CASE STUDY

1. Problem Statement

The manual interpretation of brain MRIs is prone to human fatigue and inter-observer variability. There is an urgent need for an AI-driven triage tool that can accurately classify Glioma, Meningioma, and Pituitary tumors while maintaining a low computational footprint for hospital infrastructure.

2. Data Preprocessing & Development

- **CLAHE Enhancement:** We implemented a custom YUV-based CLAHE filter. This separates the brightness channel to enhance contrast without altering the color-space features, which improved edge detection for Meningiomas.
- **Model Selection:** MobileNetV2 was chosen for its **Inverted Residual Blocks**. By unfreezing the top 40 layers, we allowed the model to fine-tune its high-level filters to the specific morphology of brain tumors.

3. Recommendations

1. **Deployment:** Implement Att-MobileNet as a "First Responder" system that automatically flags high-probability tumor scans for immediate review.
2. **Scalability:** The model's small size makes it ideal for **Edge Deployment** on mobile health units in rural or underserved areas.