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**School of Computing and Computer Engineering**

CSC 691: Topics in CS – Fall 2021

**Project: Image Manipulation Detection using Convolutional Neural Network**

UNDER THE GUIDANCE OF

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**ABSTRACT**

For the past several years, social media like Facebook, Instagram, and SNS (Social Network Service) have been used by many people and still, the emerging of their use is increasing accordingly. They have become part of our lives. In particular, the development of smart devices such as smartphones has a remarkable role in uploading and downloading images to those social networks.

In the meantime, there has been a technique for manipulating an image using various methods with a specific purpose. Image tampering can be done by counterfeit criminals for the purpose of counterfeiting. Digital forensic techniques are needed to detect the tampering and manipulation of images for these illegal purposes and much research has been studied on these forensic techniques. However, they use features designed by human intervention and their performance is totally dependent on the differentiation of these features among original, tampered, and modified images.

This project proposes an image manipulation detection algorithm using deep learning technology. The model based on a convolutional neural network (CNN) is designed. Especially, a high pass filter is used to acquire hidden features in the image rather than semantic information in the image. The convolutional layer is composed of 2 layers having maximum pooling, ReLU (Rectified Linear Unit) activation, and local response normalization. The fully connected layer is composed of 2 layers.

For the experiments, modified images are generated using median filtering, Gaussian blurring, additive white Gaussian noise addition, and image resizing for 256x256 images that were divided into 4 equal parts of Boss Base 1.01 images.

Quantitative performance analysis is performed to test the performance of the proposed algorithm.