21st Academic Sessions 2024
University of Ruhuna
Matara, Sri Lanka
https://www.ruh.ac.lk/index.php/en/
ISSN: 2362-0412

Deep Learning-Based Optimization of Dietary Plans for Effective Weight Loss Management

L.R.W. Mohottala[a] and W.A.M. Prabuddhi[b]

[a]*First Affiliation*
[b]*Second Affiliation*

Abstract

Overweight and obesity, as identified by the World Health Organization (WHO), have emerged as prevalent global health concerns, affecting over 1.9 billion individuals classified as overweight and more than 650 million falling into the obese category. These conditions significantly contribute to various health complications, including heart disease, diabetes, and several forms of cancer, necessitating urgent attention from the public health sector. In response to these challenges, this study employs convolutional neural networks (CNNs) to analyze diverse factors such as weight, height, body mass index (BMI), basal metabolic rate (BMR), body shape, and gender extracted from single photographs of human subjects. By leveraging this data, the primary objective is to estimate BMR and devise personalized nutritional meal plans for weight reduction. The research aims to demonstrate the feasibility of BMI measurement, body shape analysis, gender determination, BMR estimation, and target weight definition directly from photographic inputs. Additionally, factors such as age, dietary restrictions, water intake, sleep duration, and exercise habits are considered in the formulation of tailored dietary plans for overweight and obese individuals. The study proposes an optimized solution to mitigate health risks associated with excess weight by developing a system that delivers personalized dietary recommendations while integrating various CNN models. The accuracy of the proposed approach is evaluated against alternative CNN architectures, such as ResNet152 and VGG16, as well as professional nutritionist assessments. The framework presents a practical and scalable solution that can be seamlessly integrated into healthcare systems and wellness initiatives, thereby enhancing public health outcomes on a global scale.

Keywords: BMI, CNN, Dietary Planner, Human Body Photographs, Weight Loss

***Corresponding Author**: *ravindumohottala@gmail.com*