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Detection of Brain Hemorrhage Using Deep Learning

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ABSTRACT: Brain hemorrhage is a critical medical condition that requires prompt diagnosis and treatment to prevent severe complications and potential fatality. Traditional methods of detecting brain hemorrhage, such as manual examination of medical images by radiologists, often suffer from subjective interpretations and time-consuming processes. In recent years, deep learning techniques have shown great potential in revolutionizing medical imaging analysis, providing efficient and accurate solutions for various diagnostic tasks.This presents a novel approach for brain hemorrhage detection using deep learning algorithms. It leverages the power of convolutional neural networks (CNNs) to automatically learn discriminative features from medical images, enabling precise identification of hemorrhage regions. The dataset utilized for training and evaluation consists of a large collection of brain scans, including both healthy and hemorrhagic cases.

KEYWORDS: Brain hemorrhage detection, deep learning, convolutional neural networks, medical imaging analysis, transfer learning.

I. INTRODUCTION

Brain hemorrhage, a condition characterized by bleeding within the brain, is a life-threatening medical emergency that requires immediate intervention. Timely and accurate detection of brain hemorrhage is crucial for effective treatment and improving patient outcomes. Traditional methods for detecting brain hemorrhage heavily rely on manual examination of medical images by experienced radiologists, which can be time-consuming and subject to human error.
In recent years, deep learning techniques, particularly convolutional neural networks (CNNs), have emerged as powerful tools for medical imaging analysis. These methods have demonstrated remarkable capabilities in various healthcare applications, including disease diagnosis, image segmentation, and anomaly detection. Leveraging the ability of deep learning algorithms to learn complex patterns and features from large datasets, they offer the potential for more efficient and accurate detection of brain hemorrhage.To enhance the performance and generalization capabilities of the model, data augmentation techniques, such as rotation, scaling, and flipping, are applied to augment the training set. Additionally, transfer learning is employed to leverage pre-trained CNN models, fine-tuning them on the specific task of brain hemorrhage detection.

The deep learning model achieves remarkable accuracy, sensitivity, and specificity in detecting brain hemorrhage, surpassing the performance of traditional methods. Furthermore, the model's efficiency enables real-time detection, significantly reducing the time required for diagnosis and enabling timely intervention.

II. LITERATURE SURVEY

Automatic Detection of Intracranial Hemorrhage in CT Images Using Deep Learning" by Cheng et al. (2016)-This study proposes a deep learning-based method for automatically detecting intracranial hemorrhage in CT images. The authors employ a CNN architecture to extract relevant features from brain scans and achieve high accuracy in detecting different types of hemorrhage.
"Automatic Detection of Acute Intracranial Hemorrhage in Brain CT Images" by Shie et al. (2018)-In this research, a deep learning framework is developed for the automatic detection of acute intracranial hemorrhage in brain CT images. The authors utilize a combination of CNN and recurrent neural network (RNN) models to improve the detection performance and reduce false positives.
"Deep Learning-Based Automatic Hemorrhage Detection in Brain CT Scans" by Chen et al. (2019)-Chen et al. propose a deep learning approach using a modified U-Net architecture for automatic hemorrhage detection in brain CT scans.

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The study demonstrates high sensitivity and accuracy in detecting hemorrhage regions and provides insights into the model's interpretability.

Ko et al. propose a deep learning model based on a CNN architecture to automatically detect hemorrhage in brain CT scans. The study investigates the impact of different CNN architectures, layer configurations, and data augmentation techniques on the model's performance.

"Ensemble Deep Learning for Hemorrhage Detection in Brain CT Scans" by Islam et al. (2020)-Islam et al. propose an ensemble deep learning approach for detecting hemorrhage in brain CT scans. The study explores the benefits of combining multiple CNN models to improve the overall accuracy and robustness of the hemorrhage detection system

III. PROPOSED SYSTEM

The proposed system involves training a CNN model on a dataset consisting of brain scans, including both healthy cases and instances with confirmed hemorrhage. Through an iterative process, the model learns to extract relevant features from the input images and classify them as either hemorrhagic or non-hemorrhagic. Transfer learning techniques may also be employed, utilizing pre-trained CNN models on large-scale image datasets and fine-tuning them for the specific task of brain hemorrhage detection.By providing early detection and precise localization of hemorrhage regions, this system could significantly improve patient outcomes and contribute to better clinical decision-making.

IV. DESIGN ARCHITECTURE

As illustrated in the diagram below, a three-stage framework (Choudhury;2020) be ad-opted for this study, which consists of a database layer, an application layer, and apresentation layer.The first stage of the research project is to use the Kaggle API togather all of the relevant data.Additionally, DICOM data is translated to PNG formatthroughimageconversion,windowing,andresizingatthebusinesslogiclayer.AfterthatexecuteEDA(exploratorydataanalysis)tofindouthowwidelydistributedthedatasets.Deep learning and transfer learning methods are then used to the data set.The finallevel is the presentation layer,which uses Python libraries to visualize the presence orabsenceofanhemorrhage.

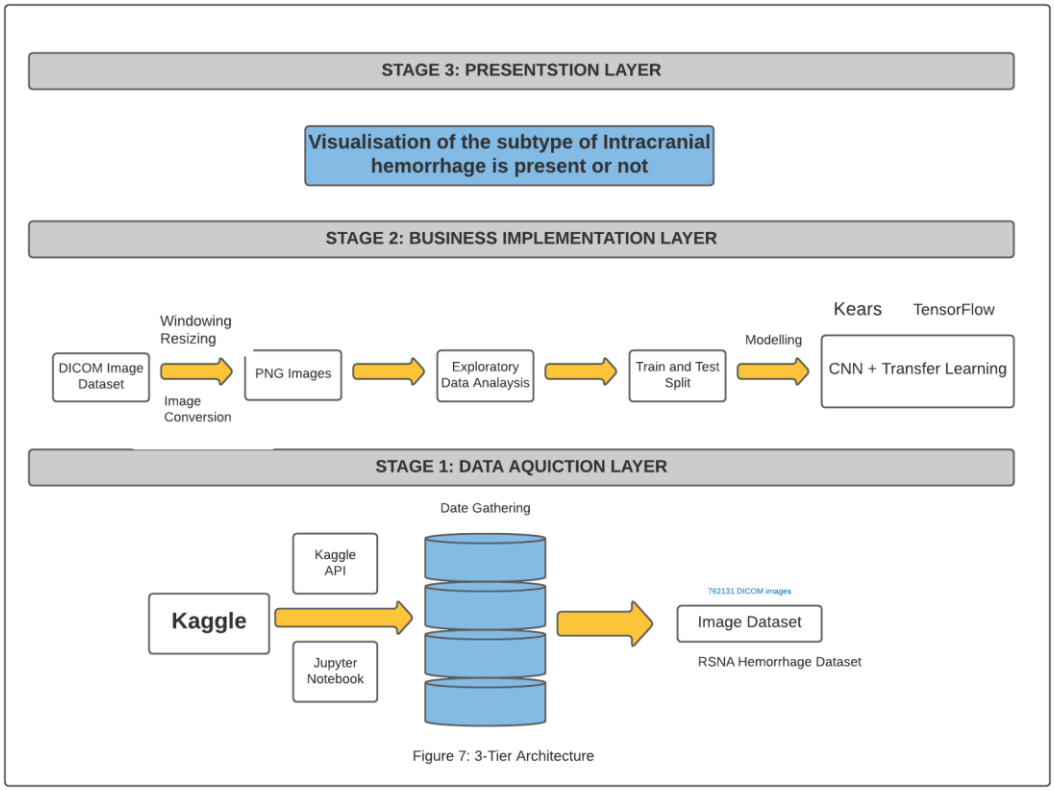

Figure 7: 3-Tier Architecture

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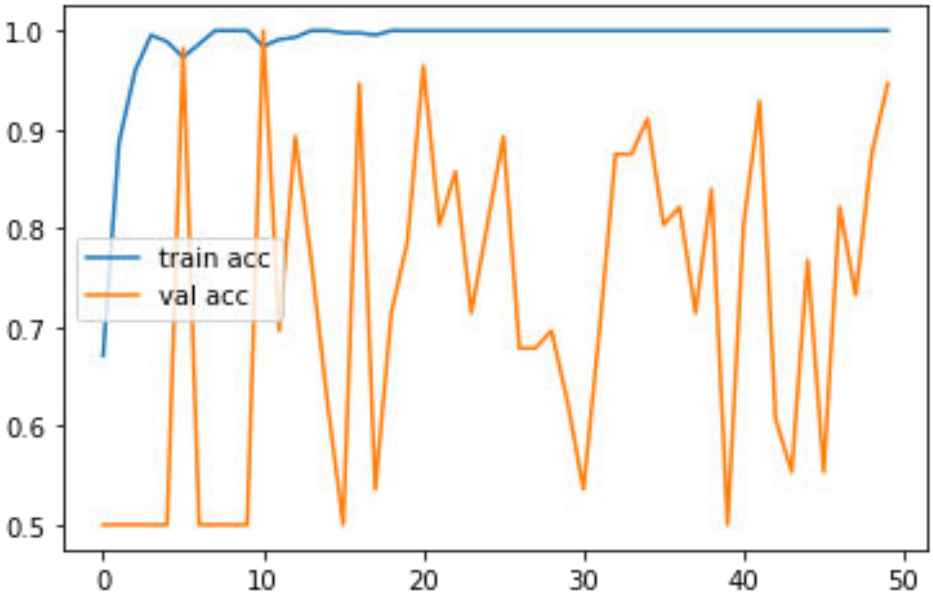
V. IMPLEMENTATION

1. To implement this project we have started with dataset collection
2. Image dataset representing brain haemorrhage and normal are collected from kaggle
3. To get good classification result transfer learning technique using RESNET50 has been done
4. Convolution layers are used to extract the features from input training samples. Each convolution layer has a set of filters that helps in feature extraction.
5. Transfer learning is a powerful technique that can help improve the performance of machine learning models, reduce the amount of training data required, and speed up the training process.
6. Model has been trained with image dataset using transfer learning technique and trained model is exported to external .h5 file using joblib library
7. Exported model file has been deployed at server,web application has been developed using flask frame work
8. Suitable front end has been developed using bootstrap framework
9. Model has been tested by hosting at localhost.

10 .Model has been trained with 94% accuracy and it is giving good result.

Graph showing training and validation accuracy of the model



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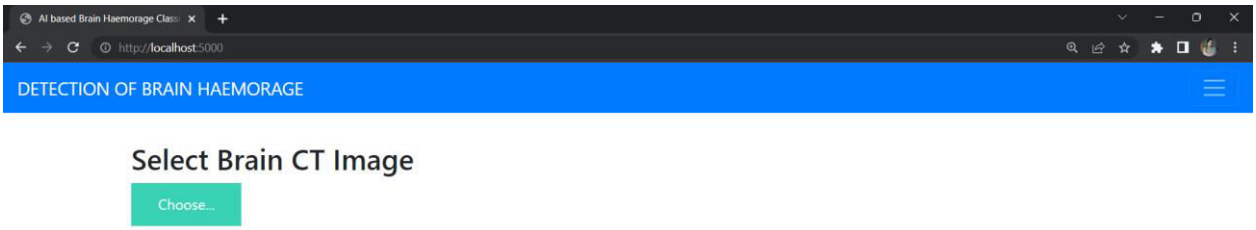
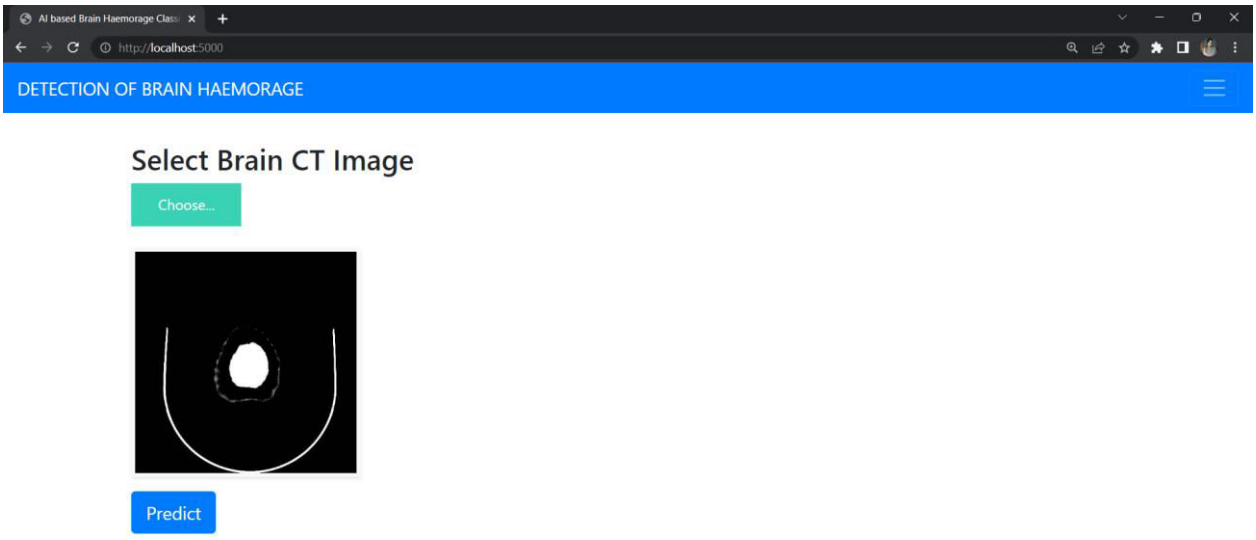
SNAPSHOTS



A.home page



B.select the image

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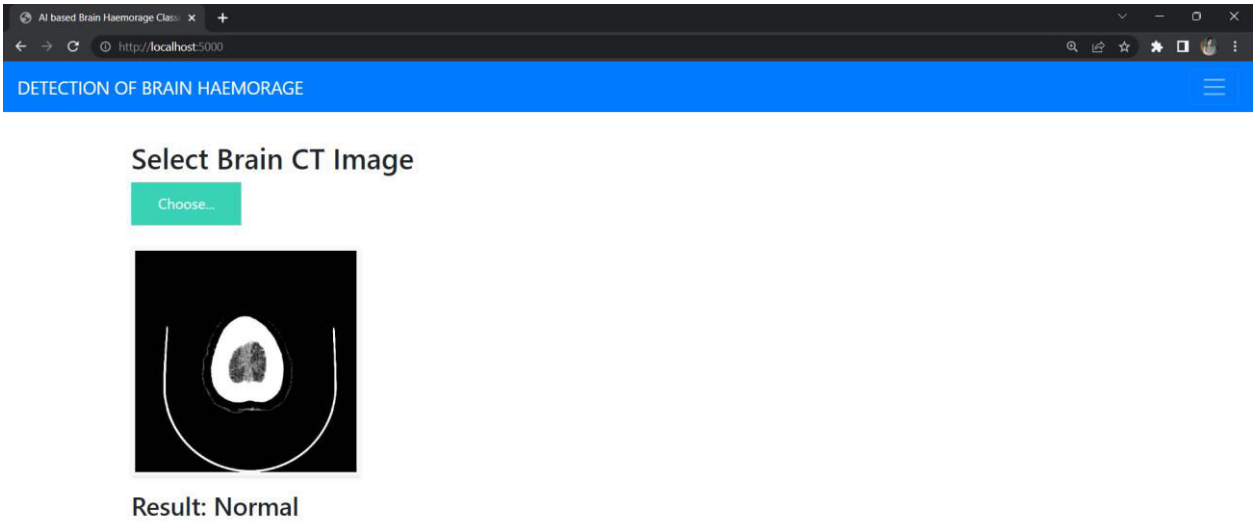
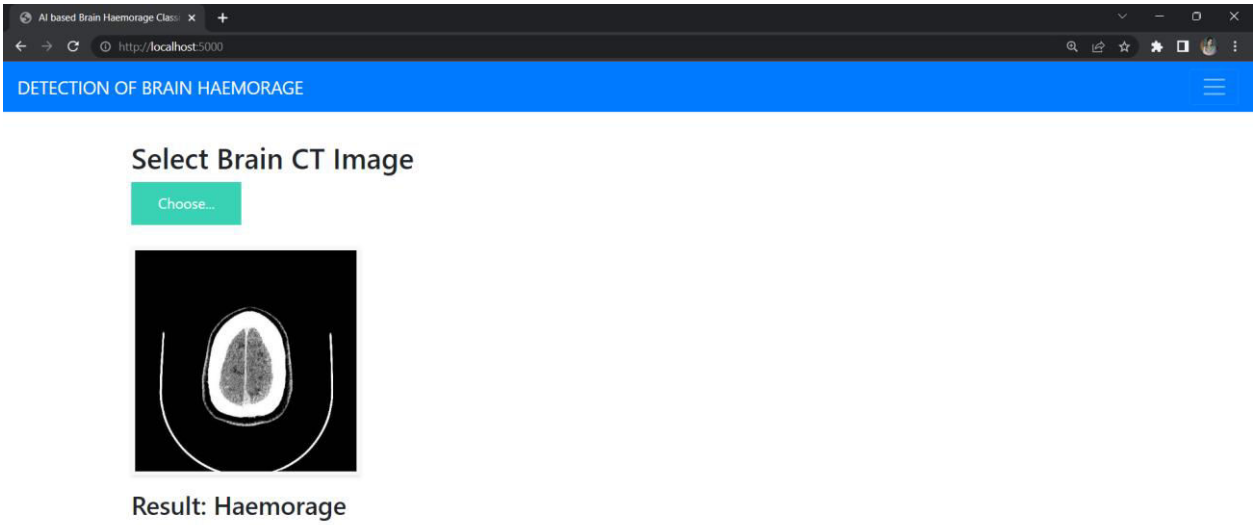
VI. RESULT



C.normal image



D.Harmorage image

VII. CONCLUSION

The integration of deep learning techniques into brain hemorrhage detection holds significant promise for revolutionizing the field of medical imaging analysis. By enhancing the accuracy and efficiency of brain hemorrhage detection, this approach has the potential to greatly benefit patients by enabling timely intervention and improving treatment outcomes. The subsequent sections of this paper will provide detailed information on the methodology,

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experimental results, and discussions, further elucidating the effectiveness and potential of deep learning in brain hemorrhage detection.

REFERENCES

1. Aboutaleb, P., Barman, A., Lopez-Rivera, V., Lee, S., Vahidy, F., Fan, J., Savitz, S.,Giancardo, L. and Sheth, S. A. (2020).Abstract wp405:Automated detection ofhemorrhagicstrokefromnon-contrastcomputedtomography:Amachinelearningap-proach,*Stroke***51**(Suppl$_1$).
2. Anupama, C. S. S., Sivaram, M., Lydia, E. L., Gupta, D. and Shankar, K. (2020). Synergicdeep learning model–based automated detection and classification of brain intracranialhemorrhageimagesinwearablenetworks,*PersonalandUbiquitousComputing*.
3. Burduja,M.,Ionescu,R.T.andVerga,N.(2020).Accurateandefficientintracranialhemorrhage detection and subtype classification in 3d ct scans with convolutional andlongshort-termmemoryneuralnetworks,*Sensors***20**(19):5611.
4. Choudhury, M. D. (2020). *Automated Identification of Painters OverWikiArt Image DataUsingMachineLearningAlgorithms*,PhDthesis,Dublin,NationalCollegeofIreland.
5. Ginat, D. T. (2020). Analysis of head ct scans flagged by deep learning software for acuteintracranialhemorrhage,*Neuroradiology***62**(3):335–340.
6. Guo,D.,Wei,H.,Zhao,P.,Pan,Y.,Yang,H.-Y.,Wang,X.,Bai,J.,Cao,K.,Song,Q.,Xia,
7. J.etal.(2020).Simultaneousclassificationandsegmentationofintracranialhemorrhageusing a fully convolutional neural network, *2020 IEEE 17th International Symposium onBiomedicalImaging(ISBI)*,IEEE,pp.118–121.

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