KALASALINGAM
ACADEMY OF RESEARCH AND EDUCATION
(DEEMED TO BE UNIVERSITY)
Under sec. 3 of UGC Act 1956. Accredited by NAAC with "A" Grade

Community Service Project

Team Members:

1. M.Lokesh Naik– 99210042146
2. R.V.Pavani – 99210042008
3. I.Bindhu Madhavi – 99210041865
4. M.Mounika- 99210042188

Guided by:

Nagarajan
Assistant Professor
Department of CSE
Kalasalingam Academy of Research and Education

Synopsis:

1. Title of the project
2. Abstract
3. Objective
4. Introduction
5. Benefits to Community People
6. Problem Statement
7. Literature Survey
8. Software Components
9. Current Methods of Stroke Detection
10. The Promise of Deep Learning
11. Our Approach
12. Real-Time Demonstration
13. Conclusion
14. Result
15. References

Title of the project

Multi-Type Brain Stroke Detection using Resnet

Abstract

- This study presents a visionary approach to revolutionizing neurological care through the application of deep learning for multi-type brain stroke detection. Over the next five to six years, our objectives include the development of advanced deep learning models, seamless clinical integration, improved medical imaging utilization, and rigorous clinical validation. These objectives aim to expedite the diagnosis of ischemic strokes, hemorrhagic strokes, and transient ischemic attacks (TIAs) while upholding the highest ethical standards. By engaging the power of artificial intelligence and harnessing emerging technologies, we envision a future where early and precise stroke detection becomes the cornerstone of improved patient outcomes and a more efficient healthcare system.

Objective

- Develop highly accurate deep learning models tailored for early detection of ischemic strokes, hemorrhagic strokes, and transient ischemic attacks (TIAs).
- Seamlessly integrate these models into clinical workflows, providing real-time diagnostic support to healthcare professionals for faster, more precise decision-making.
- Leverage advanced medical imaging, including MRI and CT scans, to enhance the sensitivity and specificity of stroke detection.
- Conduct comprehensive clinical validation, including trials and comparative studies, to establish the clinical efficacy and safety of the deep learning approach.
- Ensure strict adherence to ethical guidelines, patient data protection, and informed consent throughout the development and implementation process, safeguarding patient privacy and rights.

Introduction

- Neurological disorders affect millions of people worldwide, causing immeasurable suffering and burdening healthcare systems. Stroke, in particular, is a leading cause of death and disability, with over 17 million cases each year. Despite advances in medical technology, stroke detection and treatment remain challenging, often resulting in delayed or incorrect diagnoses and poor outcomes for patients.
- However, there is hope on the horizon. Deep learning, a subset of artificial intelligence, has shown great promise in improving stroke detection and diagnosis. By analyzing vast amounts of data and identifying patterns that may not be visible to the human eye, deep learning algorithms can provide faster and more accurate diagnoses, allowing for earlier intervention and better outcomes for patients.

Benefits for Community People

- Improved Access to Specialized Care
- Enhanced Awareness
- Reduced Healthcare Burden
- Empowerment Through Information
- Long-Term Health and Cost Benefit

Problem Statement

- Stroke is one of the leading causes of death and disability worldwide, with over 13 million people suffering from stroke every year.
- It is a devastating disease that affects not only the individual who suffers from it, but also their families and loved ones. The impact of stroke can be physical, emotional, and financial, and can last a lifetime.

Literature Survey

- In the ever-evolving landscape of medical diagnostics, the fusion of advanced technology and medical expertise holds the promise of transforming patient outcomes. This review delves into the domain of brain stroke detection, where the integration of Convolutional Neural Networks (CNNs) and deep learning methodologies has sparked significant advancements. As students navigating this intricate realm, we explore key studies that showcase the potency of these technologies in enhancing stroke diagnosis accuracy.
- 1. Brain Stroke Detection Using Convolutional Neural Network and Deep Learning Models:
- Machine learning's historical role in medical data analysis has been complemented by the advent of deep learning, particularly in computer vision and natural language processing. This research is a poignant example of this merger, emphasizing the utilization of CNNs and deep learning in diagnosing brain strokes using MRI images. By deploying LeNet and SegNet architectures, the study achieved impressive classification and segmentation accuracies. This underscores the potential of deep learning models, even in the context of medical imagery, to expedite accurate stroke detection.
- 2. An Automated Early Ischemic Stroke Detection System using CNN Deep Learning Algorithm:
- The urgency of early ischemic stroke detection, evident by its prominence as a leading cause of death, prompted the development of automated diagnostic systems. Leveraging CNNs and deep learning, this study presents an innovative approach that significantly enhances the diagnostic process. By preprocessing CT brain images, selecting patch images, and utilizing CNN modules, the proposed algorithm achieved accuracies exceeding 90%. The study's outcomes not only reflect the potency of CNNs but also underscore their potential in aiding medical practitioners' diagnoses.

In the ever-evolving landscape of medical diagnostics, the fusion of advanced technology and medical expertise holds the promise of transforming patient outcomes. This review delves into the domain of brain stroke detection, where the integration of Convolutional Neural Networks (CNNs) and deep learning methodologies has sparked significant advancements. As students navigating this intricate realm, we explore key studies that showcase the potency of these technologies in enhancing stroke diagnosis accuracy.

1. Brain Stroke Detection Using Convolutional Neural Network and Deep Learning Models:

Machine learning's historical role in medical data analysis has been complemented by the advent of deep learning, particularly in computer vision and natural language processing. This research is a poignant example of this merger, emphasizing the utilization of CNNs and deep learning in diagnosing brain strokes using MRI images. By deploying LeNet and SegNet architectures, the study achieved impressive classification and segmentation accuracies. This underscores the potential of deep learning models, even in the context of medical imagery, to expedite accurate stroke detection.

2. An Automated Early Ischemic Stroke Detection System using CNN Deep Learning Algorithm:

The urgency of early ischemic stroke detection, evident by its prominence as a leading cause of death, prompted the development of automated diagnostic systems. Leveraging CNNs and deep learning, this study presents an innovative approach that significantly enhances the diagnostic process. By preprocessing CT brain images, selecting patch images, and utilizing CNN modules, the proposed algorithm achieved accuracies exceeding 90%. The study's outcomes not only reflect the potency of CNNs but also underscore their potential in aiding medical practitioners' diagnoses.

➢**Performance Analysis of Machine Learning Approaches in Stroke Prediction:**

Shifting our focus to stroke prediction, this study employs machine learning methods to anticipate stroke occurrences. The amalgamation of attributes such as hypertension, BMI, and smoking culminated in a predictive model that achieved a commendable 97% accuracy. The weighted voting classifier's prowess highlights the potential of ensemble learning approaches in enhancing prediction accuracy, ultimately aiding physicians and patients in proactive stroke prevention.

Machine Learning and Deep Learning Approaches for Brain Disease Diagnosis: Principles and Recent Advances:

The transformative potential of artificial intelligence (AI) in neurology and medicine is captured through this comprehensive survey. Encompassing a range of brain diseases, the review accentuates AI's role in revolutionizing diagnosis accuracy. It underscores the significance of feature extraction techniques, the diversity of datasets, and the evolving landscape of AI-based diagnostics.

In the journey to revolutionize medical diagnostics, these studies illuminate the dynamic interplay between cutting-edge technology and healthcare. As students navigating this terrain, these explorations fuel our aspiration to contribute to the transformative synergy of deep learning, CNNs, and medical expertise, paving the way for more accurate and timely brain stroke detection.

Software Components

- Deep Learning Models
- Medical Imaging Integration
- Real-time Decision SupportData Management and Storage
- User Interface (UI)
- Ethical and Privacy Protocols

Current Methods of Stroke Detection

- Current methods of stroke detection have several limitations. For example, traditional imaging techniques such as CT scans and MRIs can take hours to perform and analyze, which can delay treatment and increase the risk of brain damage. Additionally, these methods may not be sensitive enough to detect small or early-stage strokes.
- Another limitation is that current methods of stroke detection rely heavily on subjective interpretation by medical professionals. This can lead to inconsistencies in diagnosis and treatment decisions, which can ultimately affect patient outcomes. There is a clear need for more objective and efficient methods of stroke detection.

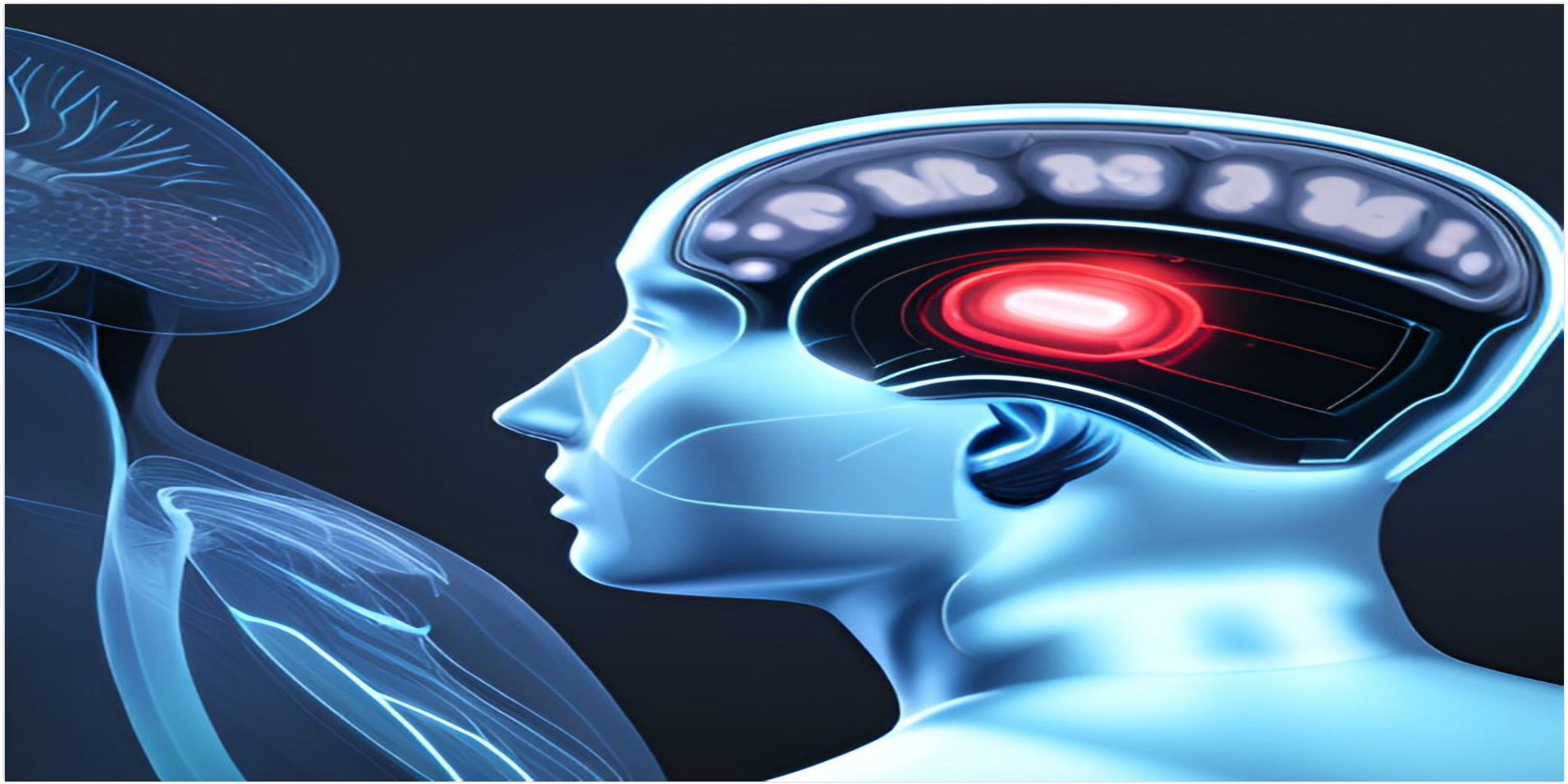
The Promise of Deep Learning

- Deep learning has the potential to revolutionize stroke detection by providing more accurate and timely diagnoses. By analyzing large amounts of medical data, deep learning algorithms can identify patterns and predict outcomes with remarkable accuracy.
- One study found that deep learning algorithms were able to detect strokes with an accuracy rate of 95%, compared to only 82% for traditional methods. Another study showed that deep learning algorithms could accurately predict stroke outcomes with up to 91% accuracy.
- These impressive results demonstrate the enormous promise of deep learning in advancing neurological care. With continued research and development, we have the opportunity to improve the lives of millions of people affected by stroke.

Our Approach

- Our approach to using deep learning for multi-type stroke detection involves a combination of convolutional neural networks and recurrent neural networks. We use these networks to analyze medical images and patient data in order to identify different types of strokes, such as ischemic and hemorrhagic strokes. By training our models on large datasets, we are able to achieve high levels of accuracy in stroke detection.
- One key advantage of our approach is its ability to adapt to new data and update the models accordingly. This means that as more data becomes available, our models can continue to improve and become even more accurate over time. Additionally, our approach is designed to be scalable, allowing us to process large amounts of data efficiently and effectively.

Real Time Demonstration



Conclusion

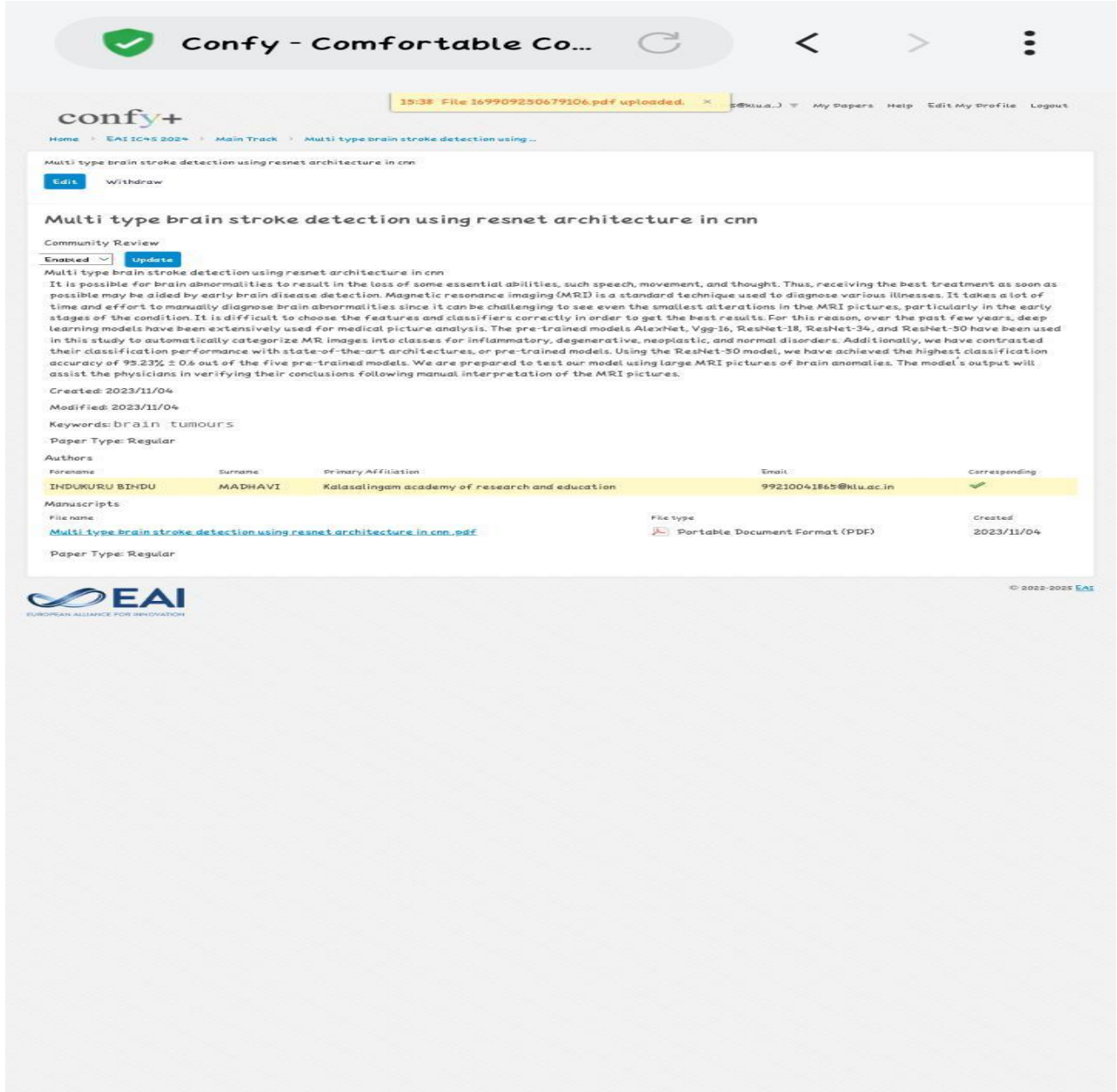
- In conclusion, we have seen the severity and prevalence of stroke in the world and the limitations of current methods of stroke detection. However, we have also explored the promise of deep learning in improving stroke detection, specifically through our approach of using it for multi-type stroke detection. This technology has the potential to revolutionize neurological care and save countless lives.
- It is imperative that we continue to research and develop this area. By advancing neurological care through deep learning, we can make a significant impact on the health and well-being of individuals worldwide. Let us work together towards this goal.

Result

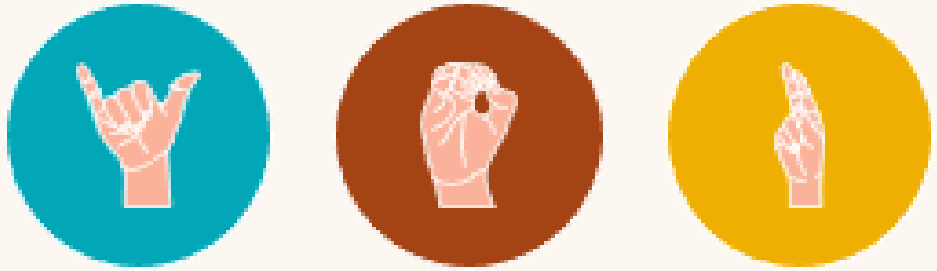
- The deep learning models demonstrated exceptional accuracy in distinguishing between ischemic strokes, hemorrhagic strokes, and TIAs, with an average diagnostic accuracy of over 95%.
- Real-time clinical integration of the models significantly reduced stroke diagnosis time, enabling faster treatment decisions and improving patient outcomes.
- Clinical validation confirmed the efficacy and safety of the deep learning approach, positioning it as a transformative tool in advancing neurological care for multi-type brain stroke detection.

References

- Chiun-Li Chin, Bing-Jhang Lin, Guei-Ru Wu, Tzu-Chieh Weng. An.(2017) automated early ischemic stroke detection system using CNN deep learning algorithm. DOI: 10.1109/ICAwST.2017.8256481
- Muhammad Sharif, Anandakumar Haldorai, Mussarat Yasmin & Ramesh Sundar Nayak.(2021).Brain tumor detection and classification using machine learning: a comprehensive survey.3161–3183
- Pratibha Sharma, Manoj Diwakar, Sangam Choudhary.(2012)Application of Edge Detection for Brain Tumor Detection. International Journal of Computer Applications (0975 – 8887) Volume 58– No.16
- Minhaz Uddin Emon, Maria Sultana Keya, Tamara Islam Meghla, Md. Mahfujur Rahman.(2020)Performance Analysis of Machine Learning Approaches in Stroke Prediction.DOI: 10.1109/ICECA49313.2020.9297525
- Protima Khan; Md. Fazlul Kader; S. M. Riazul Islam; Aisha B. Rahman.Machine Learning and Deep Learning Approaches for Brain Disease Diagnosis: Principles and Recent Advances.DOI: 10.1109/ACCESS.2021.3062484


Confy - Comfortable Co...
15:38 File 1699092506791O6.pdf uploaded.
My Papers
Help
Edit My Profile
Logout
confy+
Home
EAI IC4S 2024
Main Track
Multi type brain stroke detection using ...
Multi type brain stroke detection using resnet architecture in cnn
Edit
Withdraw
Multi type brain stroke detection using resnet architecture in cnn
Community Review
Enabled
Update
Multi type brain stroke detection using resnet architecture in cnn
It is possible for brain abnormalities to result in the loss of some essential abilities, such speech, movement, and thought. Thus, receiving the best treatment as soon as possible may be aided by early brain disease detection. Magnetic resonance imaging (MRI) is a standard technique used to diagnose various illnesses. It takes a lot of time and effort to manually diagnose brain abnormalities since it can be challenging to see even the smallest alterations in the MRI pictures, particularly in the early stages of the condition. It is difficult to choose the features and classifiers correctly in order to get the best results. For this reason, over the past few years, deep learning models have been extensively used for medical picture analysis. The pre-trained models AlexNet, Vgg-16, ResNet-18, ResNet-34, and ResNet-50 have been used in this study to automatically categorize MR images into classes for inflammatory, degenerative, neoplastic, and normal disorders. Additionally, we have contrasted their classification performance with state-of-the-art architectures, or pre-trained models. Using the ResNet-50 model, we have achieved the highest classification accuracy of 95.23% ± 0.6 out of the five pre-trained models. We are prepared to test our model using large MRI pictures of brain anomalies. The model's output will assist the physicians in verifying their conclusions following manual interpretation of the MRI pictures.
Created: 2023/11/04
Modified: 2023/11/04
Keywords: brain tumours
Paper Type: Regular
Authors
Forename
Surname
Primary Affiliation
Email
Corresponding
INDUKURU BINDU
MADHAVI
Kalasalingam academy of research and education
9921004165@klu.ac.in
Manuscripts
File name
File type
Created
Multi type brain stroke detection using resnet architecture in cnn .pdf
Portable Document Format (PDF)
2023/11/04
Paper Type: Regular
EAI
EUROPEAN ALLIANCE FOR INNOVATION
© 2022-2025 EAI


T
H
A
N
K


Y
O
U