Problem definition

MRI scans of four different forms of brain tumors—normal, glioma, meningioma, and pituitary—are included in the dataset "Brain Tumors MRI Dataset" that is being offered. Although there is a lot of promise for cutting edge medical research in this collection, the photos may not all be of the same quality, clarity, or detail. The task at hand is optimising the photos to boost overall visibility, clarity, and feature definition, hence facilitating proper analysis and diagnosis of various brain tumour kinds by researchers and medical experts.

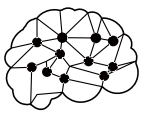
Project goal

The goal of this dataset's imagine enhancement is to offer a more distinct and in-depth depiction of brain anomalies and structures, with a special emphasis on the recognized tumor kinds (normal, glioma, meningioma, and pituitary). Better contrast, less noise, and better feature visibility should all be present in the upgraded pictures, enabling more precise and effective medical analysis. The expanded dataset hopes to do this by providing researchers and medical professionals with high-quality visual data, eventually boosting the area of medical research and aiding in the improvement of brain tumor detection and treatment.

Processing identification

We use image enhancement techniques for the "Brain Tumors Dataset" from kaggle , the dataset contain 3 types of brain tumors . To improve the quality of the MRI images, we use Python to apply image enhancement techniques such as contrast adjustment, histogram equalization, and noise reduction. These improvements are critical in emphasizing important details and identifying tumor boundaries. Specialized algorithms, such as edge enhancement and region-of-interest highlighting, are also employed to highlight certain features crucial to brain tumor diagnosis.

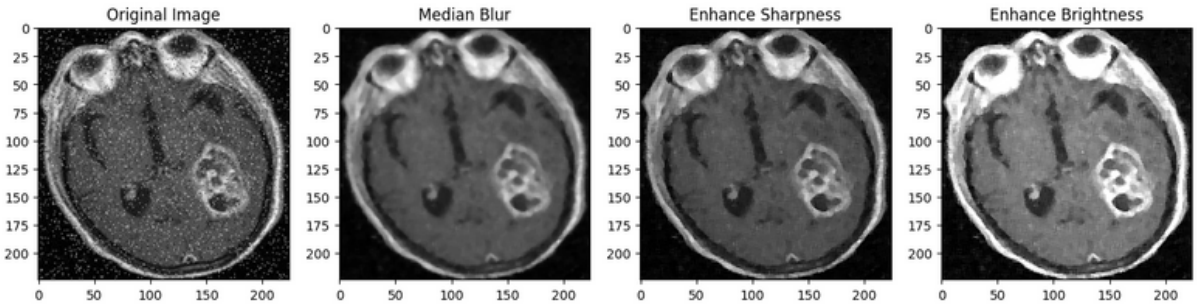
Methodology



Meningiomas

A meningioma tumor is a type of tumor that grows in the protective membranes that surround the brain and spinal cord. It can be slow-growing and usually benign, but it can also be malignant in rare situations. Headaches, seizures, cognitive difficulties, weakness, visual or hearing issues, and mood changes are all possible symptoms.(Meningiomas – Classifications, Risk Factors, Diagnosis and Treatment, n.d.)

- Image 1



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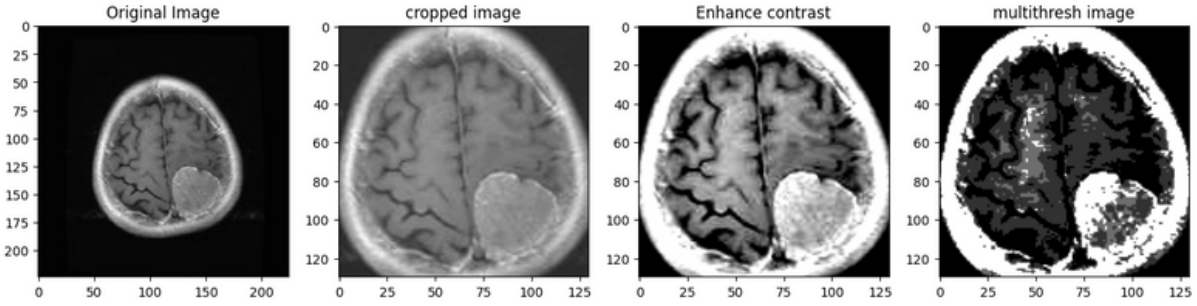

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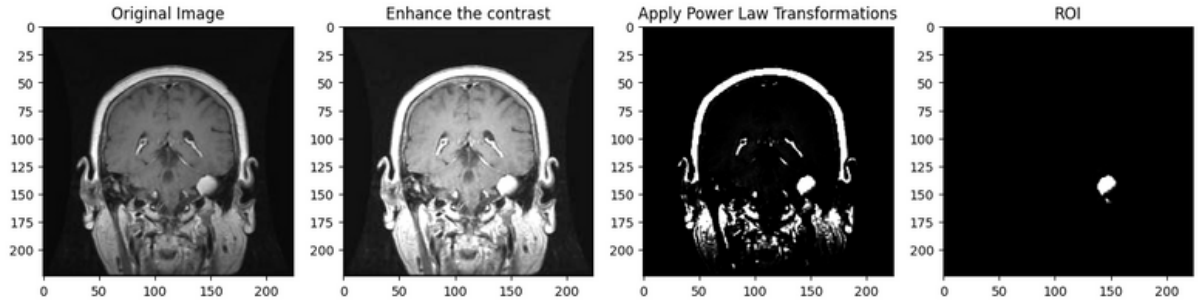

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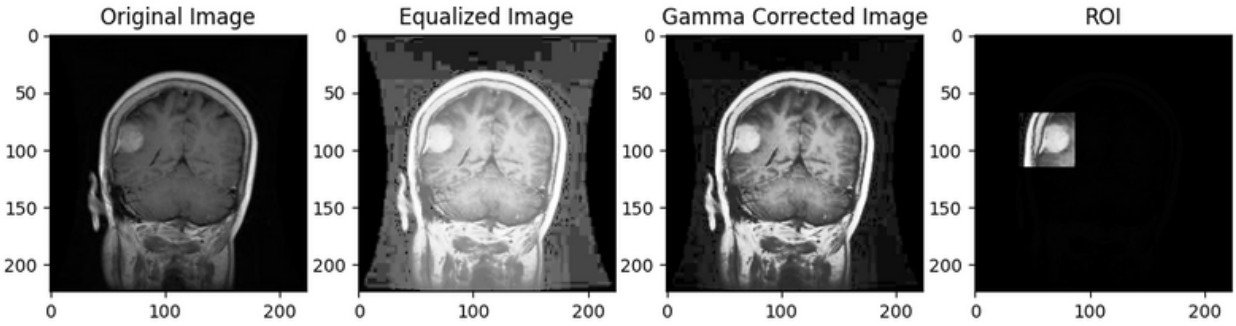

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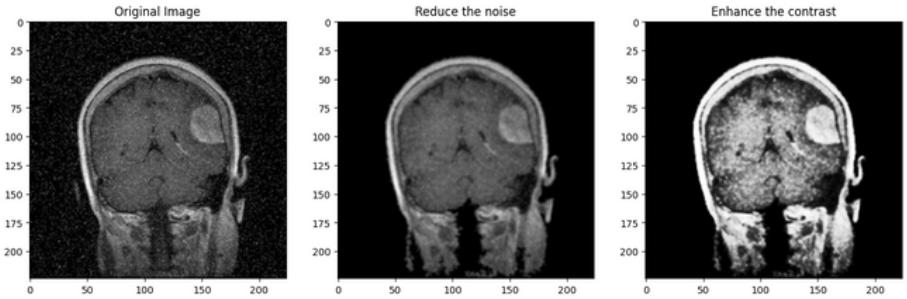

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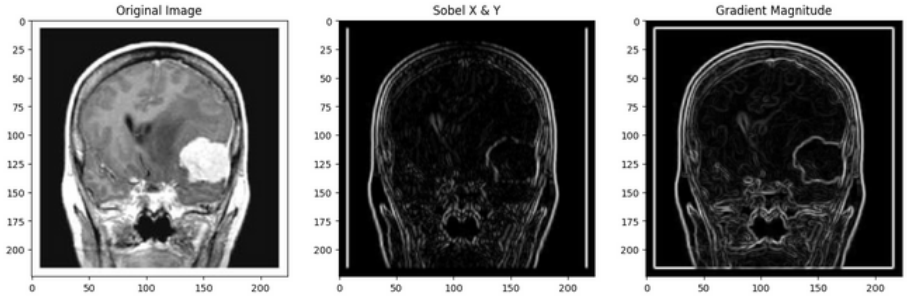

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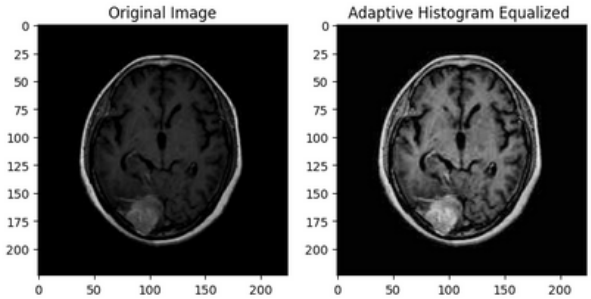
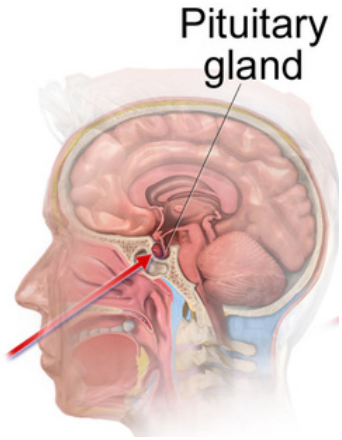
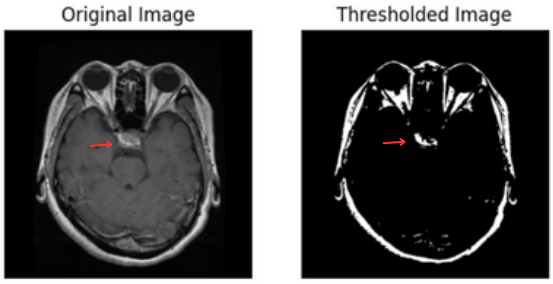


Pituitary

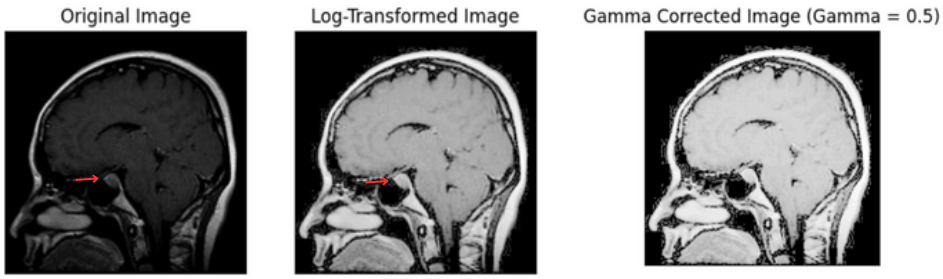


A pituitary tumor is an abnormal growth occurring in the pituitary gland, a small but crucial gland at the base of the brain. These tumors may be benign, meaning they are not cancerous, or malignant, meaning they are, in rare instances. The symptoms might include headaches, eye problems, and hormonal abnormalities, and they vary depending on the size and hormone release of the tumor. Treatment strategies range from drugs to surgery, thus a customized strategy created in consultation with medical experts is required (Pituitary Tumors – Symptoms and Treatment, n.d.).

- Image 1



- Image 2

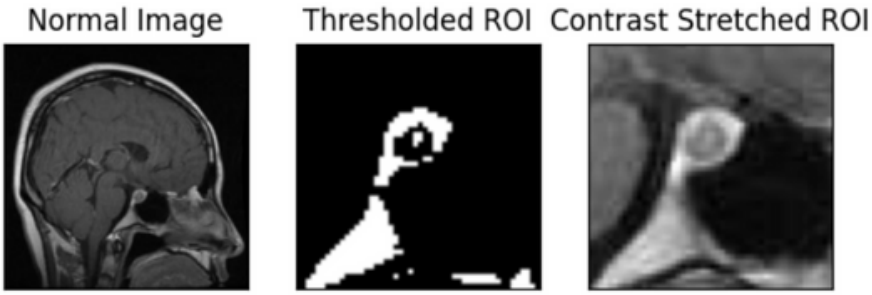


نسوي multitrsh احسن من اللوق بيوضحها

- Image 3

نسوي ماسك

- Image 4



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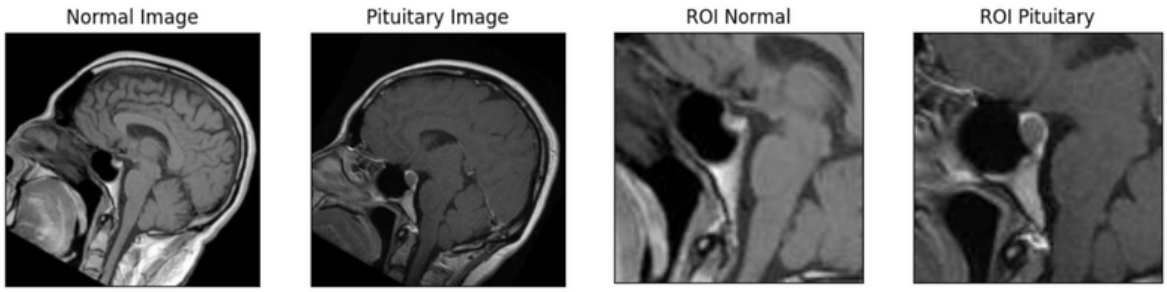
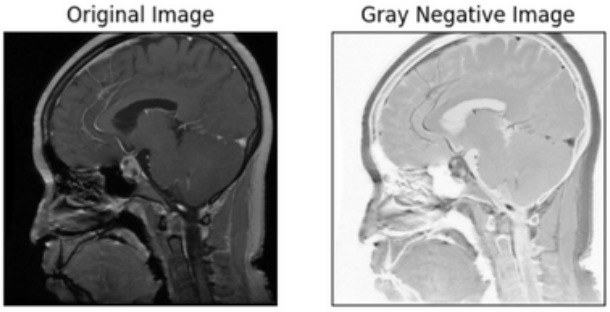


مينونه دي مره كويسة

- Image 6

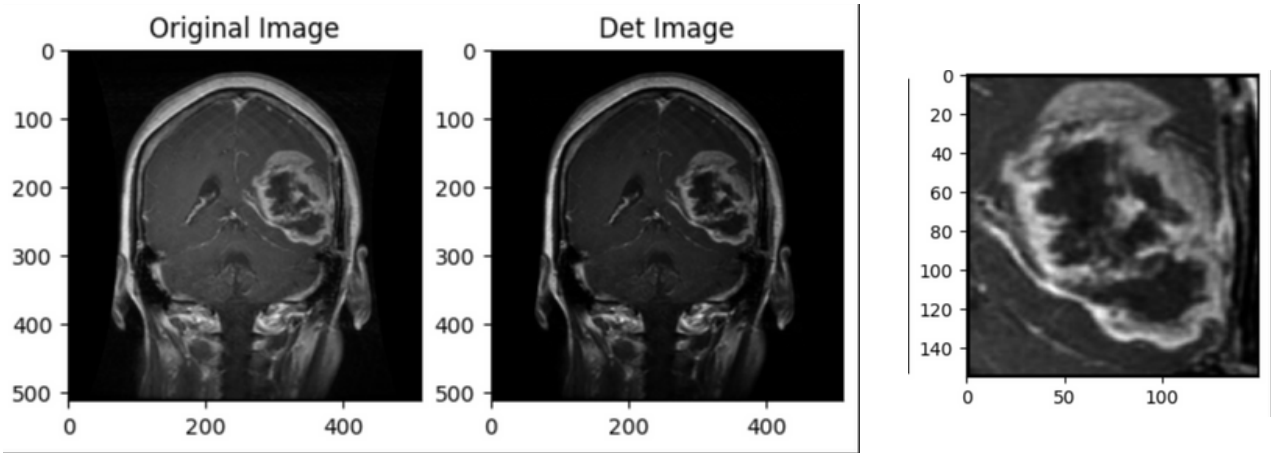
نسوي ماسك

- Image 7



قالت القديمة اوضح

- Image 1



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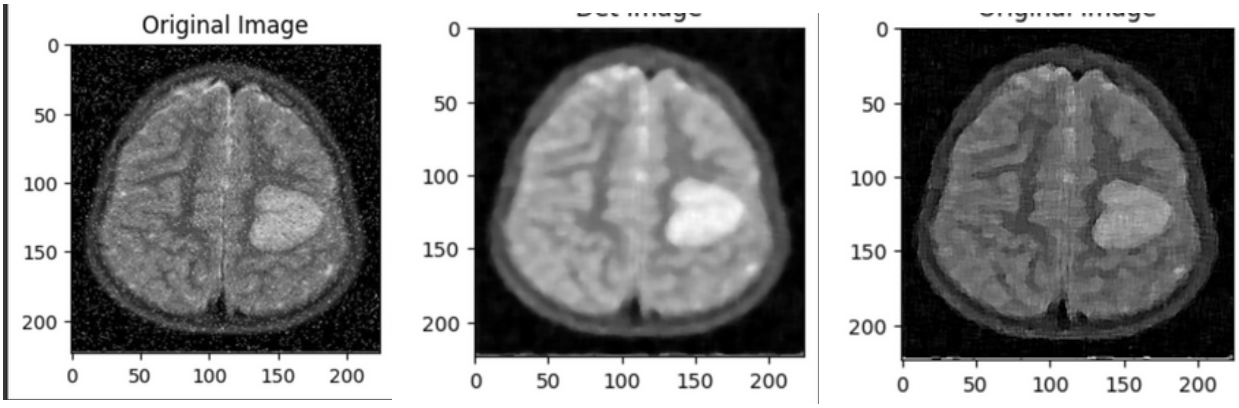

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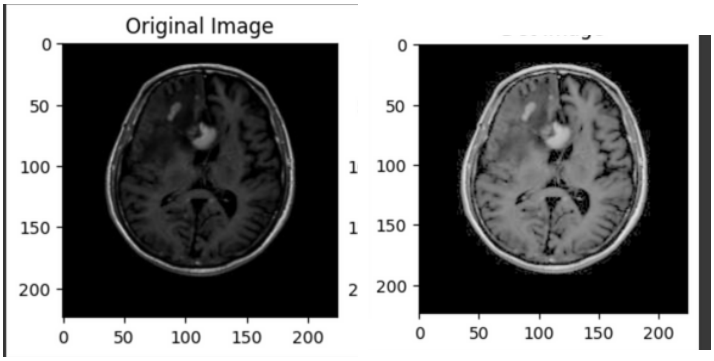

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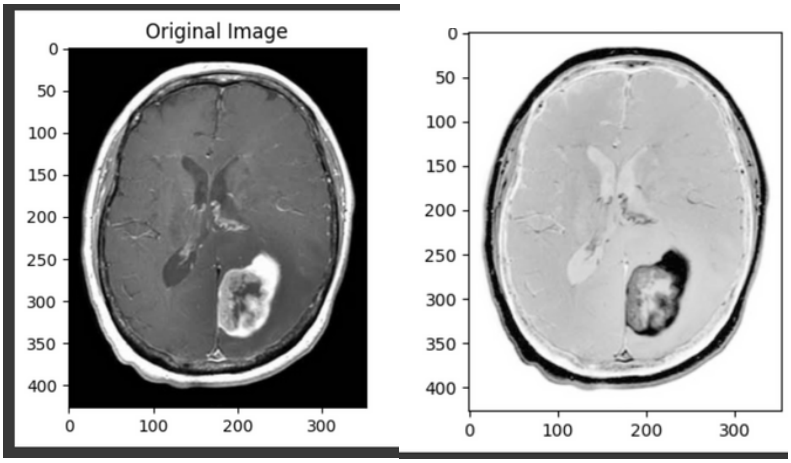

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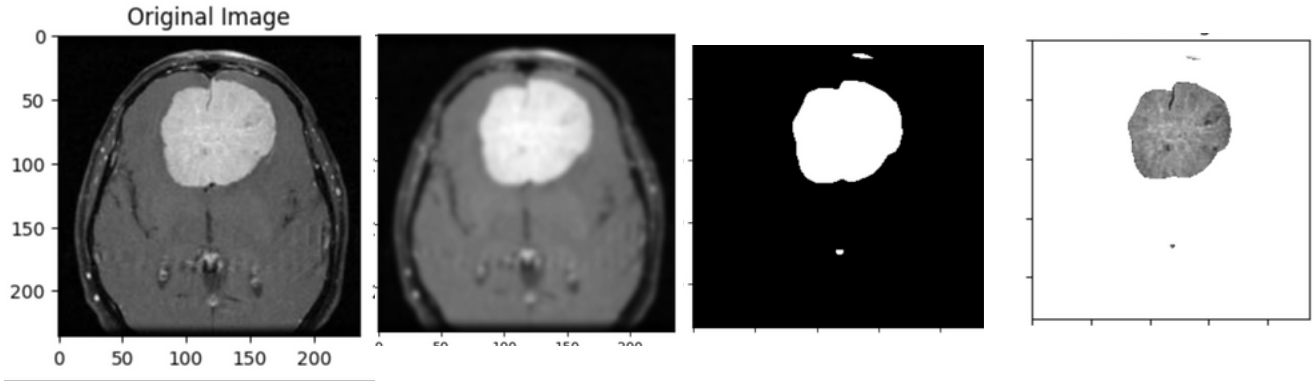

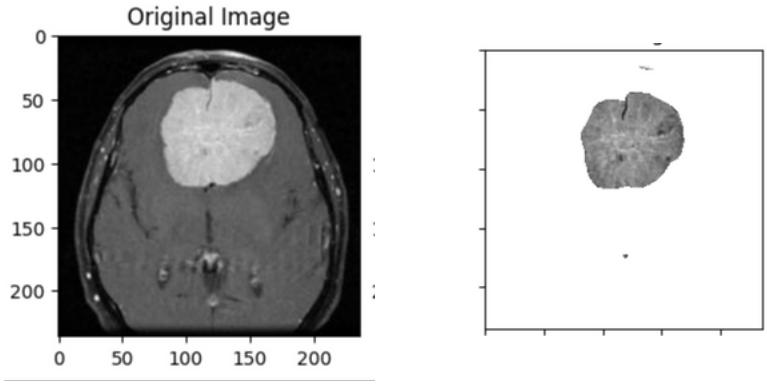

| References

- **Hashemi, M. H. (2023, July 16). Crystal Clean: Brain tumors MRI dataset. Kaggle. https://www.kaggle.com/datasets/mohammadhossein77/brain-tumors-dataset**
- **Meningiomas – Classifications, Risk Factors, Diagnosis and Treatment. (n.d.). https://www.aans.org/en/Patients/Neurosurgical-Conditions-and-Treatments/Meningiomas**