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ASSESSMENT LEAF WATER CONTENT USING SPECTRAL INDICES BY UNMANNED AERIAL VEHICLE

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Thesis submitted in fulfilment
of the requirements for the degree of
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College of Built Environment, CBE.

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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. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Under - Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

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ABSTRACT

Harumanis mango (Mangifera indica L) is a highly sought-after mango cultivar in Northern Peninsular Malaysia, particularly in Perlis. However, the effects of unpredictable weather patterns, such as climate change, have led to poor harvests due to increased temperatures and water stress during the flowering phase. In response, this study aims to gather data on leaf water content using spectral indices obtained through multispectral unmanned aerial vehicle (UAV) imagery. To address this issue, the study aims to collect data on leaf water content using multispectral imagery from unmanned aerial vehicles (UAVs). The DJI Phantom 4 Pro drone captured the images, and software like PIX4D and ArcGIS 10.4 processed the data. The study also utilized an Agri Quadcopter XP25 drone sprayer to spray water on the study site. This technology proves beneficial for farmers who lack resources to water their crops during droughts, particularly for Harumanis mango crops. Furthermore, it represents a smart farming application supporting the industrial revolution (IR4). This study objectives are to identify and generate suitable indices using UAV sensors and analyse the results in purpose to satisfy the study aim. The study found that the GNDVI and NDWI values ranged from -0.6770 to 0.9435 and -0.7014 to 0.9220, respectively, for the initial data. The secondary data, the ranges were -0.5876 to 0.9454 and -0.6867 to 0.7913. Next, the correlation between GNDVI and NDWI show a slightly positive connection for the before and after spraying. From the result, it can help the farmers to monitor their crop health and reduce the water stress during the flowering phase.

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