**"AI-Based Medical Diagnosis: Brain Tumor Detection"**

A Project Report

submitted in partial fulfillment of the requirements

of

AICTE Internship on AI: Transformative Learning

with

TechSaksham – A joint CSR initiative of Microsoft & SAP

by

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**ACKNOWLEDGEMENT**

I would like to take this opportunity to express our deep sense of gratitude to all individuals who helped us directly or indirectly during this project work.

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This project has been a remarkable learning experience, allowing me to deepen my understanding of artificial intelligence in a practical hands on manner. The mentorship and insightful feedback I received at every stage helped me navigate through the complexities of data preprocessing, model training, fine-tuning, and deployment. With their expertise and motivation, I was able to grasp new concepts, enhance my problem-solving skills, and apply theoretical knowledge to real-world scenarios.

I am deeply thankful for the encouragement and motivation that pushed me to challenge myself and explore AI in a meaningful way. This experience has not only enhanced my technical skills but also instilled confidence in my ability to work on advanced AI applications. I am truly grateful for this learning opportunity and the unwavering support that made this journey both enriching and inspiring.

#### **ABSTRACT**

Brain tumors are a serious medical condition that requires early detection for effective treatment. Traditional diagnosis methods, such as MRI scans analyzed by radiologists, can be time-consuming and prone to human error. This project aims to develop an AI-based Brain Tumor Detection system using deep learning to assist in the early and accurate identification of brain tumors from MRI images.

The primary objective of this project is to build a computer vision model that can classify brain MRI scans into four categories: glioma, meningioma, pituitary tumor, and no tumor. The project utilizes the ResNet-50 convolutional neural network (CNN) for feature extraction and classification. Various techniques such as data augmentation, transfer learning, and fine-tuning were applied to improve model performance. The model was trained and evaluated using the Brain Tumor MRI dataset, ensuring robust accuracy across different tumor types.

The system was implemented using TensorFlow and Keras for model training, with Flask used for deployment. A user-friendly web interface was developed, allowing users to upload MRI images through drag-and-drop or file upload options for real-time predictions. The interface was designed using HTML, CSS, and JavaScript, making it accessible and easy to use.

The final trained model achieved high accuracy and F1-score, demonstrating its effectiveness in classifying brain tumors. The project successfully showcases how AI and deep learning can be leveraged to enhance medical diagnosis. In conclusion, this AI-based approach provides a reliable decision-support tool for healthcare professionals, improving diagnostic accuracy and potentially aiding in early disease detection.

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**CHAPTER 1**

**Introduction**

* 1. **Problem Statement:**

Describe the problem being addressed. Why is this problem significant?

* 1. **Motivation:**

Why was this project chosen? What are the potential applications and the impact?

* 1. **Objective:**

Clearly state the objectives of the project.

* 1. **Scope of the Project:**

Define the scope and limitations.

**CHAPTER 2**

**Literature Survey**

* 1. **Review relevant literature or previous work in this domain.**
  2. **Mention any existing models, techniques, or methodologies related to the problem.**
  3. **Highlight the gaps or limitations in existing solutions and how your project will address them.**

**CHAPTER 3**

**Proposed Methodology**

* 1. **System Design**

Provide the diagram of your Proposed Solution and explain the diagram in detail.

* 1. **Requirement Specification**

Mention the tools and technologies required to implement the solution.

* + 1. **Hardware Requirements:**
    2. **Software Requirements:**

**CHAPTER 4**

**Implementation and Result**

* 1. **Snap Shots of Result:**

Kindly provide 2-3 Snapshots which showcase the results and output of your project and after keeping each snap explain the snapshot that what it is representing.

* 1. **GitHub Link for Code:**

**CHAPTER 5**

**Discussion and Conclusion**

* 1. **Future Work:**

Provide suggestions for improving the model or addressing any unresolved issues in future work.

* 1. **Conclusion:**

Summarize the overall impact and contribution of the project.

**REFERENCES**

1. Ming-Hsuan Yang, David J. Kriegman, Narendra Ahuja, “Detecting Faces in Images: A Survey”, IEEE Transactions on Pattern Analysis and Machine Intelligence, Volume. 24, No. 1, 2002.