

船舶航行安全大數據資料庫應用與分析

Ship navigation safety Application and Analysis Research of Big Data

主管單位：交通部運輸研究所

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摘要

本計畫主要著重在結合人工智慧與大數據分析技術建置一 AI 智慧化船舶航行安全監測與預測系統。透過資料探勘技術挖掘 AIS 資料庫的船舶資訊，藉以研析我國海域範圍內船舶航行資訊以及我國海域船舶航行特性，並將這些分析完的基礎數據，經過資料錯誤整理與動態壓縮處理後取得具有特徵價值的訓練資料，再藉由所建置之預測模型針對海上 AIS 船舶進行航行經緯度座標的預測。接著則進一步針對船舶航行行為進行安全評估，其船舶航行安全評估系統能夠分別饋入即時 AIS 資料與預測系統之預測結果數據進行海上 AIS 船舶航行異常行為的監測與預測應用。

此次整體研究開發成果包括：船舶航行安全預測系統建置、船舶航行安全評估系統建置、船舶航行位置預測、船艙異常監測功能開發、偏離航道監測功能開發及船舶碰撞預測功能開發。藉由系統功能的開發建置，得以有效協助找出船舶航海時的異常行為並評估其潛在的威脅，使船舶違規航行、海上事故、需水上救援等異常情況事件發生前，岸台監控的當值人員能有足夠預警時間反饋給有關單位處理，提升船舶航行安全。其研究成果將可供我國海洋委員會、交通部航港局、海巡署等單位做為一海上航安監測之輔助系統，從而提升我國海洋事務安全管理之效益。

關鍵詞：航行監測、自動識別系統、資料庫、人工智慧、大數據、深度學習、碰撞告警、偏航告警

Abstract

This project is focus on the analysis of ship navigation safety big data database. The content of this project is to extend the research results of the previous year. We use the data mining technology to mine the ship information in the AIS database to study the ship navigation information. After analyzing these basic data, we use the prediction model to predict the latitude and longitude coordinates of the maritime AIS ship. The next step is to further evaluate the safety of the ship's navigation behavior. The ship's navigation safety evaluation system can feed the real-time AIS data and the prediction result data of the prediction system.

The results of the overall research and development include: the construction of a ship

navigation safety prediction system, the construction of a ship navigation safety evaluation system, the prediction of the ship's navigation position, the development of a ship's abnormality monitoring function, the development of a departure channel monitoring function, and the development of a ship collision prediction function. Relevant technological developments such as aviation security monitoring have become one of the issues. The evaluation of the results of this research will effectively assist Taiwan relevant offices in the efficiency of ship navigation safety management.

Keywords : Navigation monitoring, automatic identification system, database, artificial intelligence, Big data, machine learning, collision warning, yaw warning.