Joshua Bridge

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Summary

I am a PhD student who is currently submission pending and writing my thesis. My background is in mathematics with a particular focus on bioinformatics and deep learning. My main interest is developing clinically useful prediction models with imaging data. I have mostly worked on ophthalmic colour fundus images, but have also developed models using optical coherence tomography, computed tomography, electrocardiography, and x-ray imaging.

Education

University of Liverpool — Liverpool, UK
PhD. Thesis title: Deep Learning Prognostic Models with Longitudinal Data — 2018 –Current

- Supervisors: Dr Yalin Zheng and Prof Simon Harding.
- Submission pending.

University of Liverpool — Liverpool, UK
MRes Biomedical Sciences and Translational Medicine, Distinction — 2017–2018

University of Manchester — Manchester, UK
BSc Mathematics, 2.2 — 2013–2016

Experience

University of Liverpool — Liverpool, UK
Research Assistant — 2021

- Diagnostic Modeling for Ocular Oncology
- Worked with clinicians to create a diagnostic model to screen referrals.

University of Liverpool — Liverpool, UK
Research Assistant — 2020

- Deep learning to aid the fight against COVID-19.
- Collaboration between University of Liverpool, Amazon Web Services, and Alces Flight.
- Secured Amazon funding of $50,000.
- Journal publications. Presentations at Super Computing 20 and AWS HPC Event.

Publications

[1] **J. Bridge**, S. Harding, and Y. Zheng, "End-to-end deep learning vector autoregressive prognostic models to predict disease progression with uneven time intervals", in *Annual Conference on Medical Image Understanding and Analysis*, Springer, 2021, pp. 517–531.

[2] **J. Bridge** and Y. Zheng, "mGEV: Extension of the GEV Activation to Multiclass Classification", 2021.

[3] K. Deng, Y. Meng, D. Gao, **J. Bridge**, Y. Shen, G. Lip, Y. Zhao, and Y. Zheng, "Transbridge: A lightweight transformer for left ventricle segmentation in echocardiography", in *International Workshop on Advances in Simplifying Medical Ultrasound*, Springer, 2021, pp. 63–72.

[4] **J. Bridge**, J. D. Blakey, and L. J. Bonnett, "A systematic review of methodology used in the development of prediction models for future asthma exacerbation", *BMC Medical Research Methodology*, vol. 20, no. 1, pp. 1–12, 2020.

[5] **J. Bridge**, S. Harding, and Y. Zheng, "Development and validation of a novel prognostic model for predicting amd progression using longitudinal fundus images", *BMJ Open Ophthalmology*, vol. 5, no. 1, e000569, 2020.

[6] **J. Bridge**, Y. Meng, Y. Zhao, Y. Du, M. Zhao, R. Sun, and Y. Zheng, "Introducing the gev activation function for highly unbalanced data to develop covid-19 diagnostic models", *IEEE Journal of Biomedical and Health Informatics*, vol. 24, no. 10, pp. 2776–2786, 2020.

[7] R. Harwood, **J. Bridge**, L. Ressel, L. Scarfe, J. W. Sharkey, G. Czanner, P. Kalra, A. Odudu, S. Kenny, B. Wilm, *et al.*, "Murine models of renal ischaemia reperfusion injury: An opportunity for refinement using non-invasive monitoring methods", *bioRxiv*, pp. 2019–12, 2020.

[8] L. Bonnett, **J. Bridge**, and J. D. Blakey, "A systematic review of methodology used in the development of prediction models for future asthma attack", *D36. INNOVATIONS IN RESEARCH METHODS AND EVIDENCE SYNTHESIS*, A6224–A6224, 2019.

[9] **J. Bridge**, S. P. Harding, Y. Zhao, and Y. Zheng, "Dictionary learning informed deep neural network with application to oct images", in *International Workshop on Ophthalmic Medical Image Analysis*, Springer, 2019, pp. 1–8.

[10] **J. Bridge**, S. P. Harding, and Y. Zheng, "Daisy descriptors combined with deep learning to diagnose retinal disease from high resolution 2d oct images", in *Annual Conference on Medical Image Understanding and Analysis*, Springer, 2019, pp. 489–496.

[11] Y. Zheng, Y. Zhao, X. Chen, D. Gao, **J. Bridge**, W. Zhu, and B. Williams, "Fully automatic localisation of the optic disc using yolo in colour fundus photographs", *Investigative Ophthalmology & Visual Science*, vol. 60, no. 11, PB038–PB038, 2019.

Skills

- **Python:** Proficient in common packages (Numpy, Pandas, SKLearn, etc.,...), Tensorflow, and PyTorch.
- **R:** Proficient in base and common packages (PROC, GGPlot, GLM, etc.,...) and Shiny.
- **Latex:** Knowledgeable in writing papers and reports in LaTeX
- **MATLAB:** Basic knowledge of core MATLAB.

Memberships & Qualifications

- Liverpool University Hospitals NHS Foundation Trust 2021–Current

Honorary Contract
NIHR Introduction to Good Clinical Practice (GCP) eLearning Certificate
NIHR Introduction to GCP - IMP management Certificate

- Royal Statistical Society 2018–Current
  Graduate Statistician
- Reviewer for journals 2018–Current
  IEEE Journal of Biomedical and Health Informatics, Investigative Ophthalmology & Visual Science, BMJ Open Ophthalmology, Nature Scientific Reports.
- Conference Program Commitee 2018
  Medical Image Understanding and Analysis.
- Animal (Scientific Procedures) Act, 1986 2017–Current
  Personal Licence Category B Certificate

References

Dr Yalin Zheng (PhD Supervisor) Reader in Ophthalmic Imaging
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Prof Simon Harding (PhD Supervisor) Ophthalmic Consultant
sharding@liverpool.ac.uk University of Liverpool