ABSTRACT

Advances in healthcare technology have driven the need for innovation in fast, efficient, and power-efficient data acquisition and processing. One of the main challenges is the processing of endoscopic image data, which has a large volume and therefore requires high storage capacity and large transmission bandwidth. This research aims to design an efficient endoscopic image data acquisition system based on Compressive Sensing (CS) architecture to reduce storage and transmission bandwidth requirements while supporting healthcare applications such as telemedicine and portable devices. The focus of this research is on applying the Complex Daubechies Wavelet method to enhance efficiency without compromising image information quality.

The methodology used includes literature review, simulation, system design, implementation, and prototype testing. The system is designed using an endoscopic camera to capture THT organ image data, which is then processed through the Complex Daubechies Wavelet-based CS method and Discrete Cosine Transform (DCT) as a comparison. Data is reconstructed using a Gaussian algorithm, processed by a Raspberry Pi 4, and displayed through a healthcare application. The prototype is tested to evaluate parameters such as compression ratio, PSNR, processing time, and power efficiency.

This research is expected to achieve a reduction in storage and bandwidth requirements of 30-70%, with a minimum image reconstruction quality of 30 dB. These results are expected to support the development of real-time telemedicine services and portable healthcare devices. Additionally, this research contributes to the efficiency of data infrastructure in the healthcare field.

Key Word: *Endoncopi*, *Compressive Sensing*, *Wavelet Daubechies*, *Telemedicine*, *Data Acquisation*, *Healthcare*.