Keli Niu

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Research interests: Computer vision for medical imaging and multimodal learning; weakly supervised learning.

EDUCATION

University of Bristol (UoB), United Kingdom **Sep 2024–Sep 2025**

MSc - Data Science (Distinction)

- Selected Courses: Large-Scale Data Engineering; Statistical Computing & Empirical Methods; Introduction to AI & Text Analytics; Visual Analytics; Technology, Innovation, Business & Society.

University of Bristol (UoB), United Kingdom **Sep 2021–Jun 2024**

BSc - Computer Science (First Class Honours)

- Selected Courses: Machine Learning; Image Processing & Computer Vision; Computer Graphics; Computer-Generated Imagery; Operating Systems & Security; Human-Computer Interaction.

RESEARCH EXPERIENCE

Key-Frame Detection in Blind-Sweep Fetal Ultrasound (MSc Dissertation) **Jun 2025–Aug 2025 · UoB**

- Prior-guided pipeline combining nnU-Net abdominal masking, structure-guided multi-frame enhancement (SMFE), and a stage-wise multi-depth semantic-temporal transformer (SMDST).
- Proposed Peak-preserving Redundancy Suppression (PRS) with BCE-centred calibration plus light supervised-contrastive and Gumbel-Softmax regularisation.
- On blind-sweep ultrasound, achieved +9.6 pp and +25.0 pp F1 gains over two strong baselines and produced stable key/sub-key segments and dwell intervals for reliable abdominal-circumference (AC) measurement.
- Extended into a paper submitted to IEEE ISBI 2026.

Multi-omics Integration for Cancer (MIR100HG) Group Lead **Feb 2025–Apr 2025 · UoB**

- Integrated ENCODE transcription factor (TF) priors, 450K methylation, and RNA-seq across LUAD/PAAD/PRAD/SKCM/STAD; built MIR100HG-centred networks with XGBoost and SHAP.
- Performed Kaplan–Meier/Cox survival modelling and cross-cancer comparison; identified convergent TFs (JUN, SUZ12, GATA1).
- In STAD, high MIR100HG associated with worse overall survival (OS) (HR ≈ 1.83, p ≈ 0.0066); released reproducible pipelines (ID harmonisation, M-value transform, stratified grouping).

Ship Detection in Synthetic Aperture Radar (SAR) Images (BSc Dissertation) **Feb 2024–May 2024 · UoB**

- Enhanced YOLOv8-obb with a Swin Transformer backbone, BiFPN, and a small-object head; introduced anchor-area weighted loss and targeted augmentation.
- Improved robustness in complex SAR backgrounds (small targets, clutter, wakes); 97.8% accuracy with +1.0 and +3.2 pp gains on small/near-shore scenes.

AI & Text Analytics **Apr 2025 · UoB**

- Financial-tweet sentiment classification (Naïve Bayes, TinyBERT) with controlled ablations and error analysis.
- Topic modelling of climate "risk/opportunity" via Latent Dirichlet Allocation (LDA) (topic-count/α sweeps, coherence evaluation).
- Social-media named entity recognition (NER) using BERT-based sequence labelling; Begin–Inside–Outside (BIO) span alignment, hyperparameter studies, boundary/continuation error analysis.

RESEARCH INTERNSHIP EXPERIENCE

Institute of Automation, Chinese Academy of Sciences - Research Intern **Jul 2023–Aug 2023 · Beijing, China**

- Reproduced and analysed YOLOv5; proposed RNN-based enhancements.
- Evaluated a multimodal model (Viscpm-chat) against MME benchmarks using Python/Linux.

EXTRACURRICULAR ACTIVITIES

Bristol Data Science Society (BDSS) **Mar 2022 · Bristol, UK**

- Built an end-to-end Python data pipeline (ingestion/cleaning/validation), ran regression analyses to surface variable relationships, and prepared features for downstream ML training.

SKILLS

Languages: Mandarin (native), English (fluent)

Programming: Python; R (tidyverse); Go (distributed systems); Java; C/C++; C#; SQL

ML/AI: PyTorch; TensorFlow; scikit-learn; BERT/TinyBERT; SHAP; survival analysis (Kaplan–Meier/Cox)

CV/NLP: YOLO v5/v8-obb; nnU-Net; Swin Transformer

Data/Cloud; Visualisation & Apps: AWS (auto-scaling; S3/SQS/DynamoDB; CloudWatch); Tableau; Maya (3D modelling); Unity + Android Studio (mobile)

Hobbies: Brush lettering (Amateur grade 8), table tennis, badminton, swimming.