Figure 1S: PREMO Samples

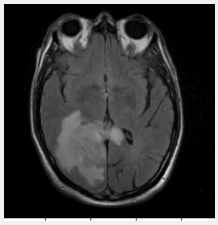
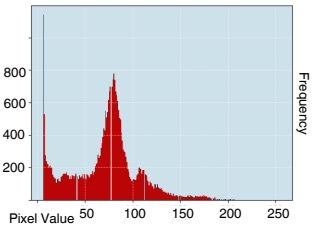
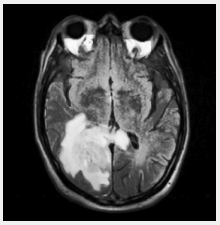
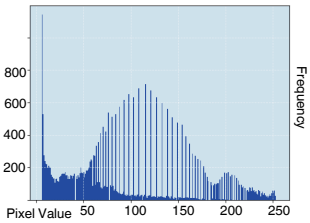
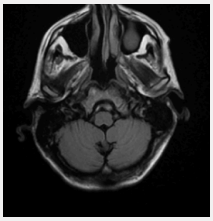
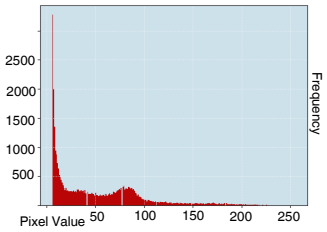
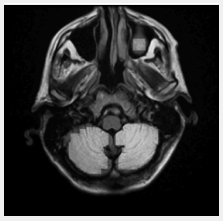
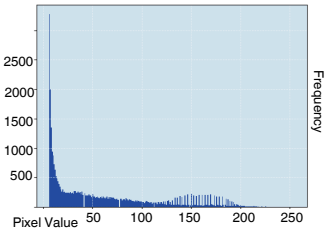
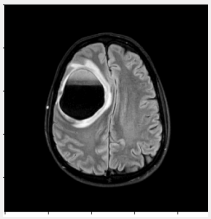
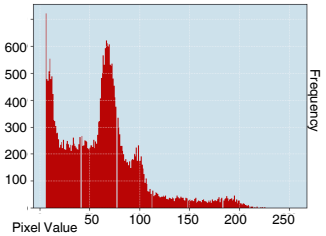
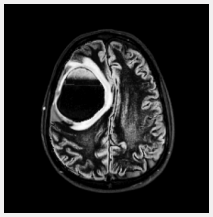
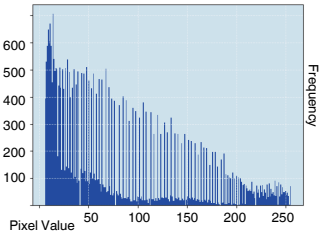
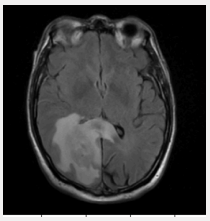
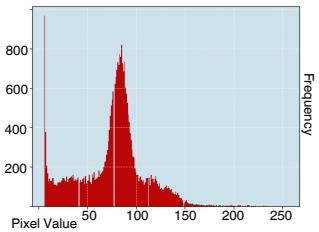
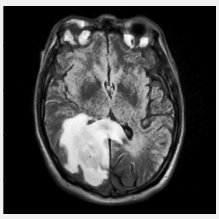
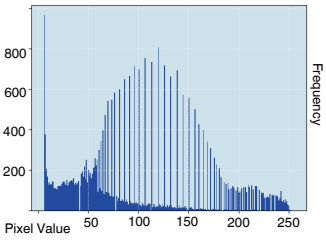
	Original MRI Scan	Histogram Plot	Normalized MRI Scan	Histogram Plot
P5TUMGBMFLA (5)				
P9NONMETFLA (5)				
P5TUMMETFLA (16)				
P5TUMGBMFLA (6)				

Figure 2S: SIENNA Post-Analysis Predicted Positive and Negative Samples

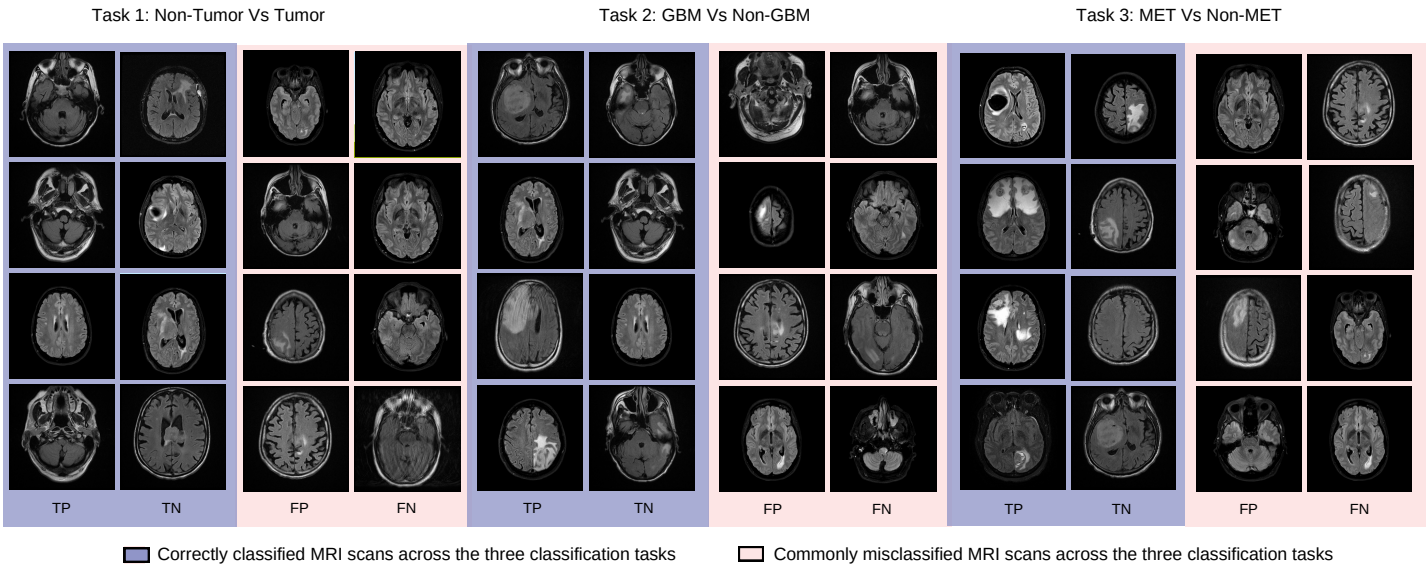
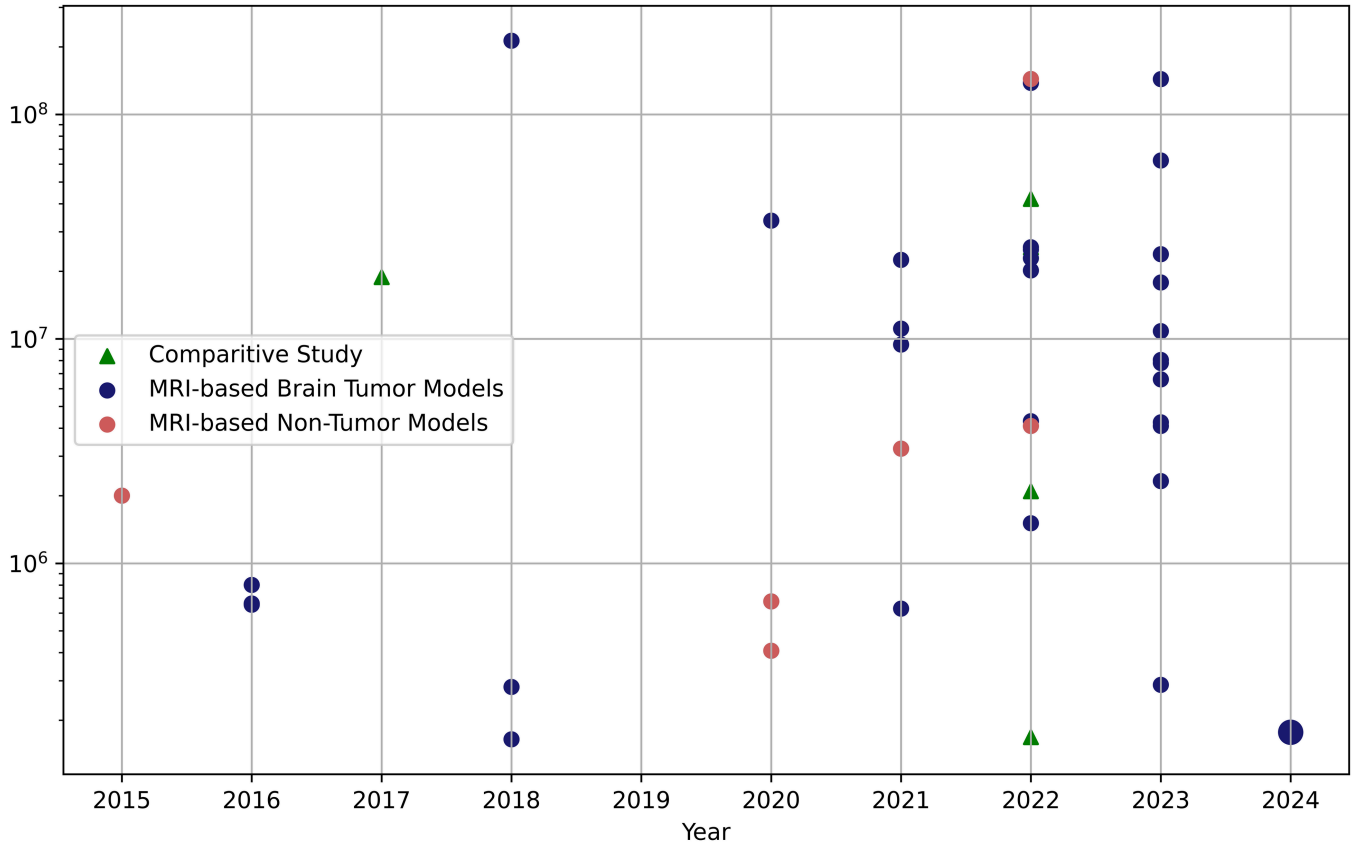


Figure 3S: Trainable Parameter Trends in MRI Diagnostics



SUPPLEMENTAL TABLE

Table 1S. Clinical Dataset 1 (This study)

Metastasized Tumor Patients (MET)						
Name	**Sex**	**Age Range**	**Manufacturer**	**Model**	**Magnetic Field (T)**	**Slice Thickness**
MP1	M	56-60	GE Medical	SignaHDxt	1.5	5
MP2	F	51-55	Philips	Ingenia	3.0	3
MP3	F	41-45	Philips	Ingenia	3.0	3
MP4	M	46-50	Philips	Ingenia	3.0	3
MP5	F	56-60	GE Medical	Signa Artist	1.5	3
MP6	F	61-65	GE Medical	Signa Artist	1.5	3
MP7	M	66-70	GE Medical	SignaHDxt	1.5	5
MP8	F	41-45	Philips	Ingenia	3.0	3
Glioblastoma Patients (GBM)						
Name	**Sex**	**Age Range**	**Manufacturer**	**Model**	**Magnetic Field (T)**	**Slice Thickness**
GP1	M	71-75	GE Medical	SignaHDxt	1.5	5
GP2	F	66-70	GE Medical	SignaHDxt	1.5	5
GP3	F	76-80	GE Medical	SignaHDxt	1.5	5
GP4	F	26-30	Philips	Ingenia	3.0	3
GP5	M	66-70	GE Medical	SignaHDxt	1.5	5
GP6	F	56-60	Philips	Ingenia	3.0	3
GP7	M	61-65	GE Medical	SignaHDxt	1.5	5
GP8	F	71-75	Philips	Ingenia	3.0	3
GP9	M	46-50	Philips	Ingenia	3.0	3

Table 2S. Clinical brain tumor – medical imaging based application study through 2015-2024 dataset

	Year	Model Type	MRI datasets for TVT	No. of MRI scans	Metric: Accuracy	Trainable Parameters	Multiclassification Tasks
1	2021	CNN	RIDER, REMBRAND, TCGA-LGG and Cheng et al	2990	99.33	11123938	Tumor vs Non-tumor
		CNN		3950	92.66	628885	Normal, Glioma, Meningioma, Pituitary, Metastatic
		CNN		4570	98.14	3245347	Grades II, III and IV
2	2020	CNN	Cheng et al	3064	96.56	33655939	Glioma, Meningioma, Pituitary
3	2022	CNN-LSTM	Kaggle	3264	92.00	1510273	Glioma, Meningioma, Pituitary
4	2022	CNN-SVM Classifier	BraTS 2018	3720	96.19	42079040	High-Grade Glioma
		CNN-SVM Classifier		4960	95.46	42079040	Low-Grade Glioma
5	2023	InceptionV3	Kaggle Brain Tumor MRI Dataset	7023	98.00	23851784	Glioma, Meningioma, Pituitary, Normal
		VGG19			96.00	143667240	Glioma, Meningioma, Pituitary, Normal
		DenseNet121			96.00	8062504	Glioma, Meningioma, Pituitary, Normal
		MobileNet			96.00	4253864	Glioma, Meningioma, Pituitary, Normal
6	2021	Inception ResNetv2	Cheng et al	3064	99.69	9445379	Glioma, Meningioma, Pituitary
7	2023	CNN	BraTS 2017, BraTS 2018, BraTS 2019 and BVHB	NA	97.87, 97.67, (by dataset)	287809	Grades I, II, III and IV
8	2022	MRI-based ResUNet approach	BraTS 2020 and CPM-RadPath 2020	NA	69.80	25000000	Peritumoral edema, Enhancing tumor, Necrosis
9	2023	EfficientNetB0	CE-MRI Figshare	2145	97.43	4100000	Glioma, Meningioma, Pituitary
		EfficientNetB1			98.66	6610000	Glioma, Meningioma, Pituitary
		EfficientNetB2			99.06	7810000	Glioma, Meningioma, Pituitary
		EfficientNetB3			98.08	10830000	Glioma, Meningioma, Pituitary
		EfficientNetB4			97.90	17850000	Glioma, Meningioma, Pituitary
10	2021	Cascade CNN	BraTS 2018	NA	92.03, 91.13, 87.26 (Dice)	22491460	Segmentation : Whole, Enhancing, Core tumor

11	2023	AlexNet CNN+ ML Classifiers	Kaggle Brain Tumor Classification (MRI) and Br35H	3600	88.75, 98.15, 86.25, 100.00	62378344	Glioma, Meningioma, Pituitary, Normal
12	2016	InputCascadeCNN	BraTS 2013	NA	88.00, 79.00, 73.00 (Dice)	802368	Segmentation : Whole, Enhancing, Core tumor
		LocalCascadeCNN		NA	88.00, 76.00, 72.00 (Dice)	654368	Segmentation : Whole, Enhancing, Core tumor
		MFCascadeCNN		NA	86.00, 77.00, 73.00 (Dice)	662513	Segmentation : Whole, Enhancing and Core tumor
13]	2018	AlexNet	Cancer Imaging Archive	4069	91.16	213122435	Healthy, Low-High grade Glioma
14	2022	ResNet50-CNN	Cheng et al and BMIDS	3064 + 253 (CV)	99.10	25600000	Glioma, Meningioma, Pituitary
		VGG-16-CNN			96.78	138400000	Glioma, Meningioma, Pituitary
		Inception V3-CNN			97.00	138400000	Glioma, Meningioma, Pituitary
		DenseNet201-CNB			97.00	20200000	Glioma, Meningioma, Pituitary
		Xception-CNN			98.20	22900000	Glioma, Meningioma, Pituitary
		MobilleNet-CNN			98.08	4300000	Glioma, Meningioma, Pituitary
15	2018	CNN	BraTS 2017	NA	92.98	281541	Glioma ROI segmentation
		CNN		NA	89.50	164525	Low-High grade Glioma
16	2023	ResNext101 and VGG19	Kaggle Brain Tumor Datasets	1800	99.98, 100.00	2325568	Glioma, Pituitary
17	2022	ResNet-50	BraTS 2019 and BraTS 2021	NA	98.62	2097922	Low grade, High grade
		3D DeepSeg		NA	84.10, 87.33 , 92.00 (Dice)	25617539	Segmentation : Whole, Enhancing and Core tumor
18	2022	SCENIC: CNN	BraTS 2017	4053	98.30	168414	Tumor vs Non-tumor

Non-Brain Tumor based MRI imaging application models

	Year	Model type	Metric: Accuracy	Trainable Parameters	Tasks
19	2015	Hierarchical Feature Representation and Multimodal Fusion with Deep Learning	95.35, 85.67, 74.58	2003000	AD vs. healthy Normal Control (NC), MCI vs. NC, and MCI converter vs. MCI non-converter
20	2022	VGG-16+ALFB	97.12	4096000	Alzheimer's Multiclassification of dementia stages
		VGG-19+ALFB	98.47	144000000	Alzheimer's Multiclassification of dementia stages
21	2021	CNN	95.52	3245860	COVID-19 severity: Mild, Moderate, Severe, Critical
22	2020	CNN	99.57	408194	COVID-19 detection

		CNN	98.27	677507	Normal, COVID-19. Pneumonia

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