

A study on

ASSAMESE HAND WRITTEN DIGIT CLASSIFICATION

A Report submitted in partial fulfillment of the requirements for the degree of

Bachelor of Information Technology

Under

The Assam Royal Global University



Submitted By:

RIA SAIKIA (192052013)

PIALI DAS (192052009)

Under the guidance of
Ms. PARISHMITA GOSWAMI
Teaching Assistant

Department of Information Technology
Royal School of Information Technology
Guwahati-781035

January-2022

A study on

ASSAMESE HAND WRITTEN DIGIT CLASSIFICATION

A Report submitted in partial fulfillment of the requirements for the degree of

Bachelor of Information Technology

Under

The Assam Royal Global University



Submitted By:

RIA SAIKIA (192052013)

PIYALI DAS (192052009)

Under the guidance of
Ms. PARISHMITA GOSWAMI
Teaching Assistant

Department of Information Technology
Royal School of Information Technology
Guwahati-781035

January-2022

DECLARATION

We, Ria Saikia, bearing Roll no. 192052013 and Piyali Das, bearing Roll no. 192052009, students of Information Technology department under Royal School of Information Technology, hereby declare that this Final Semester Project Report/Dissertation entitled Assamese Handwritten Digit Classification is a bona fide project work undertaken by us, during the period of September 2021 to December 2021, as partial fulfillment of the requirements of the degree of The Assam Royal Global University, Guwahati.

Further, we declare that this report has not been submitted by us elsewhere for the award of any degree/diploma/certificate and not linked to any other qualifications.

**SIGNATURE
(RIA SAIKIA)**

Date:
Place: Guwahati

**REGISTRATION NO. 1190308
ROLL NO. 192052013**

**SIGNATURE
(PIYALI DAS)**

Place: Guwahati

**REGISTRATION NO. 1190304
ROLL NO. 192052009**

**THE ASSAM ROYAL GLOBAL UNIVERSITY,
GUWAHATI**

CERTIFICATE

This is to certify that the report entitled “Assamese Handwritten Digit Classification” submitted by Ria Saikia (Roll No. 192052013) and Piyali Das (Roll No. 192052009) of B.Sc 5th semester, Information Technology, is an authentic work carried out by them under my supervision and guidance.

To the best of my knowledge, the matter embodied in the report has not been submitted to any other University/Institute for the award of any Degree or Diploma.

Signature of Supervisor(s)
Name(s)
Department(s)
The Assam Royal Global University
January, 2022

ACKNOWLEDGMENT

We would like to express our deepest gratitude to Information Technology Department of The Assam Royal Global University for providing us the opportunity to undertake this mini project on the title "Assamese Handwritten Digit Classification".

We acknowledge with sincere thanks to our project guide Parishmita Goswami for excellent guidance and selfless efforts. Without their co-operative attitude, constant inspiration and dedicated at each and every stage of this project it would not be possible to make this project complete.

We would also like to express our gratitude towards the Head of the Department of Information Technology Department, Dr. Aniruddha Deka Sir. We are also grateful to other teachers of the department for contributing their inputs in this project

Lastly, we would like to thank our parents and friends for all the support without which this project couldn't have been completed in the given limited time frame. Also a special acknowledgement goes to our colleague who helped us in completing the project by exchanging interesting ideas and sharing their experience.

PIYALI DAS (ROLL NO. 192052009)

RIA SAIKIA (ROLL NO. 192052013)

EXECUTIVE SUMMARY

In the recent few decades, there has been a lot of effort in literature focusing on Indian languages for mechanically detecting characters. However, Assamese being extensively spoken and used in many governmental tasks and activities in North-East India, only a few of them focused on optical character recognition of the language. Due to differences in people's writing styles, the minimal contribution in this field appears to be weak and insufficient in their ability to distinguish handwritten characters. This prompted us to develop a computational model for automatic recognition of Assamese numbers in ten different classes Ranging from 0 to 9 .

This study employs convolutional neural network (CNN) and artificial neural network (ANN) to learn and understand the various styles of Assamese handwritten digits.

TABLE OF CONTENTS

Particulars	Page No.
Declaration	i
Approvals	ii
Acknowledgement	iii
Executive Summary	iv
Table of contents	v
List of Figures	vi
Chapter I (Introduction)	1
Chapter II (Literature Review)	2
Chapter III (Methodology)	5
Chapter IV (Result Analysis)	11
Chapter V (Conclusion and Future Scope)	17
References	19

LIST OF FIGURES

Fig. No.	Fig. Title	Page No.
2.1	Convolutional Neural Network.....	3
2.2	Artificial Neural Network.....	4
3.1	Original Image.....	6
3.2	Image with normalized pixel.....	6
3.3	CNN Architecture Used.....	7
3.4	ANN Architecture Used.....	7
3.5	Functional Block Diagram.....	8
3.6	Block diagram showing working of CNN.....	9
3.7	Block diagram showing working of ANN.....	9
4.1	Loss and Accuracy at the beginning of training CNN.....	11
4.2	Loss and Accuracy at the end of training.....	12
4.3	Train loss Vs Valid loss and Train Accuracy Vs Valid Accuracy for CNN	12
4.4	Confusion matrix plot for CNN model.....	13
4.5	Loss and Accuracy at the beginning of training ANN.....	13
4.6	Loss and Accuracy at the end of training.....	14
4.7	Train Loss Vs Valid Loss for ANN.....	14
4.8	Train Accuracy Vs Valid Accuracy.....	15
4.9	Confusion matrix plot for ANN model.....	15
5.0	Output from CNN model.....	16
5.1	Output from ANN model.....	16