

Skewness-Guided Pruning of Multimodal Swin Transformers for Federated Skin Lesion Classification on Edge Device

RESEARCH SEMINAR

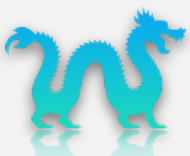
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Kuniko Paxton

**Postdoctoral Edge AI Researcher at the University of Hull, England
Member of the National Edge AI Hub**

In recent years, high-performance computer vision models have achieved remarkable success in medical imaging, with some skin lesion classification systems even surpassing dermatology specialists in diagnostic accuracy. However, such models are computationally intensive and large in size, making them unsuitable for deployment on edge devices. In addition, strict privacy constraints hinder centralized data management, motivating the adoption of Federated Learning (FL). To address these challenges, this study proposes a skewness-guided pruning method that selectively prunes the Multi-Head Self-Attention and Multi-Layer Perceptron layers of a multimodal Swin Transformer based on the statistical skewness of their output distributions. The proposed method was validated in a horizontal FL environment and shown to maintain performance while substantially reducing model complexity. Experiments on the compact Swin Transformer demonstrate approximately 36% model size reduction with no loss in accuracy. These findings highlight the feasibility of achieving efficient model compression and privacy-preserving distributed learning for multimodal medical AI on edge devices.



Location: Bit Alliance Lab (3-46), III floor
Faculty of Electrical Engineering, University of Sarajevo