Abstracts of the WCMSR 2026

Oral Session

ORIGINAL ARTICLE

01. EVALUATING THE EFFICACY OF ON-DEVICE AI IN RADIOLOGICAL IMAGE CLASSIFICATION: USING COREML FOR BRAIN TUMOR DETECTION

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BACKGROUND: The rapidly expanding prevalence of AI in patient care and treatment planning reflects its transformative potential in improving healthcare outcomes and efficiency. AI applications in radiology can aid in accuracy of diagnosis and alleviating physician workload. However, one barrier to integration of AI is its financial burden due to subscription-based software costs, ongoing updates, and hardware requirements. A potential way to offset these costs is the adoption of local, on-device machine learning workflows, implemented through accessible development environments such as Apple's Xcode in combination with Create ML and the Core ML framework. **METHODS**: This project evaluated the accuracy of a Core ML–based image classification model for detecting brain tumors on MRI images and assessed the feasibility of leveraging the Xcode development environment to train machine learning (ML) image classification models with Create ML. Utilizing de-identified, publicly available brain MRI datasets, a supervised image classification model developed using Apple's Create ML Image Classifier was trained to differentiate between glioma, meningioma, pituitary tumors, and healthy brain images. Standardization of images was done using Create ML Image Feature Print v2, which automatically scaled each image to 360 x 360 pixels. A total of 7,023 images were in the dataset with 5,970 (85%) images utilized for training and 1,053 (15%) images used for testing. **RESULTS**: After 21 training iterations, the classifier achieved 93% accuracy on the test images, with precisions of 96% for healthy, 95% for pituitary tumor, 93% for glioma, and 87% for meningioma. **CONCLUSION**: The model demonstrates consistently higher performance across all categories, with slightly lower scores for glioma and meningioma. As shown by our CoreML model achieving 93% accuracy in identifying brain MRI tumor subtypes, utilizing the Xcode development environment and CoreML is a viable and promising way for future development of effective and cost-efficient diagnostic radiology tools for brain tumor detection.

Key Words: Artificial Intelligence; Machine Learning; Radiology; Magnetic Resonance Imaging; Brain Neoplasms; Image Processing, Computer-Assisted; Pattern Recognition, Automated (Source: MeSH-NLM).

	Confusion Matrix				
		Predicted			
		Glioma	Meningioma	Pituitary	Healthy
True	Glioma	219	8	8	8
	Meningioma	13	210	12	12
	Pituitary	4	4	252	3
	Healthy	1	1	0	298

Table 1. Confusion matrix for the test dataset.

- High correct classification along the diagonal.
- Most misclassifications occurred between: Glioma ↔ Meningioma
- May be due to insufficient training examples of meningiomas, complicated by their variable size and position and their overlapping appearance with other lesions on 2D MRI.
- "True" indicates the actual tumor class; "Predicted" indicates the model output.

ISSN 2076-6327

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