

2021臺灣國際蘭花研討會蘭科植物科技研發成果發表 Taiwan International Orchid Show Orchid Research Result Publication

技術/專利：非破壞性質檢測之蝴蝶蘭品質分級系統

technology/patent：A Quality Grading System of Pot-Phalaenopsis Orchid Using Non-destructive Inspection

研發機關：國立嘉義大學資訊工程系

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摘要 Abstract

蝴蝶蘭成株外銷在臺灣花卉產業上扮演一很重要角色，一般產品的分級選別作業，包括盆苗以及開花株品質辨識等，本研究透過影像處理、電腦視覺與人工智慧等技術導入，開發出蝴蝶蘭種苗及開花株非破壞性質檢測系統，建立出一套標準化之品質選別機制。我們首先應用影像處理與人工智慧技術，量測蝴蝶蘭種苗生長相關定量特徵，包含：盆苗葉幅、葉片夾角、葉片長度、葉片長寬比與葉片總數等參數；以及量測開花株之花梗數、花苞數、花朵數、掉苞/花數以及花序長等，再根據產業慣用種苗分級評分標準，設計相關種苗分級演算法，開發出一蝴蝶蘭種苗及開花株品質分級系統，改善傳統以目視及經驗判斷的分級方式，同時也建立出蝴蝶蘭品管作業標準，藉此有效降低人工作業成本，達到農業知識數位化、生產自動化、產品優質化、操作便利化及溯源雲端化的農業4.0目標。

Phalaenopsis plant export plays an important role for flower industry in Taiwan. In general, the quality grading of phalaenopsis products can be decomposed into two stages: evaluating the quality of pot seedlings and flower plants. In this study, we develop a smart and non-destructive inspection system of pot-phalaenopsis based on quality grading with various techniques including: image processing, computer vision and artificial intelligence to establish a standardized selection mechanism. It measures quantitative growth parameters of pot-phalaenopsis including: leaf span, leaf angle, leaf length/width, ratio of length/width and total leaf number, and number of the flower buds, number of flowers, numbers of dropped buds/flowers, number of stalk and length of inflorescence based on computer vision and AI technology. We believe the proposed smart inspection and quality grading system of Phalaenopsis can thus enhance the competence capabilities of the flower industry.

圖表 Figure & Table

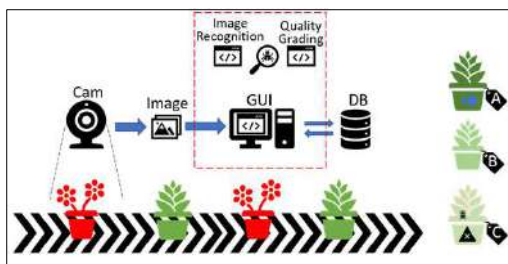


Figure 1. Architecture of the proposed Phalaenopsis grading system

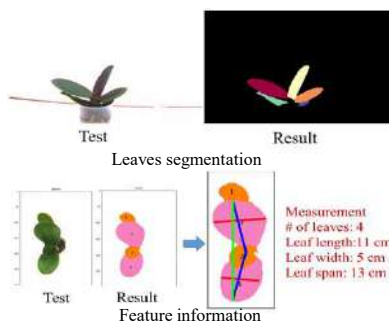


Figure 3. Leaf detection on pot-seedlings and extraction of growth parameters



Figure 4. Detection Plant disease and pests



Figure 5. Classification on flower plants



Figure 6. A quality grading system of flower plants



Figure 7. A quality grading system of pot-seedlings

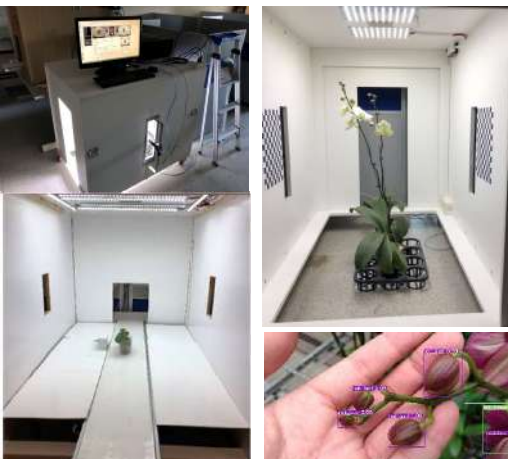


Figure 2. Top-left: image fetching environment; bottom-left: transportation; top-right: flower plant; bottom right: identification using Deep Learning