Car Logo Recognition using YOLOv8 and Microsoft Azure Custom Vision

Muhammad 'Arif Mohd Anuwa
Centre for Mathematical Science
Universiti Malaysia Pahang Al-Sultan
Abdullah,
Lebuhraya Persiaran Tun Khalil Yaakob,
26300 Gambang, Pahang, Malaysia.
sd20053@student.ump.edu.my

Nor Azuana Ramli
Centre for Data Sciences & Artificial
Intelligence
Universiti Malaysia Pahang Al-Sultan
Abdullah,
26300 Gambang, Pahang, Malaysia.
azuana@ump.edu.my

Mohd Zaid Waqiyuddin Mohd Zulkifli
Credence,
1 Jalan Damansara, Damansara Kim, 60000
W.P. Kuala Lumpur, Malaysia.
zaidwaqiyuddin@credence.tech

Abstract— **This research is conducted with its main objective to develop an accurate and faster model that can identify brands from logos captured through car images used by Universiti Malaysia Pahang Al-Sultan Abdullah (UMPSA) staff. The software used for this case study is You Only Look Once (YOLO) version 8 and Microsoft Azure's Custom Vision. Each software was compared and results from the analysis showed that YOLOv8 is renowned for its speed and efficiency and is capable of real-time object detection, which makes it ideal for applications where speed is critical. However, this approach might occasionally compromise accuracy, especially for smaller objects or objects that are close together. Microsoft Azure Custom Vision, on the other hand, may not be as fast as YOLOv8, but it generally delivers high accuracy, especially if adequately trained with a diverse set of tagged images. To conclude, the choice between YOLOv8 and Microsoft Azure Custom Vision depends on the specific requirements of the project, technical expertise, and resources.**

Keywords—Car logo recognition, You Only Look Once, Microsoft Azure, image processing, object recognition.

I. INTRODUCTION

Analysing digital photos for valuable data is called image analytics. This method incorporates many levels of image analysis, from the most basic, like reading bar codes, logos, and text, to the most complex tasks such as identifying specific items in a picture. Image analytics is utilised for brand recognition through the process of classifying and arranging photographs related to the brand logos. Although image analytics for brand recognition has already been applied in Malaysia, the focus of this case study is on the development of an accurate and faster model that can identify brands from logos captured through car images used by Universiti Malaysia Pahang Al-Sultan Abdullah (UMPSA) staff.

There are lots of previous studies that have been conducted involving car logo recognition and most of the methods proposed are traditional car logo recognition such as template matching, feature point, Histogram of Oriented Gradients (HOG), and traditional machine learning methods and deep neural networks. Study done by [1] proposed a car logo recognition method based on enhanced matching, constrained region extraction and a single shot feature pyramid detector (SSFPD) network. This study improved the classification performance of the network by using SSFPD combined with a reduced ResNeXT model. The results of the study showed that

93.79% accuracy was achieved on the standard vehicle logos dataset and 99.52% accuracy was achieved using different public datasets, which indicated that the proposed model outperformed the existing method.

Studies by [2] and [3] applied convolutional neural networks (CNN) to learn characteristics for car logo recognition automatically. However, results obtained in [2] showed that hybrid CNN provided better accuracy, precision, recall and F-score compared to traditional CNN where 400 images were used in this study. Meanwhile, results from [3] showed that an average accuracy of 99.07% was obtained by applying 10,000 logo images for training and 1500 logo images for testing. It can be concluded that CNN can perform better if there are large datasets being applied to train the model.

The latest study by [4] applied You Only Look Once (YOLO) version 4 in detecting car logos. The CSPDenseNet was introduced to improve the backbone feature extraction network, and a shallow output layer was added to replenish the shallow information of the target. Then, the deformable convolution residual block was employed before a new detection head based on a convolutional transformer block was proposed. Results from this study showed that the average accuracy of all categories in the VLD-45 dataset was 62.94%, which was 5.72% higher than the original model. Although some techniques for pre-processing for this study are different from [4], it has similarities with this study since both studies applied YOLO as a method for logo recognition.

This study contributes to companies and agencies where they can benefit from a more profound comprehension of brand recognition and the insights can be used for marketing. Besides, the academic community can gain a more profound familiarity with brand sentiment analysis in both the classroom and the real world. As this study is more on the comparison between two tools, this paper is organised as follows, where related works is presented in the next section. All the methods and techniques used in analysing car logos will be explained in section III. Then, all the results obtained are discussed in section IV before this paper ends with a brief conclusion and some recommendations that can be done for future study.