the Society of Magnetic Resonance in Medicine / Society of Magnetic Resonance in Medicine. 71. 10.1002/mrm.24806.

Honal, Matthias **Lovell-Smith, Cris** Vicari, Marco Weitzel, Elisabeth Izadpanah, Kaywan Weigel, Matthias. (2013). Accurate semiautomatic assessment of ligament length variations from MRI data. Medical physics. 40. 092301. 10.1118/1.4818058.

C. D. Lovell-Smith et al, "Combined prospective-retrospective correction applied to 3D brain imaging", Abstract and talk at ESMRMB, 2011.

C. D. Lovell-Smith et al, "Black spot: A prototype camera module" in Image and Vision Computing New Zealand, 2008. IVCNZ 2008. 23rd International Conference.

Unabridged employment and publication history from 1999 onward available on request.