

## ABSTRACT

High quality images are needed in various professional fields such as medical, research, and policing. However, it often happens that the resulting image is not good so that important information contained in the image is not detected because of the noise. This can reduce information from an image.

In this final project, one of the image quality improvements is the Fast Super Resolution Convolutional Neural Network (FSRCNN) method. FSRCNN has eight layers and focuses on accelerating the speed of reconstruction which is high resolution and will be inserted by an autoencoder. The insertion using an autoencoder will be assisted by maxpooling and upsampling layers adjusted so that the results of the FSRCNN modification get the maximum value. For FSRCNN AE 1, maxpooling and upsampling were carried out twice and for FSRCNN AE 2, maxpooling and upsampling were performed four times. By using DIV2K data as training data and using Set5, Set14, and BSDS200 datasets as testing data, five images will be taken in each dataset.

After modifying the FSRCNN model using an autoencoder. The results obtained from the FSRCNN AE 2 model are better than the FSRCNN and FSRCNN AE 1 models. Following are the highest PSNR results for each reference FSRCNN model 37.00, the FSRCNN AE 1 model 37.50, and the FSRCNN AE 2 model 37.78. The image results from both models show that the image produced by FSRCNN AE 2 is better than FSRCNN AE 1. Although the results have not reached the actual HR, at least the resulting image is better than the input image.

**Keywords:** *Image enhancement, convolutional neural network, FSRCNN, autoencoder.*