



**Department of Electrical and Computer Engineering**

**North South University**

## **Senior Design Project**

# **Smart Detection of Deepfake Using Various Deep Learning Models**

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**Faculty Advisor:**

**Dr. Mohammad Monirujjaman Khan**

**Associate Professor**

**ECE Department**

**Summer, 2023**

# LETTER OF TRANSMITTAL

25 November, 2023

To

Dr. Rajesh Palit  
Chairman,  
Department of Electrical and Computer Engineering  
North South University, Dhaka

**Subject: Submission of Capstone Project Report on “Smart Detection of Deepfake Using Various Deep Learning Models”**

Dear Sir,

With due respect, we would like to submit our **Capstone Project Report** on “**Smart Detection of Deepfake Using Various Deep Learning Models**” as a part of our BSc program. The report deals with Deepfake detection using machine learning and computer vision. This project was very much valuable to us as it helped us gain experience from practical field and apply in real life. We tried to the maximum competence to meet all the dimensions required from this report.

We will be highly obliged if you kindly receive this report and provide your valuable judgment. It would be our immense pleasure if you find this report useful and informative to have an apparent perspective on the issue.

Sincerely Yours,

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Mariam Binte Bashir  
ECE Department  
North South University, Bangladesh

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Iftekher Mahbub Rafi  
ECE Department  
North South University, Bangladesh

# APPROVAL

Mariam Binte Bashir (2021874042) and Iftekher Mahbub Rafi (2021463642) from Electrical and Computer Engineering Department of North South University, have worked on the Senior Design Project titled “**Smart Detection of Deepfake Using Various Deep Learning Models**” under the supervision of Dr. Mohammad Monirujjaman Khan partial fulfillment of the requirement for the degree of Bachelors of Science in Engineering and has been accepted as satisfactory.

## Supervisor’s Signature

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**Dr. Mohammad Monirujjaman Khan**

**Associate Professor**

Department of Electrical and Computer Engineering

North South University

Dhaka, Bangladesh.

## Chairman’s Signature

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**Dr. Rajesh Palit**

**Professor**

Department of Electrical and Computer Engineering

North South University

Dhaka, Bangladesh.

# DECLARATION

This is to declare that this project is our original work. No part of this work has been submitted elsewhere partially or fully for the award of any other degree or diploma. All project related information will remain confidential and shall not be disclosed without the formal consent of the project supervisor. Relevant previous works presented in this report have been properly acknowledged and cited. The plagiarism policy, as stated by the supervisor, has been maintained.

Students' names & Signatures

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**2. Mariam Binte Bashir**

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**3. Iftekher Mahbub Rafi**

## ACKNOWLEDGEMENTS

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Furthermore, the authors would like to thank the Department of Electrical and Computer Engineering, North South University, Bangladesh for facilitating the research. We would also like to thank our friend Afsara Waziha for helping us in this project. The authors would also like to thank their loved ones for their countless sacrifices and continual support.

# ABSTRACT

## **Smart Detection of Deepfake Using Various Deep Learning Models**

Deepfake is a digitally manipulated image or video that is generated using an algorithm to replace the original person with someone else which looks authentic. The need to create efficient techniques for identifying and categorizing counterfeit photos on digital platforms has become crucial due to their widespread presence. This project does the prediction of counterfeit photos by employing of deep learning (DL) and transfer learning methodologies, specifically leveraging convolutional neural networks (CNNs) models. Our work focuses to enhance the accuracy and reliably detecting deep fake images. The DL models have been trained using the dataset acquired from Kaggle, titled "140k Real and Fake Images". Transfer learning techniques are employed to enhance prediction performance by leveraging knowledge from large datasets and applying it to pre-trained models. Evaluation criteria such as accuracy, precision, recall, and F1 score are employed to assess the ability of a model to effectively distinguish between genuine and manipulated images. The models exhibit strong discriminatory capabilities and provide reliable picture classifications. The study investigates the efficacy of various deep-learning models in the task of image classification. The Vgg16 achieved a peak accuracy of 99%, showcasing the possibilities of deep learning algorithms. MobileNetV3s and DenseNet121 demonstrate their efficacy in faulty image categorization by achieving accuracies of 98%, 94%, and 95% correspondingly. Unlike other models, Xception achieves remarkable accuracy rates of 96% through training on a wide range of datasets containing both genuine and manipulated images. This enables it to effectively differentiate between real image and deepfakes, which we deployed to build a website. Thus, our experiment demonstrates the versatility of deep learning models in handling various image formats.