Medical Intelligence and Robotic Cognition (MIRoC) Lab

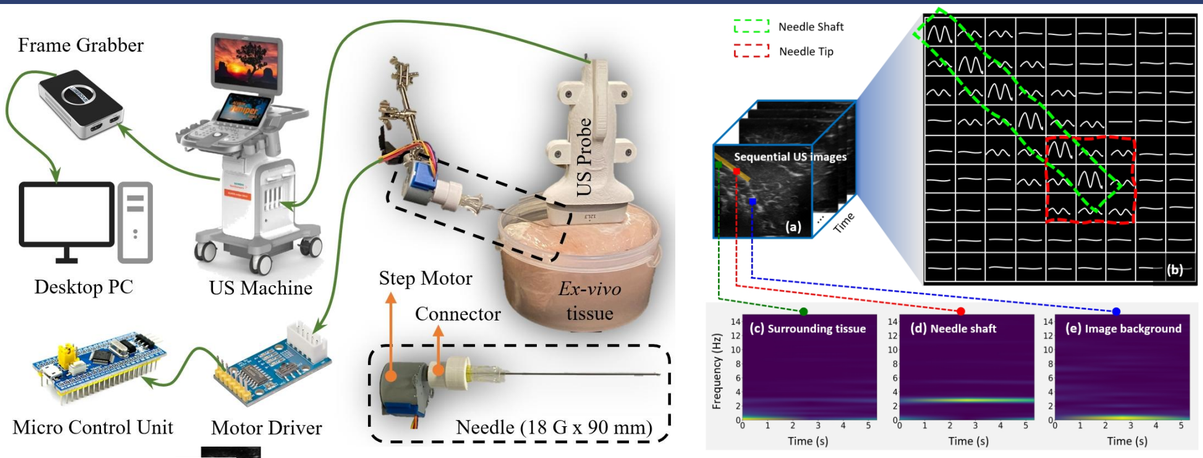
Zhongliang Jiang

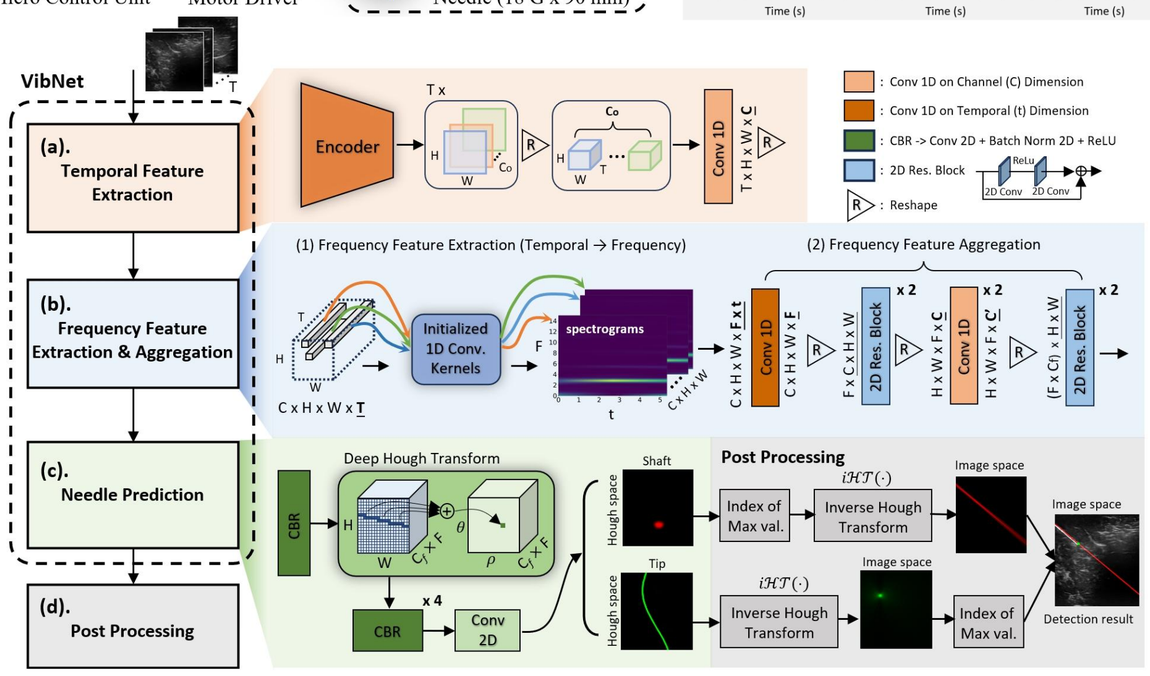
Department of Mechanical Engineering

Lab Webpage

Video Demo

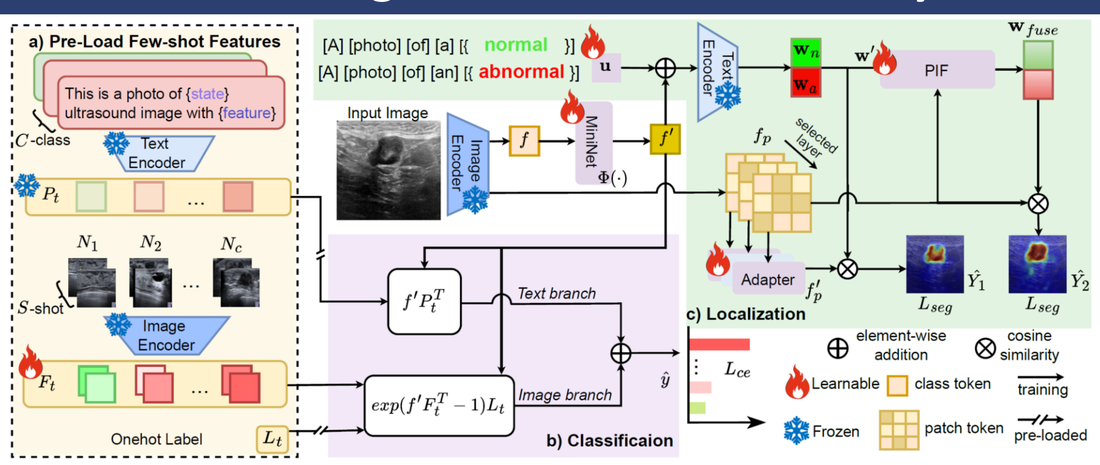
Vibration-Boosted Needle Detection

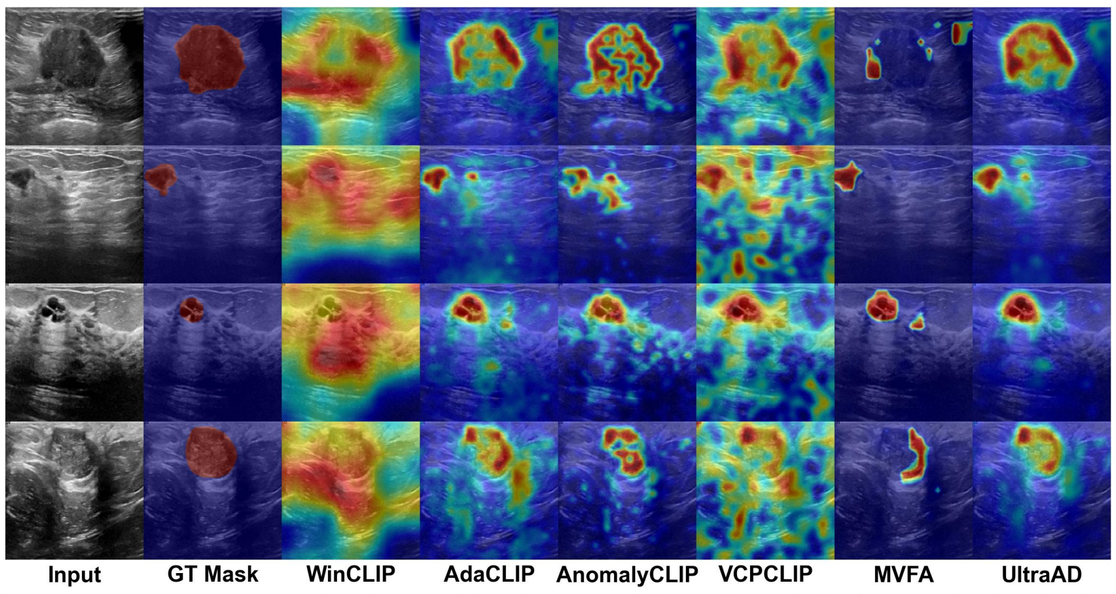




D. Huang, C. Li, A. Karlas, X. Chu, K.W.S. Au, N. Navab, and Z. Jiang. "Vibnet: Vibration-boosted needle detection in ultrasound images." ***IEEE Transactions on Medical Imaging***, 2025.

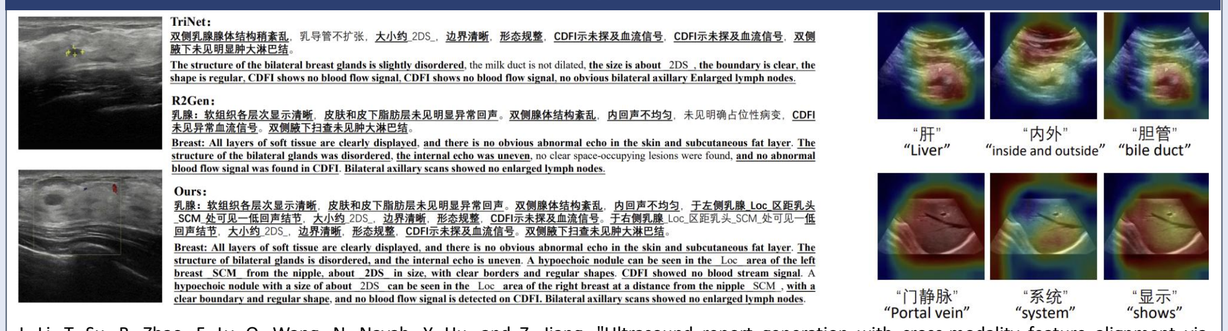
Few-Shot Learning for Ultrasound Anomaly Detection





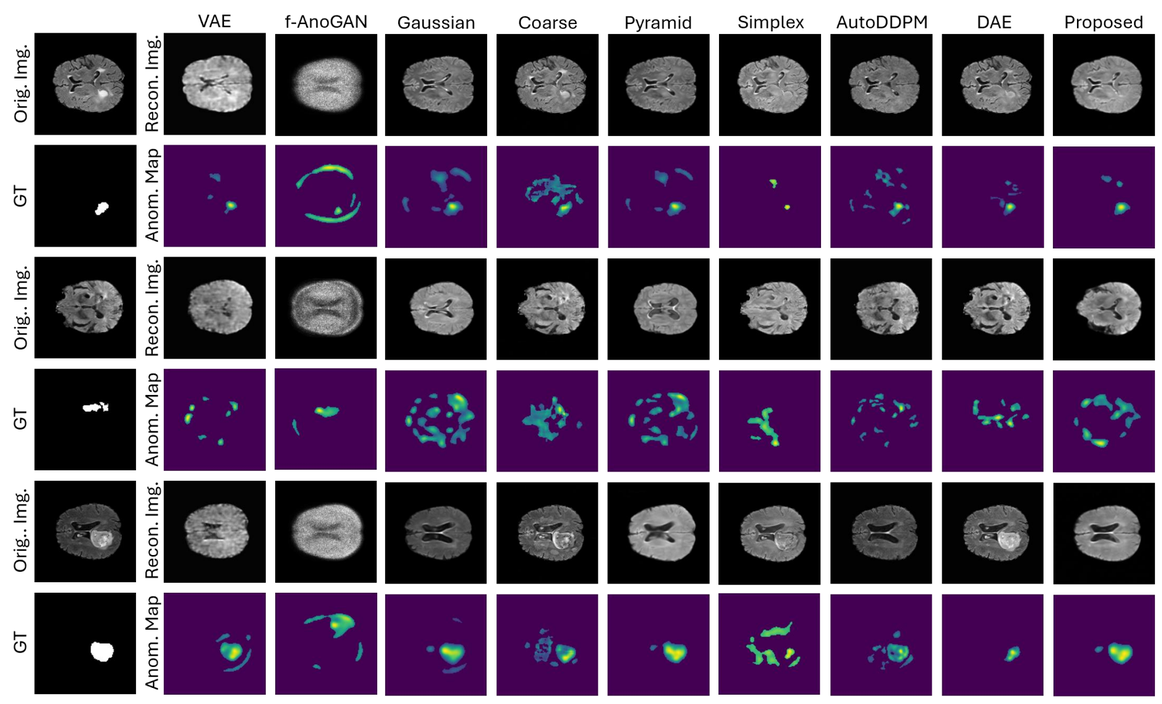
Y. Zhou, Y. Bi, W. Tong, W. Wang, N. Navab, and Z. Jiang. "Ultraad: Fine-grained ultrasound anomaly classification via few-shot clip adaptation." In ***International Conference on Medical Image Computing and Computer-Assisted Intervention***, pp. 625-635, 2025.

Ultrasound Report Generation



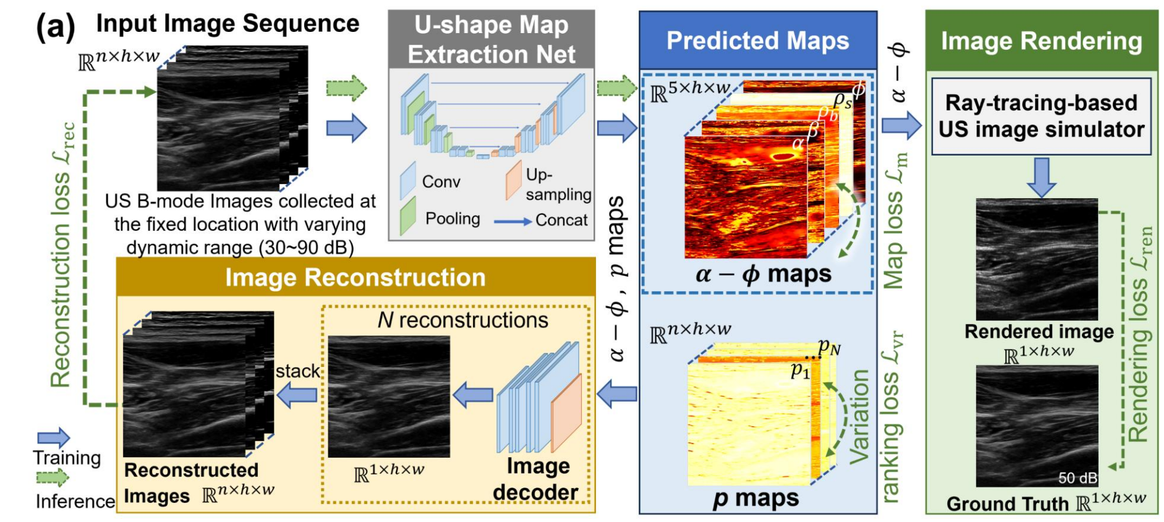
J. Li, T. Su, B. Zhao, F. Lv, Q. Wang, N. Navab, Y. Hu, and Z. Jiang. "Ultrasound report generation with cross-modality feature alignment via unsupervised guidance." ***IEEE Transactions on Medical Imaging,*** 2024.

Diffusion-Based Medical Image Anomaly Detection



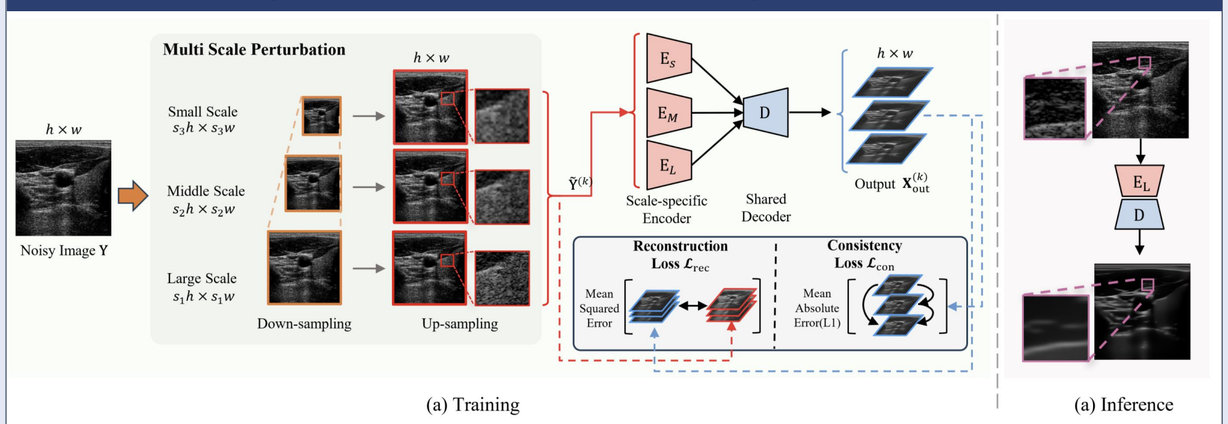
Y. Bi, L. Huang, R. Clarenbach, R. Ghotbi, A. Karlas, N. Navab, and Z. Jiang. “Synomaly noise and multi-stage diffusion: A novel approach for unsupervised anomaly detection in medical images.” ***Medical Image Analysis***, 2025.

Reverse Approximation of Tissue Properties



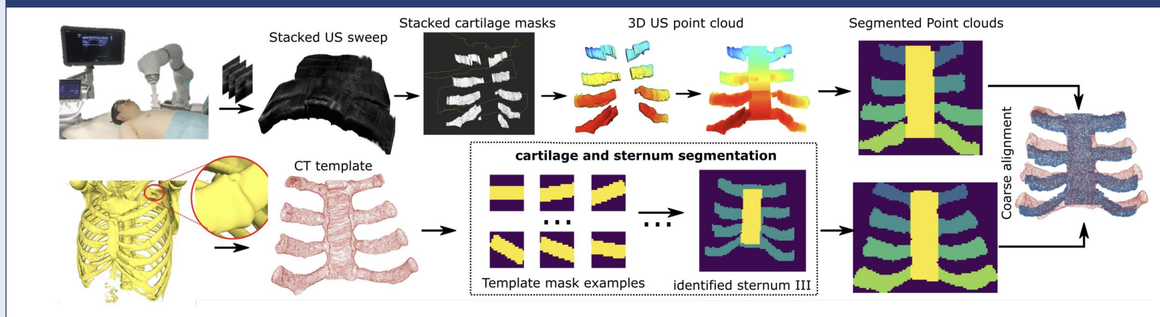
Y. Li, K.W. Kwok, M. Wysocki, N. Navab, and Z. Jiang. "UltRAP-Net: Reverse Approximation of Tissue Properties in Ultrasound Imaging." ***Advanced Intelligent Systems***, 2025.

Self-Supervised Ultrasound Speckle Reduction



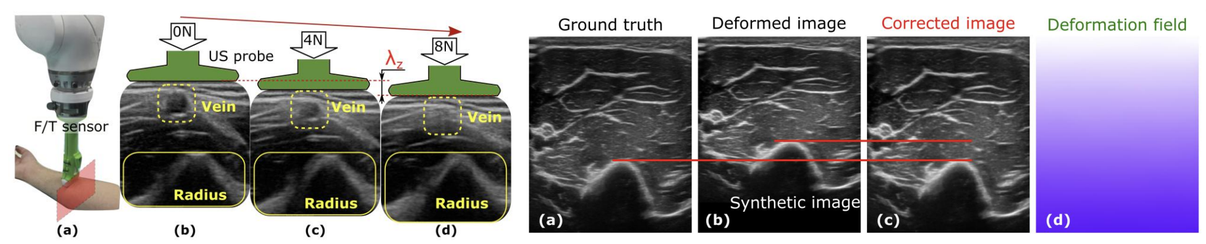
X. Li, N. Navab, and Z. Jiang. “Speckle2Self: Self-supervised ultrasound speckle reduction without clean data.” ***Medical Image Analysis***, 2025.

Non-Rigid Ultrasound-CT Registration



Z. Jiang, Y. Kang, Y. Bi, X. Li, C. Li, and N. Navab. "Class-aware cartilage segmentation for autonomous US-CT registration in robotic intercostal ultrasound imaging." ***IEEE Transactions on Automation Science and Engineering*** 22 (2024): 4818-4830.

Deformation Correction



Z. Jiang, Y. Zhou, D. Cao, and N. Navab. "DefCor-Net: Physics-aware ultrasound deformation correction." ***Medical Image Analysis,*** 2023.