Bangladesh Army University of Science and Technology (BAUST), Saidpur

Department of Computer Science And Engineering

Course Code: CSE 4131

Course Title: Artificial Neural Network and Fuzzy Systems Sessional

Project Name: Handwritten Digit Recognition System using Machine Learning

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Introduction:

Handwritten Digit Recognition using Machine Learning develops –

- Methods and models to recognize handwritten digits.
- Handwritten digit recognition is vital for automation in banking, retail, and healthcare.
- Due to writing styles, forms, and sizes, recognizing handwritten numerals is difficult. Deep learning and neural networks can improve handwritten digit identification accuracy.

Problem Definition:

- The task of recognizing handwritten digits is challenging due to variations in writing styles, shapes, and sizes, which can make it difficult to develop a rule-based approach for recognition.

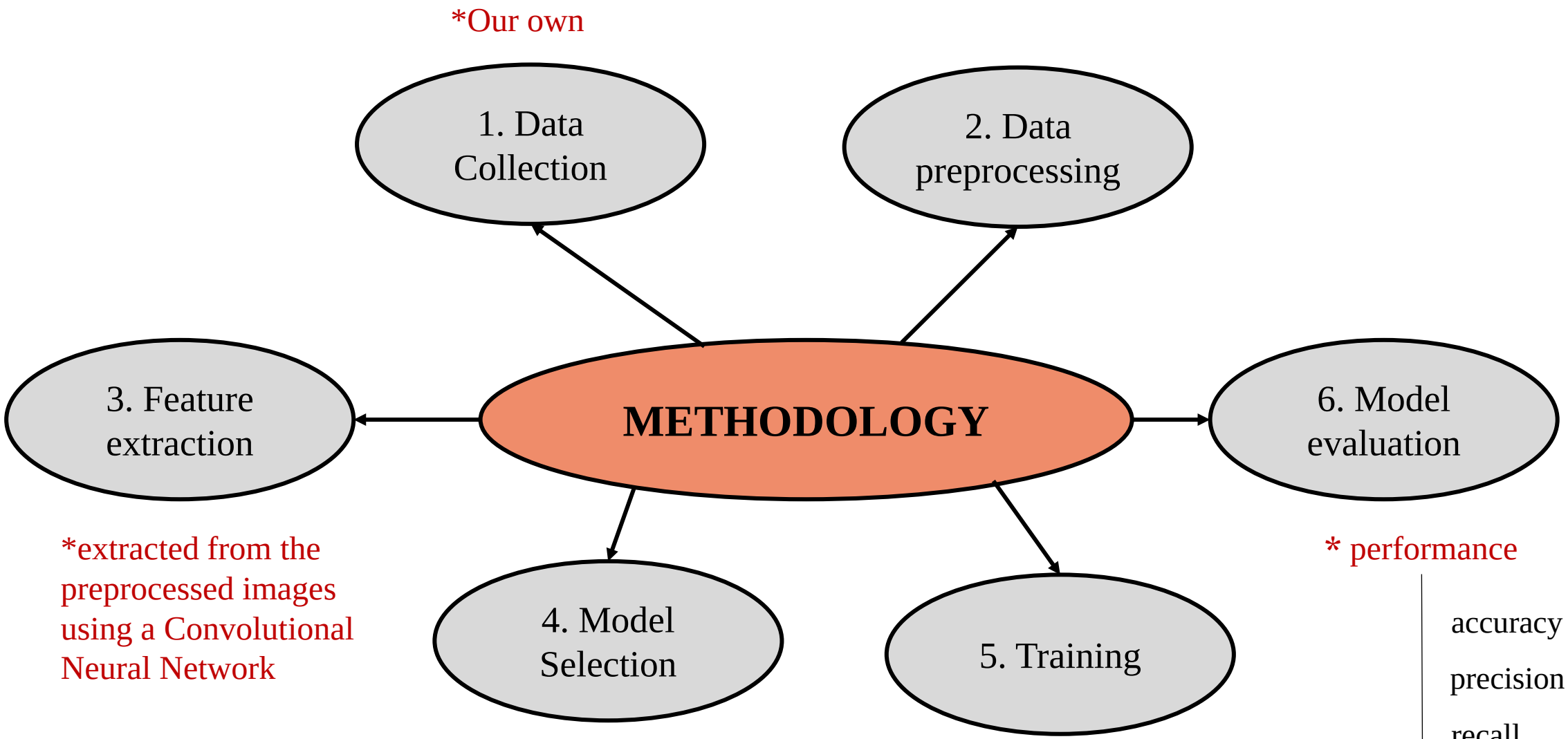
- Since models can be trained with machine learning algorithms to recognize handwritten digits with high accuracy, this presents a promising solution.

- Banking, education, and security all use handwritten digits on forms, checks, and identification documents, therefore a solution to this problem would be useful in those areas.

Objective:

The main objective is to –

- Accurately recognising images of Handwritten digits based on classification methods for multivariate data.
- Enhancing automation – needed in postal address recognition, form filling, and signature verification
- Improving accuracy and efficiency
- Developing new machine learning algorithms


*Our own
1. Data Collection
2. Data preprocessing
3. Feature extraction
METHODOLOGY
6. Model evaluation
*extracted from the preprocessed images using a Convolutional Neural Network
4. Model Selection
5. Training
* performance
accuracy
precision
recall
*VGG net16
*Inception net V3
*Xception net
*ResNet50

Tools:

Tools needed for the implementation –
Python,
TensorFlow,
Keras,
Scikit-learn,
OpenCV,
PyTorch,
Jupiter Notebook

Implementation:

1. Loading the dataset
2. Splitting the dataset into training and testing sets
3. Preprocessing the data
4. Training a machine learning model on the training data
5. Evaluating the model on the testing data

Results Analysis

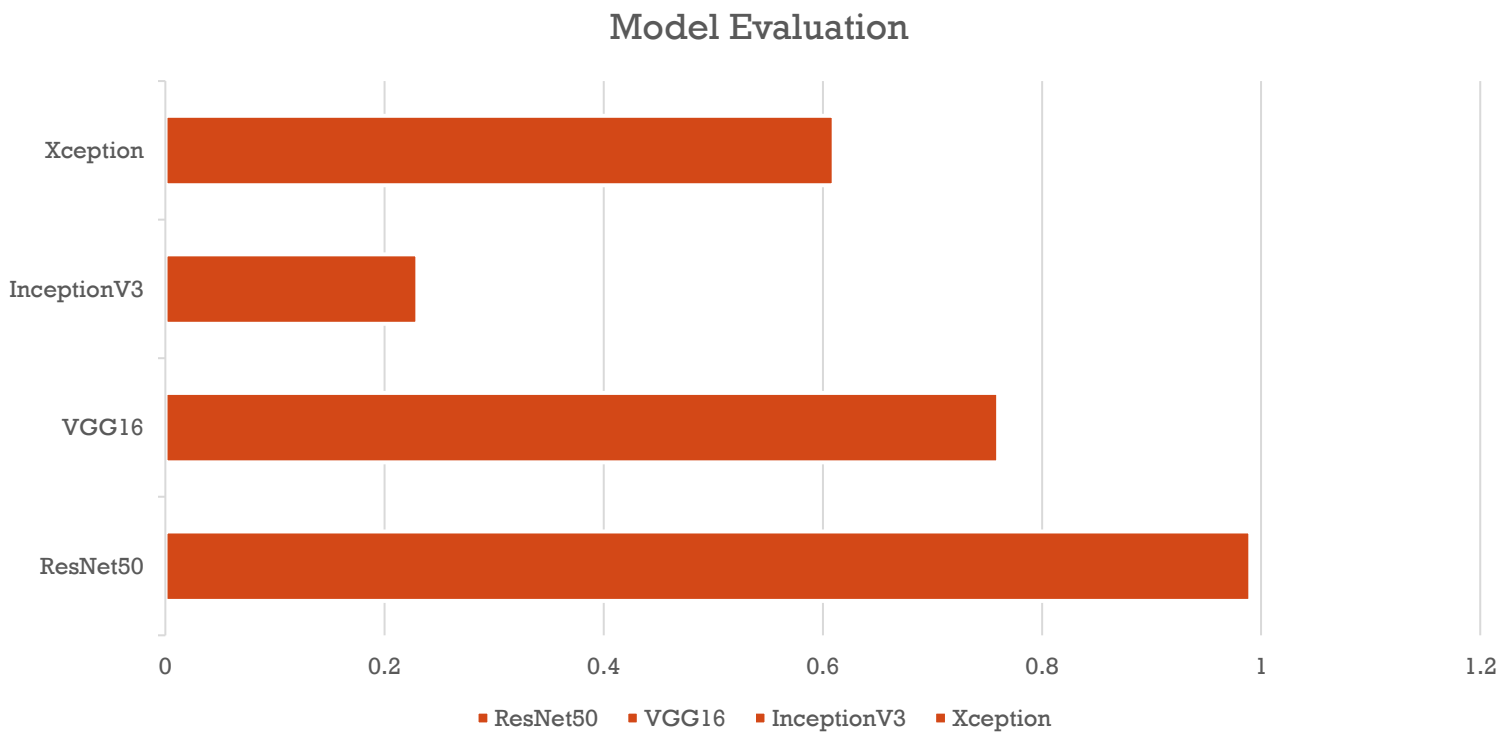


Figure 01: Model Analysis

Conclusion

In conclusion, handwritten digit recognition is an important and challenging problem in the field of machine learning, and the development of accurate and efficient algorithms for this task has numerous practical applications. And it has also expanded natural language processing and computer vision research.