I-VIEW: AN IMAGE PROCESSING AND MACHINE LEARNING APPROACH FOR ACCURATE IDENTIFICATION OF SOYBEAN *(Glycine max L.)* CROP AND WEEDS

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ACCEPTANCE SHEET

This undergraduate thesis entitled **"I-VIEW: AN IMAGE PROCESSING AND MACHINE LEARNING APPROACH FOR ACCURATE IDENTIFICATION OF SOYBEAN (Glycine max L.) CROP AND WEEDS,"** prepared and submitted by **RONNY ANGEL B. PASTRANA,** in partial fulfillment of the requirements for the degree of **BACHELOR OF SCIENCE IN AGRICULTURAL AND BIOSYSTEMS ENGINEERING (AB MACHINERY AND POWER ENGINEERING),** is hereby accepted:

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BIOGRAPHICAL SKETCH

The author, Ronny Angel Barrozo Pastrana, was born in San Jose City on October 3, 2001, and currently resides in Ligaya Llanera, Nueva Ecija. She is the eldest child of Ronaldo Panday Pastrana and Mary Rose Barrozo Pastrana.

She took her primary and secondary education at Ligaya Elementary School and Core Gateway College Inc., respectively, where she was a consistent honor student. She participated in several poster-making competitions during High School. These experiences allowed her to explore her creativity while honing her technical skills. Ronny graduated from Senior High School at Core Gateway College, Inc. with High Honors, demonstrating academic excellence and a talent for the arts. In 2019, Ronny was admitted to Central Luzon State University to pursue a Bachelor of Science in Agricultural and Biosystems Engineering, majoring in AB Machinery and Power Engineering.

Aside from academics, she was also a Student Leader at Central Luzon State University (CLSU). She was a member of an organization, Engineering Computer Club, which developed her leadership skills. This role allowed her to guide her peers and make important decisions. Working with others in the club also boosted her confidence and made her proud of her accomplishments.

Ronny also took part in training at PHilMech, where she gained real-world experience in Agricultural and Biosystems Engineering. This hands-on training helped her learn about the equipment and technology used in her field, giving her valuable skills to apply in her future career.

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ABSTRACT

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In recent years, the classification of soybean plants and weeds has gained traction due to the increasing need for automate d agricultural solutions. To address this, the study introduces I-VIEW, also known as Intelligent View, a deep learning-based approach using Convolutional Neural Networks (CNNs) to classify soybean plants and weeds accurately. This approach was trained on eight different soybean varieties, including Black, Brown, Canada, Clsoy 1, Clsoy 2, Collection 1, Collection 2, and Tiwala 10 Soybean, incorporating advanced image processing techniques to improve accuracy and RGB image processing to prepare the dataset for training. The deep learning models for I-VIEW were developed using Python, a versatile and widely used programming language known for its robust ecosystem of machine learning libraries such as TensorFlow and Keras. The evaluation was conducted at three levels: overall classification accuracy on a testing dataset, validation dataset, and real-world testing. The testing dataset achieved a perfect accuracy of 100% with no errors among 900 images; the validation dataset attained an accuracy rate of 94.7% with a 5.3% error rate. In real-world scenarios, the accuracy rate is 91% and 9% error rate. The proposed method outperforms previous relevant works and provides a reliable approach to identifying soybean plants and weeds.

Keywords: image processing; machine learning; soybean crop; weed identification

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