A Project Report on

Detection of Brain Tumor Using Advanced Image Processing And The Ensemble Model and YOLO Family

Submitted in Partial fulfilment of the requirement for award of the degree of

MASTER OF TECHNOLOGY

In

SYSTEMS AND SIGNAL PROCESSING

Submitted by

N.VIDHYA SREE

23U41D4502

Under the Esteemed guidance of

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Associate Professor

Head of the Department ECE

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

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NH-16, Anakapalle – 531002, Visakhapatnam, A.P.

2023-2025

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ELECTRONICS & COMMUNICATION ENGINEERING

CERTIFICATE

This is to certify that the project report entitled **"Detection Of Brain Tumor Using Advanced Image Processing And The Ensemble Model And YOLO Family"** submitted by **N.VIDHYA SREE (23U41D4502)** In partial fulfilment of the requirements for award of the Degree of **Master of Technology** in **Electronics & Communication Engineering**, from Dadi Institute of Engineering & Technology(A), Anakapalle affiliated to **JNTUGV, Accredited by NAAC with 'A' grade** is a record of bonafide work carried out by them under my guidance and supervision.

P. Poorna Priya

Dr.P.POORNA PRIYA
ASSOCIATE PROFESSOR
PROJECT GUIDE

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29/5/25

EXTERNAL EXAMINER

ACKNOWLEDGEMENT

I would like to express our gratitude to our project guide, **Dr.P.POORNA PRIYA, Associate Professor, Head of the Department** of the Electronics & Communication Engineering, for her guidance and assistance throughout the development of this project. Without her supervision, support, and encouragement, we would not have gained awareness of many new things during our project.

I convey our heartfelt thanks to **Dr.P.POORNA PRIYA**, Associate Professor & Head of the Department of Electronics & Communication Engineering, for motivating us to successfully complete the project.

I would like to thank Principal **Dr.R.VAIKUNTA RAO**, Dadi Institute of Engineering & Technology, for providing the necessary facilities to carry out our project work successfully.

I express our gratitude to the Teaching and Non-teaching Staff of the Department of Electronics & Communication Engineering, who have been directly and indirectly involved in this journey, for their encouragement in completing our project.

I would like express our deep sense of gratitude to **HONORABLE CHAIRMAN, SRI DADI RATNAKAR**, of Dadi Institute of Engineering & Technology, for providing necessary facilities to carry out our project work successfully.

Endeavors over a long period can also be successful through constant effort and encouragement. I wish to take this opportunity to express our deep gratitude to all the people who have extended their cooperation in various ways during our project. It is our pleasure to acknowledge the help of all those respected individuals.

PROJECT ASSOCIATE

N.VIDHYA SREE (23U41D4502)

DECLARATION

I hereby declare that the project entitled **"Detection Of Brain Tumor Using Advanced Image Processing And The Ensemble Model And YOLO Family"** is submitted in partial fulfilment of the requirements for the award of Master of Technology in **Electronics & Communication Engineering** under esteemed supervision of **Dr.P.POORNA PRIYA, Associate Professor**. This is a record of work carried out by us and results embodied in this project report have not been submitted to any other university for the award of any Degree.

PROJECT ASSOCIATE

N.VIDHYA SREE (23U41D4502)

ABSTRACT

Brain tumor detection and classification play a critical role in diagnosing and treating abnormal cell growth that can lead to life-threatening conditions. Using the Brain Tumor dataset, this approach combines advanced transfer learning models and deep convolutional neural networks (DCNNs) for enhanced performance. For classification, models such as DCNN, ResNet152, EfficientNetB2, Xception, and NasNetMobile were utilized, with a hybrid model of DCNN and ResNet152 serving as the baseline. The ensemble model combining Xception and NasNetMobile achieved an outstanding accuracy of 98.1%, precision of 98.3%, recall of 97.9%, and F1 score of 98.1%, demonstrating its superior capability in feature extraction and classification. Tumors are categorized into four grades: Grade 0 indicates no tumor, Grade I represents a small tumor, Grade II signifies a medium-sized tumor, and Grade III indicates a large tumor. For detection, advanced YOLO models, including YOLOv5x6, YOLOv5s6, YOLOv8, and YOLOv9, were applied to identify abnormalities with precision. Among these, YOLOv9 achieved a mean Average Precision (mAP) of 78.9%, along with a precision of 84.3% and recall of 78.9%, showcasing its effectiveness in detecting abnormalities. The integration of these techniques leverages the strengths of hybrid models and ensemble learning for classification while utilizing cutting-edge YOLO architectures for detection. A Flask-based interactive interface is also implemented to enhance usability and enable secure user authentication, bridging the gap between technical innovation and practical application.

Keywords : *Brain Tumor Detection,Brain Tumor Classification , (DCNN) ,Transfer Learning ,ResNet152 ,EfficientNetB2 ,Xception ,NasNetMobile ,Hybrid Model ,YOLO Family*

Detection of Forged images using Transfer Learning and Ensemble model

A Project Report on Submitted in partial fulfilment of the requirements for award of the degree of

MASTER OF TECHNOLOGY

In

SYSTEMS AND SIGNAL PROCESSING

By

K.BHARGAVI

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Under the Esteemed guidance of

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CERTIFICATE

This is to certify that the project report entitled **"Detection of forged images using Transfer Learning and Ensemble model"** submitted by **K.BHARGAVI(23U41D4501)** In partial fulfilment of the requirements for award of the Degree of **Master of Technology** in **Electronics & Communication Engineering**, from **Dadi Institute of Engineering & Technology(A)**, Anakapalle affiliated to **JNTUGV, Accredited by NAAC with 'A' grade** is a record of bonafide work carried out by them under my guidance and supervision.

Dr.B.ANJANEE KUMAR
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EXTERNAL EXAMINER

ACKNOWLEDGEMENT

I would like to express our gratitude to our project guide, **Dr.B.ANJANEE KUMAR, Associate Professor, Department** of the Electronics & Communication Engineering, for her guidance and assistance throughout the development of this project. Without her supervision, support, and encouragement, we would not have gained awareness of many new things during our project.

I convey our heartfelt thanks to **Dr.P.POORNA PRIYA**, Associate Professor & Head of the Department of Electronics & Communication Engineering, for motivating us to successfully complete the project.

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PROJECT ASSOCIATE

K.BHARGAVI(23U41D4501)

DECLARATION

I hereby declare that the project entitled **"Detection Of Forged images using Transfer Learning and Ensemble Model "** is submitted in partial fulfilment of the requirements for the award of Master of Technology in **Electronics & Communication Engineering** under esteemed supervision of **Dr.B.ANJANEE KUMAR, Associate Professor**. This is a record of work carried out by us and results embodied in this project report have not been submitted to any other university for the award of any Degree.

PROJECT ASSOCIATE

K.BHARGAVI(23U41D4501)

ABSTRACT

In the era of social media, digital images serve as a primary medium for information exchange. However, malicious software poses a significant threat by forging images to disseminate fake information ,necessitating robust digital image forgery detection techniques. Traditional methods often focus on detecting a specific type of forgery ,such as image splicing or copy-move, limiting their practical applicability in real-world scenarios where multiple types of forgeries coexist. To address this challenge ,this study explores advanced deep learning architectures for detecting diverse image forgeries using the CASIA dataset .We evaluate the performance of several state-of-the-art convolutional neural (CNN) models, including InceptionV3, VGG16, VGG19, DenseNet, MobileNetV2, ResNet effectively addressing real-world 50, ResNet101, ResNet152 ,Xception ,and NASNet Mobile. These models are bench marked to identify their efficacy in detecting forgeries with high accuracy. Additionally ,a hybrid model combining Xception and NAS Net Mobile is proposed to leverage the strengths of both architectures ,enhancing detection accuracy and robustness .The results demonstrate the potential of hybrid models in digital image forgery detection, paving the way for secure information sharing on digital platforms.

Keywords: Digital Image Forgery, Transfer Learning, Deep Learning, Convolutional Neural Networks (CNN), Image Splicing ,Hybrid Model.