“Image Analysis for Intracranial Hemorrhage using CNN”

**Minor Project Report Submitted**

**To**

**Chhattisgarh Swami Vivekananda**

**Technical University, Bhilai (C.G.), India**

****

*for*

*The award of the degree*

*of*

**BACHELOR OF TECHNOLOGY(Hons.)**

*In*

**COMPUTER SCIENCE & ENGINEERING**

**(Artificial Intelligence)**

**By**

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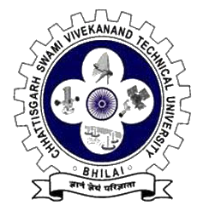
**Enrollment No.CB4598**

Under the Guidance of

**Dr.J.P.Patra**

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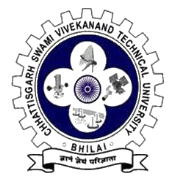
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**DECLARATION BY THE CANDIDATE**

I, the undersigned solemnly declare that the thesis entitled **“Image Analysis for Intracranial Hemorrhage using CNN”** is based on my work carried out during the course of my study under the supervision of **Dr. J.P Patra,** **,** Head of the Department of Computer Science and Engineering, University Teaching Department CSVTU (C.G.), India.

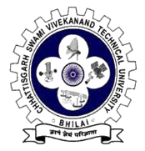
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I

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CERTIFICATE OF THE SUPERVISOR

This is to certify that the incorporation in the thesis “Image **Analysis for Intracranial Hemorrhage using CNN”** is a record of research work carried out by Ruchi Shukla, bearing Roll No. 300012721005 Enrollment No. CB4598 guidance and supervision for the award of the degree of Bachelors of Technology in Computer Science & Engineering (Artificial Intelligence ) of Chhattisgarh Swami Vivekananda Technical University, Bhilai (C.G.) India.

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1. Embodies the work of the candidate himself,
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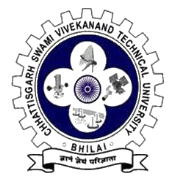
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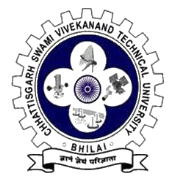
This is to certify that the project thesis entitled “Image **Analysis for Intracranial Hemorrhage using CNN”** wassubmitted by Ruchi Shukla, student of B.Tech. (CSE(A.I)) (Roll No. 300012721005, Enrollment No. CB4598) has been examined by the undersigned as a part of the examination and is hereby recommended for the award of the degree **Bachelors** **of Technology in Computer Science and Engineering** (Artificial Intelligence & Data Science )of Chhattisgarh Swami Vivekananda Technical University, Bhilai (C.G.) India.

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IV

ABSTRACT

Intracranial hemorrhage (ICH) is a life-threatening medical condition that requires swift and accurate diagnosis for effective intervention. This research presents a novel approach to intracranial hemorrhage detection through automated image analysis using Convolutional Neural Networks (CNNs). The study leverages advanced deep learning techniques to analyze medical imaging data, specifically focusing on the detection of hemorrhages in brain scans.

The dataset utilized in this study consists of a diverse collection of labeled brain images, encompassing various patient demographics and clinical scenarios. Preprocessing steps are applied to the images, including normalization, resizing, and augmentation, to enhance the robustness and generalization capabilities of the CNN model. The dataset is partitioned into training, validation, and test sets to facilitate rigorous model training and evaluation.

The CNN architecture is tailored for image analysis, comprising convolutional layers for feature extraction and spatial hierarchies, pooling layers for dimensionality reduction, and fully connected layers for precise classification. The output layer utilizes a sigmoid activation function for binary classification, distinguishing between brain scans with and without intracranial hemorrhage.

During model compilation, the binary cross-entropy loss function is employed, and the Adam optimizer is fine-tuned with an optimized learning rate. Training involves iterative epochs, with the inclusion of dropout layers to prevent overfitting and enhance the model's ability to generalize to unseen data.

Evaluation metrics such as accuracy, precision, recall, and F1 score are computed to assess the model's diagnostic performance on the test set. Fine-tuning and optimization are conducted based on these metrics, aiming to achieve a highly reliable and efficient automated intracranial hemorrhage detection system.

Considerations for ethical standards and privacy regulations associated with medical image data are paramount. Collaborative efforts with healthcare professionals ensure adherence to ethical guidelines, emphasizing responsible deployment in real-world clinical

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**List of Abbreviations**

1. **CNN** - Convolution Neural Network

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