摘要

　　為發展與推廣智慧國土及智慧測繪科技以及相關應用，內政部 109 年度辦理「智能測繪科研發展計畫」，透過發展人工智慧與大量數據分析技術，利用衛星與航遙測影像進行國土地表形變分析、整理國際遙測影像訓練資料集、辦理相關科教活動等，進一步提升國土利用與形變分析技術。隨著人工智慧技術逐漸受到重視，如何將這些技術擴充及應用於國土利用與形變分析技術上，已成為刻不容緩的重要課題。

　　本計畫目的為發展人工智慧於測繪科技之相關應用，並透過人工智慧技術進行航遙測影像分析、辨識等應用。在技術發展與應用方面，本計畫工作成果包含：(1)透過雷達衛星影像地表形變智慧分析、機器學習等相關技術，發展衛星影像地表形變分析技術、(2)建立航遙測影像地表形變智慧分析、影像智慧辨識訓練資料集等相關技術，發展航遙測影像辨識技術與應用、(3)衛星與航遙測影像智慧分析與辨識，進行製圖防災整合應用案例試辦、(4)發展智慧物聯網之防災整合應用技術。在推動與評估方面，本計畫工作成果包含：(1)高程基準潮位站數據分析、(2)科教活動之推廣、(3)協助與配合內政部推動國際測繪合作事務、(4)發展智能實驗室。

　　本期報告詳述上列工作內容之實施方法以及階段性成果。透過本計畫的執行，達到整合與強化人工智慧應用之發展、落實科技紮根、厚植國家科研人才，以及提昇相關產業與國家整體的競爭力。

CSRSR

Abstract

In order to develop and promote related technologies and applications for smart land use and deformation monitoring and analyses, the Ministry of Interior (MOI) has initiated the "Technology Development for Smart Surveying and Mapping" project in 2020. The initiative aims to develop and integrate satellite and airborne remote sensing analysis with artificial intelligence (AI) and Big Data Analysis related technologies for land use and deformation monitoring and applications. In addition, the project will also promote the use of these new technologies and increase the public awareness of their applications.

In terms of technology development, the primary contents of this project include: (1) satellite-based optical and SAR data analysis for land change and deformation analysis and machine learning for this type of analysis; (2) airborne image analysis for land use and deformation monitoring and object detection applications; (3) smart analysis of satellite and airborne images for mapping and hazard mitigation applications; and (4) integrated IoT technologies for hazard mitigation applications.

On the other hand, this project also undertakes necessary tasks to promote the related technologies and their applications. These tasks include: (1) analysis of tidal station data; (2) promotion and popular science education of related topics; (3) international promotion and collaboration on surveying and mapping; and (4) establishment of smart mapping laboratories.

This report describes the materials, algorithms, and methodologies used and developed in this project as well as the progress and preliminary results of the tasks listed above. The outcomes of this project not only will integrate AI and remote sensing for smart surveying and mapping but also build and increase

the capacity for technology development and applications.