高效能突發性水患預警展示研發與衝擊分析

Development of High-performance Early Warning Visualization and Impact Analysis Models for Flash Flood Disasters

主管單位：國家科學與技術委員會

陳偉柏　　郭文達　　江申　　魏曉萍　　林燉瑛　　張志新

國家災害防救科技中心

摘要

　　國家災害防救科技中心 111 年度於智慧防災架構下，執行「高效能突發性水患預警展示研發與衝擊分析」計畫，本防災科研究計畫 111 年度各項災害預警技術研發工作分為三大主軸，包括「應用人工智慧、影像分析及統計分析技術完成水文水理災害預警模擬程序架構」、「導入暴雨逕流與平行計算技術開發突發性高效能洪災預警分析模式」以及「開發劇烈海象衝擊分析模擬技術」。計畫年度成果已完成項目條列如下：

1. 應用人工智慧技術完成水文水理災害預警模擬程序架構；
2. 應用人工智慧技術完成水理災害預警模擬程序架構；
3. 開發影像數據驅動水理災害預警技術；
4. 不同降水延時之動態淹水警戒值的應用與分析；
5. 導入暴雨逕流模組及平行計算技術開發都會區閃洪預警分析模式；
6. 開發劇烈海象衝擊分析模擬技術

關鍵詞：人工智慧、影像分析、統計分析、平行計算、劇烈海象

Abstract

　　In 2022, the National Science and Technology Center for Disaster Reduction (NCDR) carried out the "Development of High-performance Early Warning Visualization and Impact Analysis Models for Flash Flood Disasters" project in the framework of "Intelligent Disaster Prevention." The three primary purposes of this project have been implemented this year. There are "Application of artificial intelligence, image analysis, and statistical analysis technology to attain the early warning simulation program framework of hydrological and hydraulic disasters," "Introduction of storm runoff and parallel computing technology to develop sudden high-efficiency flood early warning analysis model," and "Development of severe walrus Shock Analysis Simulation Technology." The annual results of the plan and the completed projects are listed as follows:

1. Apply artificial intelligence technology to complete the early warning and simulation

program structure of hydrological and hydraulic disasters;

2. Application of artificial intelligence technology to complete the framework of hydraulic disaster early warning simulation program;

3. Develop image data-driven hydraulic disaster early warning technology;

4. Application and analysis of dynamic flooding warning values with different precipitation delays;

5. Introduce the rainstorm runoff module and parallel computing technology to develop a flash flood warning model for urban areas;

6. Development of severe marine weather impact analysis and simulation techniques.

Keywords：artificial intelligence, image analysis, statistical analysis, parallel computing, severe marine weather