發展智慧室內外製圖技術

Developing indoor and outdoor intelligent mapping technology for mobile devices

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摘要

測繪與空間資訊相關應用領域，由於移動測繪系統的機動性、多元感測資訊以及對數位影像處理與蒐集的能力，可以明顯節省過去傳統測量所需要的人力及時間。故除了傳統的空間資訊與測繪應用以外，隨著移動裝置的普及、無人載具的發展與自駕車技術的研究，預期結合現有移動測繪技術、室內圖資建置技術、物聯網空間資訊應用將有效支撐適地性服務急速擴張的需求，這對深化空間資訊領域產業的發展有正面的助益。另一方面，隨著智慧型運輸系統的發展，自動駕駛汽車成為未來全新的交通方式。自駕車用地圖在自駕車運行具有不可或缺之地位，提供自駕車決策系統輔助，降低技術門檻及所需經費，並且提升安全性。國內已累積多年發展與應用車載移動製圖技術之經驗，並具備成熟的資料處理技術。

除了傳統的空間資訊應用外，隨著適地性服務相應而生，空間資訊業者目標將從戶外的廣大天地轉進至建築物內，身入其境的室內圖資可對消費者產生視覺性及情緒性的影響，發掘出更大商機。本案針對當前高精地圖的產製程序與經驗延伸至室內地圖的建置應用之可行性，訂定完整的室內測繪作業程序，並針對成功大學總圖書館地下停車場、電機工程學系系館地下停車場、科技部資安暨智慧科技研發大樓停車場進行圖資繪製，藉由實際室內製圖試辦調整室內測圖的程序，以利未來室內高精地圖相關指引與標準的建置。

關鍵詞：室內智慧製圖、室內語義地圖、移動測繪系統、高精地圖

Abstract

In the application related to surveying and mapping, the mobile mapping systems can significantly save the workforce and time required. Based on hardware improvements, mobile sensors are becoming more diverse, smaller, and cheaper, while the accuracy is improving. On the other hand, with intelligent transportation systems, autonomous vehicles have become a

new way of transportation in the future. The map for autonomous vehicles is indispensable in the operation of autonomous vehicles. It assists in autonomous vehicle decision-making systems and lowers the technical threshold. High-definition maps (HD maps) for autonomous vehicles mainly rely on the onboard sensors to obtain point clouds and images and is produced through feature extraction and manual assistance methods. However, if there is no unified standard production process, specification, and map formats for producing HD maps for autonomous vehicles, it may cause inconsistent format issues, resulting in unnecessary resource investment and safety issues of autonomous vehicles.

In addition to traditional spatial information applications, the surveying industry will focus on the indoor intelligent mapping technology. This project refers to the HD maps guideline, HD maps standard, and outdoor mapping experience to construct the indoor surveying and mapping operation procedure. The test fields are the underground parking lot of National Cheng Kung University library and the Department of Electrical Engineering, and Cybersecurity & Smart Technology R&D Building. The mapping procedure will be adjusted through the actual mapping. All the experiences will facilitate the establishment of relevant guidelines and standards for indoor HD maps in the future.

Keywords：Indoor intelligent mapping, Indoor semantic map, Mobile mapping, system, High definition map