

NASI LEMAK CALORIE COUNTER WITH DEEP NEURAL NETWORK

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ABSTRACT - This report presents the development of a Nasi Lemak Calorie Counter system using a deep learning approach. The objective of the project is to accurately detect and estimate the calorie content of various components in Nasi Lemak, a popular Malaysian dish. The methodology involves data collection, model training using a single-shot multibox detector (SSD) architecture, and integrating the trained model into a user-friendly interface. The system achieves accurate object detection and estimates calorie content based on the detected components. The performance of the system is evaluated using precision, recall, and mean Average Precision (mAP) metrics. The results show promising performance, with an overall mAP score of 32.27% across different components. The system's limitations are identified, including the need for a larger dataset and further optimization for real-time usage. Future directions include dataset expansion, integration of additional dishes, and enhancing real-time performance. The Nasi Lemak Calorie Counter system provides a valuable tool for individuals to monitor their calorie intake accurately and make informed dietary decisions.

Keywords: Nasi Lemak, calorie estimation, object detection, deep learning, single-shot multibox detector, mean Average Precision (mAP)

1. INTRODUCTION

The objective of this project is to develop a Nasi Lemak Calorie Counter system using deep learning techniques. Nasi Lemak is a popular Malaysian dish with various components, and accurately estimating its calorie content can be challenging. The system utilizes a deep learning model based on the single-shot multibox detector (SSD) architecture to detect and localize different components, such as rice, chicken, anchovies, peanuts, sambal, and cucumber. The trained model is integrated into a user-friendly interface, allowing users to capture images of Nasi Lemak and obtain calorie estimates for each component. The project aims to provide individuals with a convenient tool for monitoring their calorie intake and making informed dietary choices.

2. METHODOLOGY

The methodology consists of several key steps. Firstly, a diverse dataset of annotated Nasi Lemak images is collected and preprocessed. The SSD model is then trained using this dataset, optimizing for object detection and localization. The training process involves multiple iterations, adjusting hyperparameters, and fine-tuning the model to achieve optimal performance. The trained model is integrated into a graphical user interface (GUI), enabling users to capture images and obtain real-time predictions of the Nasi Lemak components. The calorie estimation is based on the average calorie values obtained from the Malaysian Food Composition Database.

3. RESULTS AND DISCUSSION

The performance of the Nasi Lemak Calorie Counter system is evaluated using precision, recall, and mean Average Precision (mAP) metrics. The system achieves promising results, with an overall mAP score of 32.27% across different components. The individual component mAP scores range from 15.74% for kacang to 59.33% for telur. These scores indicate the system's capability to accurately detect and estimate the calorie content of Nasi Lemak components. However, the system's performance can be further improved by expanding the dataset and optimizing for real-time usage.

4. NOVELTY OF RESEARCH / PRODUCT

This research brings novelty through the development of a Nasi Lemak Calorie Counter system that combines object detection and calorie estimation using deep learning techniques. The integration of deep learning algorithms, such as the single-shot multibox detector (SSD), enables accurate detection and localization of Nasi Lemak components in images (Liu et al., 2016). The system incorporates the Malaysian Food Composition Database for precise calorie estimation, setting it apart from generic food tracking applications (Malaysian Food Composition Database). By focusing specifically on Nasi Lemak, a popular Malaysian dish, this research addresses the unique challenges posed by its diverse components and variations. The comprehensive tool provides a user-friendly interface and empowers individuals to make informed dietary decisions (Liu et al., 2016). This research contributes to the fields of computer vision and nutrition tracking, offering a novel solution tailored to the Malaysian culinary landscape.

5. CONCLUSION

The Nasi Lemak Calorie Counter system demonstrates the effectiveness of deep learning techniques in accurately detecting and estimating the calorie content of Nasi Lemak components. It provides a user-friendly tool for individuals to monitor their calorie intake and make informed dietary choices. The system's performance can be enhanced by addressing limitations such as dataset size and real-time optimization. Future directions include dataset expansion, integration of additional dishes, and further improvement of real-time performance. The Nasi Lemak Calorie Counter system contributes to the field of computer vision and offers a valuable solution for individuals seeking to maintain a healthy and balanced diet.

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