

ABSTRACT

This research aims to enhance visual quality and motion smoothness in video through two main approaches: super-resolution using the SRCNN (Super-Resolution Convolutional Neural Network) model and frame interpolation using FILM (Frame Interpolation for Large Motion). The entire process is executed directly on the Jetson Nano device to demonstrate the capability of local (edge) processing.

In the first experiment, eight sequential image frames were captured from an ESP32-CAM camera with an initial resolution of 240×176 pixels. Each image was upscaled using bicubic interpolation, then processed by three variants of the SRCNN model (915, 935, and 955) with scaling factors of $\times 2$, $\times 3$, and $\times 4$. The results showed that the SRCNN-935 model with a $\times 3$ scaling factor provided the best output, achieving a PSNR value of 34.45 dB. Inference times were efficient, ranging from 2 to 5 seconds per image.

After the super-resolution process, the enhanced frames were paired and used as input to the interpolation model to generate intermediate frames. This step aimed to increase the number of frames temporally, resulting in smoother video playback. The system successfully generated seven interpolated frames, increasing the total number of frames from 8 to 15. The interpolation results were visually acceptable, although some artifacts were observed in regions with fast-moving objects.

Overall, the system demonstrates that the combination of super-resolution and frame interpolation can be effectively implemented on the Jetson Nano for standalone image and video processing tasks.

Keywords : *super resolusi, interpolasi frame, Jetson Nano*