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Editorial

Computer Vision as Prime Mover of Agricultural Revolution 4.0

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The broad transitions of agricultural technologies from the prehistoric to modern agricultural production, management, and decision support systems determine the validity of the so-called agricultural revolution. By definition, it is the intensifying increase in agricultural outputs that are dominantly based on the developed techniques and approaches in the levels of germplasm up to energizing systems of plant factories. The latest recorded and widely accepted third agricultural revolution is the Green Revolution that happened five decades ago in the developing world especially in European and Western countries. This have significantly contributed to boost their economy and scientific outputs.

Another wave of agricultural revolution, informally denoted as Agricultural Revolution 4.0 (AR4.0), is now advancing. AR4.0 is being empowered by the impacts of industrial revolution. Precision agriculture-related technologies are coherent to this one especially computer vision. Computer vision is basically the application of algorithms to extract significant vegetation features whether it is coming from the crops or its cultivation medium for decision support system. There are several applications in sowing, cultivating, harvesting, and storing of agricultural products that mainly use unmanned aerial vehicles [1], biosensors, and cameras for intelligent systems. These intelligent systems are close environment agriculture that allows the production of crops all year round. It may be implemented in a hydroponic, aquaculture, aeroponic, and aquaponic cultivation systems approach. However, the major problem for electrical-powered cultivation is the sustainability challenge. One innovation is the multiple use of crops being cultivated such as a Smart Farm in Morong, Rizal, Philippines that grows loose-leaf lettuce and used the lettuce leaf extracts to fabricate a dye-sensitized solar cell as substitute to the toxic element ruthenium [2]. Computer vision was used here to verify the innate phytopigments. The leaf extract as optimized using evolutionary strategy significantly increased the solar energy efficiency of the developed solar cells, thus, contributing to the materialization of sustainability in the local region. Another important application of computer vision in the field of crop science is the non-destructive assessment of chlorosis and necrosis visible in the leaves [3]. Hence, the role of computer science particularly in the integration of computer vision and computational intelligence is deemed essential because of the need the community and industry demands.

The author confidently believes that we have only scratched the outer shell of what computer vision could provide in the field of agricultural technologies. Persistent innovation and development of image processing algorithms and schemes could undoubtedly contribute to its advancement. Local policies for computer vision applications must stem out from the research institutions, government, and industries. Such contribution of standards has a great hint of economical progress for the years to come.

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