Felix Bragman

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Machine learning researcher and engineer with expertise in deep learning and computer vision. Passionate about developing fundamental models to tackle complex problems and power the next-generation of products.

Work Experience

Medtronic, Surgical Robotics
Principal AI Scientist/Engineer   2021-present
- Researching and developing machine learning algorithms to process surgical videos:
  - Topics include: multi-task learning, transformer architectures and spatio-temporal models
- Contributing production-ready code for R&D and deployment of models for production
- Developed a novel multi-task mixture of experts transformer for internal models
- Responsible for supervision of junior team members and UCL Machine Learning MSc students

Babylon Health
Senior Research Scientist   2019-2021
- Led research on representation learning from medical data to power AI-assisted products
- Deployed a graph neural network (GNN) for learning patient embeddings from medical records to power internal products
- Developed a PyTorch toolkit for deep learning on medical time-series for internal R&D

University College London
Research Associate in Machine Learning and Medical Image Computing   2017-2019
Supervisor: Dr. M. Jorge Cardoso
- Fundemental research in deep multi-task learning for computer vision
- First author work published at MICCAI 2018 (oral, top 5%) and ICCV 2019 (oral, top 4%)
- Contributed to NiftyNet: an open-source TensorFlow library for medical image analysis

Education

University College London
Ph.D. in Computer Vision   2012-2017
Quantitative lung CT analysis for the study & diagnosis of COPD
Supervisors: Prof. David Hawkes and Prof. John Hurst
- Developed supervised and unsupervised learning methods for the study and diagnosis of lung disease from 3D Computed Tomography scans
- Published at top technical (MICCAI and IEEE Transactions on Medical Imaging) and high ranking medical journals (American Journal of Respiratory & Critical Care Medicine, 11% acceptance rate)

University of Oxford
M.Sc. with distinction in Biomedical Engineering (ranked 1st in class)   2011-2012

University College London
B.Eng. first class honours in Mechanical Engineering (Dean's List)   2007-2011

Skills

Experienced
Python (PyTorch, Tensorflow, Keras) and MATLAB

Knowledgeable
C++, Bash and Docker

Activities

Reviewer
NeurIPS, ICML, ICLR, MICCAI, MIDL and IEEE Transactions on Medical Imaging

Selected Publications

ICCV - 2019 (oral) - top 4.3% of 4,303 submissions
Stochastic filter groups for multi-task CNNs: learning specialist and generalist convolution kernels
https://arxiv.org/abs/1908.09597
- Novel method that learns task-specific and shared representations for multi-task learning
- Developed Stochastic Filter Groups modules; a probabilistic grouping of kernels that help learn the CNN architecture
- Optimisation enabled through variational inference to learn the posterior distribution over possible groupings of kernels and network parameters

MICCAI - 2018 (spotlight oral) - top 5% of submissions
Uncertainty in multitask learning: joint representations for probabilistic MR-only radiotherapy planning
https://arxiv.org/abs/1806.06595
- Developed a multi-task learning method that learns to dynamically weight the loss function using heteroscedastic uncertainty
- Method is based on Bayesian deep-learning to estimate uncertainty in the neural network
- Applied method to simultaneous MR to CT synthesis and organ-at-risk segmentation

IEEE Transactions on Medical Imaging - 2017
Pulmonary lobe segmentation with probabilistic segmentation of the fissures and a groupwise fissure prior
https://ieeexplore.ieee.org/document/7903649
- Lung segmentation from three-dimensional Computed Tomography (CT) scans
- Developed an unsupervised lung fissure segmentation method based on Gaussian Mixture Modelling and Markov Random Field regularisation
- Lobe segmentation was performed using the fissure segmentation and a population model of the fissures

MICCAI - 2017
Manifold Learning of COPD
https://discovery.ucl.ac.uk/id/eprint/10042862/1/paper332.pdf
- Developed a novel method to analyse disease progression of COPD from CT scans
- Created of a novel descriptor of disease severity to quantify patterns of tissue classification
- Performed manifold fusion of separate manifolds of COPD phenotypes learnt using Isomap
- Kernel regression to identify trajectories of disease progression to better monitor disease progression

Selected Awards

MIDL Honorable Mention Reviewer Award   2020, 2021
Medical Imaging with Deep Learning conference
Awarded to the top reviewers at the conference

MICCAI Reviewer Award   2019
Medical Image Computing and Computer Assisted Interventions conference
Awarded to top reviewers at the conference

MICCAI Travel Award   2018
Medical Image Computing and Computer Assisted Interventions conference
Awarded to 50 researchers

British Lung Foundation Travel Award   2014
European Respiratory Society conference
Awarded to early-career clinical/non-clinical researchers in the respiratory field

The Professor Sir Michael Brady Prize   2012
University of Oxford, Department of Engineering Science
Awarded for overall best performance in the M.Sc. in Biomedical Engineering

University College London Dean's List   2011
University College London
Awarded for achieving a degree average of at least 75%