

ABSTRACT

Obesity has become a major health problem in Indonesia with a prevalence of 21.8% in adults, while the lack of public understanding of food nutritional content exacerbates this condition. This research aims to develop an integrated food nutrition measurement system based on Force-Sensitive Resistor (FSR) sensors and Inception algorithm to support obesity control programs based on the "Isi Piringku" concept from the Ministry of Health.

The system consists of digital scale hardware using FSR sensors through Bluetooth communication. The application integrates computer vision based on InceptionV3 for classifying 18 Indonesian food categories, automatic nutrition calculation algorithms, local database, and dual input methods (camera and scale). Testing was conducted using 6 objects with weight variations of 150-200 grams to evaluate system performance.

The system achieved an average accuracy of 95.74% with 4.11% tolerance meeting the $\pm 10\%$ standard for household scales. The InceptionV3 algorithm achieved 83% accuracy for food classification with 3.74-second Bluetooth connection time. The system has 302 mA power consumption with 4.5 hours of continuous operation battery life. The system provides a more accurate nutrition monitoring alternative compared to conventional visual estimation (error 15-30%) and has potential as an effective solution for obesity control in Indonesia.

Keywords: *Bluetooth, computer vision, digital scale, ESP32, FSR sensor, Inception algorithm, Isi Piringku, nutrition monitoring, obesity*