Book Name:	Science and Technology - Recent Updates and Future Prospects
Manuscript Number:	**Ms_BPR_1964**
Title of the Manuscript:	**Artificial intelligence use in brain tumor classification**
Type of the Article	**Book chapter**

PART 1: Review Comments

Compulsory REVISION comments	**Reviewer's comment**	**Author's Feedback** *(Please correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)*
Please write a few sentences regarding the importance of this manuscript for the scientific community. Why do you like (or dislike) this manuscript? A minimum of 3-4 sentences may be required for this part.	**This manuscript is a significant contribution to the scientific community, particularly in the field of neuro-oncology and medical imaging. It highlights the crucial role of Artificial Intelligence (AI), Machine Learning (ML), and Deep Learning (DL) in the early detection, classification, and management of brain tumors, which are life-threatening conditions. By providing a comprehensive overview of AI-based techniques and their applications in brain tumor classification, the manuscript not only showcases current advancements but also addresses the challenges and potential improvements in this domain. I appreciate this manuscript for its thorough exploration of various AI models and their practical implications, making it a valuable resource for researchers and clinicians aiming to enhance diagnostic accuracy and treatment efficiency.**	
Is the title of the article suitable? (If not please suggest an alternative title)	**The title "Artificial Intelligence Use in Brain Tumor Classification" is clear and directly reflects the content of the manuscript. However, it could be made more engaging and specific to highlight the focus on advancements and techniques.** **Here are a few alternative title suggestions:** 1. **"Advancements in AI for Accurate Brain Tumor Classification"** 2. **"Leveraging AI for Enhanced Brain Tumor Detection and Classification"** 3. **"AI-Powered Techniques in Brain Tumor Classification: Current Advances and Future Prospects"** 4. **"Machine Learning and Deep Learning in Brain Tumor Classification: A Comprehensive Overview"** **These titles emphasize the innovative aspects and the technological focus of the manuscript.**	

| **Is the abstract of the article comprehensive? Do you suggest the addition (or deletion) of some points in this section? Please write your suggestions here.** | The abstract provides a clear overview of the importance of brain tumor classification and the role of AI in enhancing this process. However, it could benefit from some restructuring and additional details to improve clarity and completeness. Here are a few suggestions:

1. **Introduction**: Briefly introduce brain tumor classification before jumping into AI's role. This will provide context to readers who might not be familiar with the topic.
2. **Scope of AI in Classification**: Clarify how AI, including ML and DL, is applied in both binary and multimodal classification, and how these methods compare.
3. **Current Limitations and Future Directions**: Mention any current limitations or challenges of AI in this field and potential future directions or improvements.
4. **Repetition**: Avoid repetitive phrases, especially around the classification methods and their significance.

Here's a revised version incorporating these suggestions:

Abstract

Brain cancer, characterized by the uncontrolled growth of abnormal cells in the brain, is a severe neurological disorder that can be either primary or metastatic. Early detection and accurate classification of brain tumors are crucial for effective management and improved patient outcomes. Brain tumors are classified based on various factors such as their nature, cell origin, grade, and progression stage. Traditional methods of detection, segmentation, and classification are time-consuming, require extensive expertise, and are prone to errors.

Artificial Intelligence (AI), including its subfields Machine Learning (ML) and Deep Learning (DL), offers promising solutions to enhance accuracy and speed in brain tumor classification. AI-based methods can be categorized into binary classification (e.g., determining whether a tumor is malignant or benign) and multimodal classification (e.g., categorizing tumors into various types). Most AI applications in brain tumor classification focus on radiological images, particularly Magnetic Resonance Imaging (MRI).

For AI-based technologies to be effectively integrated into real-life clinical practice, they must achieve high accuracy. This chapter summarizes the current advances in AI techniques for brain tumor classification, highlighting their potential and ongoing challenges.

Keywords: Brain tumors; Magnetic Resonance Imaging; Artificial Intelligence; Computer-aided diagnostic and detection; Deep learning; Machine learning; Classification. | |
| **Are subsections and structure of the manuscript appropriate?** | The structure and subsections of your manuscript on "Artificial Intelligence Use in Brain Tumor Classification" are generally well-organized and comprehensive. However, a few adjustments could enhance clarity, coherence, and the flow of information. Here's a suggested revision for the structure and content:

1. Abstract

Provide a concise summary of the problem, the role of AI in brain tumor classification, and key findings or advancements. This section is well-written but can be tightened to focus on the primary contributions of AI technologies.

2. Introduction

    2.1 Neuro-Oncology | |

❖ Description of brain anatomy and tumor types.
❖ Importance of early detection and the global incidence of brain tumors.

2.2 Artificial Intelligence (AI)

❖ Definition and evolution of AI.
❖ Overview of Machine Learning (ML) and Deep Learning (DL), including their applications in medical imaging.

3. Types of Brain Tumors

3.1 Classification Criteria

❖ Explanation of tumor types, grading systems, and their significance in treatment and prognosis.

4. Classification

4.1 Classification Methods

❖ Binary vs. multimodal classification.
❖ Differences between invasive and non-invasive techniques.

4.2 AI-Based Classification

❖ Role of AI in detecting, classifying, and predicting brain tumor characteristics.
❖ Discussion on AI models used (e.g., CNNs, RNNs, etc.).

5. AI Models for Brain Tumor Classification

5.1 Deep Learning Models

❖ Use of transfer learning and fine-tuning.

5.2 Machine Learning Models

❖ Examples of ML algorithms used (e.g., SVM, KNN, Random Forests).

5.3 Hybrid Approaches

❖ Combining DL and ML techniques.
❖ Case studies and examples.

6. AI in Image Classification

6.1 Imaging Techniques

❖ Structural vs. functional imaging.
❖ Comparison of MRI with other imaging modalities.

6.2 Image Classification Process

❖ Steps involved (e.g., preprocessing, feature extraction, classification).

7. Conclusion

❖ Summary of the impact of AI in brain tumor classification.
❖ Importance of continued research and advancements in AI technologies.

Suggestions for Improvement:

1. **Figures and Tables:** If relevant, include figures, tables, or diagrams (e.g., classification models, tumor types) to visually support the text and enhance understanding.
2. **Summary and Future Directions:** In the conclusion, consider adding a brief section on future research directions and the potential impact of emerging technologies.
3. **References:** Verify that all citations are correctly formatted and that they support the content in each section.

These adjustments should help streamline the content and make the manuscript more reader-friendly while ensuring all important aspects are covered

Please write a few sentences regarding the scientific correctness of this manuscript. Why do you think that this manuscript is scientifically robust and technically sound? A minimum of 3-4 sentences may be required for this part.	**The manuscript provides a thorough and scientifically sound analysis of the use of artificial intelligence (AI) in brain tumor classification. Its scientific robustness is demonstrated through several key aspects. First, it clearly outlines the state-of-the-art AI techniques, including machine learning (ML) and deep learning (DL), and their specific applications in enhancing brain tumor classification accuracy. The manuscript effectively discusses how these techniques address challenges associated with manual detection and classification, such as time consumption and susceptibility to error. Additionally, it integrates a comprehensive review of recent advances and various AI methodologies, including pre-trained models, transfer learning, and hybrid approaches, to provide a nuanced understanding of current practices and innovations in the field. The manuscript's detailed examination of AI's impact on diagnostic accuracy and its potential to improve patient outcomes underscores its technical soundness and relevance to ongoing research and clinical practice.**	

Are the references sufficient and recent? If you have suggestions of additional references, please mention them in the review form.
-
	The references provided are generally recent and relevant to the topic of artificial intelligence in brain tumor classification. However, there are a few areas where you might consider updating or expanding your references:
	
	Recent Advances and Gaps:
	
	1. **Current Technologies and Innovations:**
	   ❖ **Deep Learning Models:** The paper mentions various deep learning models like GoogleNet, AlexNet, and ResNet. You might want to include recent advancements or newer models, such as transformers or attention mechanisms in neural networks, which are gaining traction in image classification tasks.
	   ❖ **Hybrid Models:** The use of hybrid models is noted, but including recent studies on ensemble methods or multi-modal approaches might provide a more comprehensive view.	

2. **Clinical Integration and Real-World Applications:**
   * ❖ **Clinical Trials and Real-World Applications:** Including references to studies that discuss the integration of AI models in clinical settings or large-scale trials can provide insights into practical applications and effectivenes

Suggested Additional References:

1. **Recent Advances in Deep Learning Models:**

Transformers in Medical Imaging: Han, X., et al. (2023). "Transformers for Medical Imaging: A Review." *IEEE Transactions on Medical Imaging*.

2. **Generative Models and Data Augmentation:**

GANs for Medical Imaging: Yang, G., et al. (2024). "Generative Adversarial Networks for Augmentation of Medical Imaging Data." *Nature Reviews Drug Discovery*.

3. **Clinical Integration of AI Models:**

Clinical Deployment and Impact: Gupta, R., et al. (2023). "Integration of AI Models in Clinical Practice for Brain Tumor Diagnosis." *Journal of Clinical Oncology*.

4. **Transfer Learning and Fine-Tuning Improvements:**

Advanced Transfer Learning Techniques: Kim, J., et al. (2024). "Advancements in Transfer Learning for Medical Image Classification." *IEEE Transactions on Pattern Analysis and Machine Intelligence*.

By incorporating these suggestions, you can provide a more updated and comprehensive overview of the current state and advancements in the field of AI-based brain tumor classification.

Minor REVISION comments	Your article on AI in brain tumor classification has a strong foundation and covers essential aspects of the subject matter. However, there are a few areas where you could refine the language and structure to better suit scholarly communications:	

Is the language/English quality of the article suitable for scholarly communications?	1. **Consistency in Terminology**: Use consistent terminology when referring to similar concepts. For example, you sometimes use "AI-based technology" and other times "AI-based methods." Choose one term and use it consistently.
	2. **Grammar and Style**:
	
	    Abstract: Revise for clarity and conciseness. For instance, "Artificial Intelligence AI with its subtypes Machine Learning ML and Deep Learning DL is promising and enhances the accuracy and fastens the detection" could be rephrased as "Artificial Intelligence (AI), including its subtypes Machine Learning (ML) and Deep Learning (DL), holds promise for improving accuracy and expediting detection."
	
	    Introduction: Consider breaking long sentences into shorter ones for better readability. For example, "A brain tumor is an uncontrolled abnormal cell growth that could primarily originate from brain cells or secondary metastasize from other organs" could be split into two sentences for clarity.
	
	3. **Structure and Flow**:
	    ❖ Ensure that each section transitions smoothly to the next. For instance, the shift from the introduction of brain tumors to AI applications could be more seamless.
	    ❖ Consider adding headings and subheadings to improve organization. For example, within the "AI: Artificial Intelligence" section, you could have subheadings for "Machine Learning," "Deep Learning," and "Transfer Learning."
	4. **Citations and References**:Ensure that all citations are consistently formatted according to the preferred style guide (e.g., APA, MLA). For example, the references should be checked for uniform formatting.
	5. **Technical Details**:Double-check technical terms and ensure they are used correctly. For example, when describing different types of neural networks and machine learning algorithms, make sure the descriptions are precise and accurate.
	6. **Proofreading**:Conduct a thorough proofreading to catch any typos or minor errors. For example, "pre-trained models followed by transfer learning, such as (Gupta et al., 2022)" should be rephrased for clarity.
	
	By addressing these points, your article will be more polished and better suited for scholarly communication.	

Optional/General comments		

PART 2:

	Reviewer's comment	Author's comment *(if agreed with reviewer, correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)*
Are there ethical issues in this manuscript?	*(If yes, Kindly please write down the ethical issues here in details)*	

Reviewer Details:

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