Mikkel **Fly Kragh**

MSc, PhD

Civil status
Married, 3 children

Address
Skjørringvej 12
8464 Galten
Denmark

Phone
+45 51761455

Mail
mikkel@theailab.dk

Web
theailab.dk
linkedin.com/in/mikkelkragh
github.com/mikkelkh
scholar.google.com

Languages
Danish - native
English - professional
German - elementary

Experience

May. 24 - Now **Freelance: AI Tech Lead**
Trifork A/S
At Trifork, I'm involved in three projects:
- Development and deployment of real-time computer vision systems for advanced driver assistance systems (ADAS)
- Development and validation of clinical prediction models for the Danish healtcare system
- Development and deployment of a machine vision inspection system for quality assurance

Feb. 23 - Now **Computer Vision and Machine Learning specialist**
Co-founder, AI Lab ApS
Co-founder of AI Lab ApS (theailab.dk), an AI consultancy and development house located in Aarhus, Denmark. We offer prototype development, consultancy services and vision systems within the area of computer vision and deep learning.

Apr. 22 - Now **External examiner**
Danish Agency for Higher Education and Science
External examiner (censor in Danish) on BSc and MSc engineering and master programs in Denmark. As an external examiner, I have assessed and graded both BSc and MSc theses within the areas of machine learning, deep learning, computer vision, and robotics.

Sep. 22 - Apr. 24 **Freelance: Computer Vision Engineer**
CARIAD, Volkswagen Group
Active learning (intelligent data collection) algorithms for self-driving cars. Deep learning model training for semantic segmentation and object detection. Model quantization with ONNX and ONNX Runtime (CPU/Cuda/TensorRT). Large investigation and usage of multiple experiment tracking tools. Modern Python development of a machine learning system (MLOps, experiment tracking, CI/CD in Azure, code review, pre-commits, linting, type-hints and environments).

Aug. 21 - Aug. 22 **Senior Research Scientist**
Vitrolife A/S
Use of deep learning and computer vision to optimize assisted reproduction technologies. As a research scientist, I was in charge of prototyping emerging technologies within machine learning, such as:
- Self-supervised learning on ~500,000 videos of fertilized human eggs
- Bias identification and mitigation using adversarial domain adaptation
- Uncertainty estimation and separation using ensemble models
- Model calibration using multivariate logistic regression
- Clinical relevance investigation of evaluation metrics for discrimination, calibration, and ranking performance of prediction models.

Additionally, I was in charge of scientific communication and research collaboration with both fertility clinics and universities. Here, I supervised BSc, MSc and PhD students in their scientific and AI-related collaborations with Vitrolife.

May. 18 - Jul. 21 **Industrial Postdoc**
Vitrolife A/S
Automatic Scoring and Selection of Embryos for Improving Standard IVF Treatment (ASSIST).
Developed deep learning models on microscopy imaging surpassing human-level performance on embryo quality assessment. These models (Guided Annotation™ and iDAScore®) are currently in production and used daily by hundreds of fertility clinics worldwide.

Dec. 14 - Apr. 18 **PhD Student**
Department of Engineering, Aarhus University
Lidar Sensing for Object Detection and Classification in Agriculture.
The project was part of the Safer Autonomous Farming Equipment (SAFE) project (Innovation Fund Denmark). I worked with sensor fusion techniques combining lidar sensing with color and thermal imaging as well as radar.

Education

Dec. 14 - Apr. 18 **PhD**
Department of Engineering, Aarhus University
Thesis: *"Lidar Sensing for Object Detection and Classification in Agriculture"*

Jan. 12- Jan. 14 **Master of Science in Information Technology**
Department of Engineering, Aarhus University
MSc thesis: *"Inspection of Glass Containers using Multi-target Particle Tracking and 3D Positioning"*
ECTS weighted average: 11.9 (7-step-scale)

Aug. 08 - Jan. 12 **Bachelor of Engineering in Electronics and Computer Engineering**
Aarhus School of Engineering
BSc thesis: *"InSpot Intelligent Spotlight"*
ECTS weighted average: 11.6 (7-step-scale)

Selected Courses

Aug. 15 **Summer School in Field Robotics**
University of Southern Denmark
PhD course, 7.5 ECTS

Apr. 15 - Jul. 15 **Deep Learning for Image Analysis**
Department of Engineering, Aarhus University
PhD reading course, 5 ECTS

Feb. 13 - Apr. 13 **Artificial Intelligence for Robotics**
Udacity (online)
MSc reading course, 5 ECTS

Mar. 12 - Jun. 13 **Computer Vision**
Department of Engineering, Aarhus University
MSc course, 5 ECTS

Dec. 16 - Jan. 18 **Self-Driving Car Engineer Nanodegree Program**
Udacity (online)
PhD course collection, 10 ECTS

Technology

Subject	Level	Years of experience
C	Low	2
C++	Medium	4
C#	Low	1
CI/CD	Medium	3
Camera Calibration	High	3
Computer Vision	High	12
Deep Learning	High	9
Git	High	7
Machine Learning	High	12
MLOps	Medium	4
MATLAB	High	5
Python	High	10
Pytorch	High	6
Research	High	10
ROS (Robot Operating System)	Medium	4
Sensor Fusion	Medium	3
Tensorflow / Keras	High	5

Selected Publications

Oct. 24
High-speed camera system for efficient monitoring of invasive plant species along roadways
F1000Research
M. Dyrmann, S.K. Skovsen, P.H. Christiansen, M.F. Kragh, A. Krogh

Jul. 23
Comparing performance between clinics of an embryo evaluation algorithm based on time-lapse images and machine learning
Journal of Assisted Reproduction and Genetics
M.N. Johansen, E.T Parner, M.F. Kragh, K. Kato, S. Ueno, S. Palm, M. Kernbach, B. Balaban, I. Keleş, A.V. Gabrielsen, L.H Iversen, J Berntsen

Mar. 23
Development and validation of deep learning based embryo selection across multiple days of transfer
Nature, Scientific Reports
J.T. Lassen, M.F. Kragh, J. Rimestad, M.N. Johansen, J. Berntsen

Feb. 22
Robust and generalizable embryo selection based on artificial intelligence and time-lapse image sequences
PLoS ONE
J. Berntsen, J. Rimestad, J. Lassen, D. Tran, M.F. Kragh

Oct. 21
Predicting embryo viability based on self-supervised alignment of time-lapse videos
IEEE Transactions on Medical Imaging
M.F. Kragh, J. Rimestad, J. Lassen, J. Berntsen, H. Karstoft

Jun. 21
Embryo selection with artificial intelligence: how to evaluate and compare methods?
Journal of Assisted Reproduction and Genetics
M.F. Kragh, H. Karstoft

Jun. 21
Abstract
Calibration of artificial intelligence (AI) models is necessary to reflect actual implantation probabilities with image-based embryo selection
ESHRE: European Society of Human Reproduction and Embryology
M.F. Kragh, J. Lassen, J. Rimestad, J. Berntsen

Sep. 20
Abstract
Opening the black box: relation between AI-predicted embryo implantation and traditional morphokinetic and morphological annotations
ASRM: American Society for Reproductive Medicine
J. Berntsen, J. Rimestad, J. Lassen, M.F. Kragh

Jun. 20
Abstract
Robust embryo scoring model based on artificial intelligence (AI) applied to a large time-lapse dataset
ESHRE: European Society of Human Reproduction and Embryology
J. Rimestad, M.F. Kragh, J. Lassen, A. Tran, J. Berntsen

Oct. 19
Automatic grading of human blastocysts from time-lapse imaging
Computers in Biology and Medicine
M.F. Kragh, J. Rimestad, J. Berntsen, H. Karstoft

Jul. 19
UnsuperPoint: End-to-end Unsupervised Interest Point Detector and Descriptor
arXiv preprint arXiv:1907.04011
P.H. Christiansen, M.F. Kragh, Y. Brodskiy, H. Karstoft

Jun. 19
Abstract

Automatic morphological grading of human blastocysts with time-lapse imaging and artificial intelligence

ESHRE: European Society of Human Reproduction and Embryology

M.F. Kragh, J. Rimestad, J. Berntsen, H. Karstoft

Mar. 19

Multi-Modal Obstacle Detection in Unstructured Environments with Conditional Random Fields

Journal of Field Robotics

M. Kragh, J. Underwood

Apr. 18
Dissertation

Lidar-Based Obstacle Detection and Recognition for Autonomous Agricultural Vehicles

PhD Dissertation, AU Library Scholarly Publishing Services

M.F. Kragh

Mar. 18

Multi-Modal Detection and Mapping of Static and Dynamic Obstacles in Agriculture for Process Evaluation

Frontiers in Robotics and AI

T. Korthals, M. Kragh, P. Christiansen, H. Karstoft, R.N. Jørgensen, U. Rückert

Nov. 17

FieldSAFE: Dataset for Obstacle Detection in Agriculture

MDPI Sensors

M. Kragh, P. Christiansen, M.S. Laursen, M. Larsen, K.A. Steen, O. Green, H. Karstoft, R.N. Jørgensen

Aug. 17

Towards Inverse Sensor Mapping in Agriculture

International Conference on Intelligent Robots and Systems, Workshop

T. Korthals, M.F. Kragh, P. Christiansen, U. Rückert

Jun. 17

Platform for evaluating sensors and human detection in autonomous mowing operations

Precision Agriculture

P. Christiansen, M. Kragh, K. A. Steen, H. Karstoft, R. N. Jørgensen

Dec. 16

3D impurity inspection of cylindrical transparent containers

Measurement Science and Technology

M. Kragh, K. Bjerge, P. Ahrendt

Jun. 16

Multi-modal Obstacle Detection and Evaluation of Occupancy Grid Mapping in Agriculture

International Conference on Agricultural Engineering

M. K. Hansen; P. Christiansen, T. Korthals, T. Jungeblut, H. Karstoft, R. N. Jørgensen

Jun. 16
Poster

Self-supervised Traversability Assessment in Field Environments with Lidar and Camera

International Conference on Agricultural Engineering

M. K. Hansen, J. Underwood, H. Karstoft

Jan. 16

Automatic behaviour analysis system for honeybees using computer vision

Computers and Electronics in Agriculture

G. J. Tu, M. K. Hansen, P. Kryger, P. Ahrendt

Sep. 15

Towards a DSL for Perception-Based Safety Systems

International Workshop on Domain-Specific Languages and models for Robotic systems

J.T.I. Mogensen, S. Suvei, M. K. Hansen, P. Christiansen, U. P. Schultz

Jul. 15

Advanced sensor platform for human detection and protection in autonomous farming

European Conference on Precision Agriculture

P. Christiansen, M. Kragh, K. A. Steen, H. Karstoft, R. N. Jørgensen

Jul. 15

Object Detection and Terrain Classification in Agricultural Fields using 3D Lidar Data

International Conference on Computer Vision Systems

M. K. Hansen, R. N. Jørgensen, H. Pedersen

Feb. 12

Kinect depth sensor evaluation for computer vision applications

Technical report

M. Andersen, T. Jensen, P. Lisouski, A. Mortensen, M. Hansen, T. Gregersen, and P. Ahrendt