中文摘要：

深度學習技術能達到快速有效的農作物坵塊之自動標示與判釋，因此可以讓國家對農情的掌握與回應更有效率，但這類型技術在實務上仍有不少挑戰與困難需要克服。為了回應這些重要的問題，本計畫訂定下列兩項研究目標：第一項是基於深度學習方法開發判釋不同時期水稻植被的模型。根據我們先前的研究成果，我們預計利用Unet-VGG16作為進行影像分割的深度學習方法，也就是運用影像分割方法來自動分割水稻植被。第二項是研究將植生指標作為深度學習特徵之效益，並依據此結果開發影像分割模型。我們過去已嘗試使用RG-NIR和NIR-RG作為輸入。在接下來的研究中，我們將嘗試混和原始資料與植生指標如NDVI。在完成這兩項技術之開發後，我們預計利用水稻植栽坵塊來驗證這些新的深度學習模型之效能。

英文摘要：

Deep learning technologies can be used to automatically interpret aerial photographs, such as labelling agricultural fields with their types. Even though they are promising technologies, high accuracy on segmenting and labelling agricultural fields still remains challenging. This proposal focuses on the issue of automatic rice field segmentation and labelling at different rice growth stages. There are two research goals in this proposal. First, we will develop a deep learning model on top of the Unet-VGG16 architecture for semantic segmentation of rice fields at each rice growth stage. Second, we will develop deep learning models based on several vegetation indices such as NDVI, in order to segment and label rice fields at different growth stages correctly and efficiently. After the development of the segmentation and labelling technologies, we will use aerial photographs with rice fields to evaluate the efficiency of the proposed deep leaning models.