UNIVERSITI TEKNOLOGI MARA
CAWANGAN PULAU PINANG

CLASSIFICATION OF METAL SCREW DEFECT DETECTION USING FOMO ON EDGE IMPULSE

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February 2025

AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work.

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ABSTRACT

Surface defects in metal screws are typically identified through manual inspection, which can be prone to human error. The introduction of deep learning, particularly in visual detection, offers a significant improvement in the effectiveness and precision of defect identification. This project uses the FOMO (Faster Objects, More Objects) algorithm to detect surface flaws on metal screws. FOMO is optimized for real-time applications, making it suitable for edge devices with limited resources such as microcontrollers. The model processes images to identify defects by analyzing features such as shape, texture, and structural integrity. By enabling defect detection directly on compact, low-power devices, this method reduces the need for expensive hardware and complex setups. The results demonstrate that FOMO not only achieves high accuracy of 94.5% in defect detection but also operates efficiently, with minimal latency, making it ideal for real-time applications. Furthermore, this approach underscores the growing role of deep learning in automating quality control processes, offering a fast, reliable, and scalable solution for the manufacturing industry.

ACKNOWLEDGEMENT

Firstly, I wish to thank Allah the Almighty, the Most Gracious, and the Most Merciful for giving me the strength, patience, and determination to complete this final year project successfully. My deepest gratitude and thanks go to my supervisor, Prof Madya Ir Ts Dr. Zainal Hisham Che Soh, for his invaluable guidance, constant encouragement, and expert advice throughout this journey. His profound knowledge and insightful feedback have been crucial in shaping this project and bringing it to completion.

I am deeply thankful to my mother, Wan Radiah Binti Wan Embong, and my father, Daing Bin Ismail, for their unwavering support, sacrifices, and endless encouragement. Their belief in me has been my source of strength and inspiration, and I dedicate this achievement to them.

This journey would not have been possible without the collective help, guidance, and encouragement of these individuals, to whom I owe my sincerest gratitude.

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