

## ABSTRACT

Hypertension is a medical condition that has a significant impact on public health. Often referred to as the "silent killer," hypertension can occur without clear symptoms but can lead to serious complications if not properly managed. This study focuses on the development of a web-based blood pressure and heart rate monitoring system using IoT technology. The system integrates the MPS20N0040D-D pressure sensor and ADC HX711 to ensure accurate signal conversion and data acquisition. The Seeed Studio XIAO ESP32S3 microcontroller was chosen for its small size and built-in Wi-Fi capabilities, enabling efficient data processing and connectivity. Using the Maximum Amplitude Algorithm (MAA), the system achieved a blood pressure measurement accuracy of 93.19% for systolic and 87.24% for diastolic, with a heart rate accuracy of 93.14%. Although the system shows some limitations in cuff placement and user variability, it demonstrates effective performance in remote health monitoring. This research contributes to the enhancement of wearable health monitoring devices, highlighting the importance of IoT in healthcare for early detection and management of hypertension.

**Keywords:** *Early Detection, Hypertension, Internet of Things, Maximum Amplitude Algorithm, Telehealth, Wearable Device.*