Bulletin

Memorandum of Understanding Collaboration in Innovation and Technology

Foreword

To strengthen the synergy of the Hong Kong Police Force (the Police Force) in delivering quality policing service, the Information Systems Wing (ISW) of the Police Force signed a Memorandum of Understanding (MoU) with the Hong Kong Science and Technology Parks Corporation (HKSTP) in September 2022 to explore innovative and value-added technological solutions and nurture innovation and technology (I&T) talents.

During the three-year period covered by the MoU, the Police Force and HKSTP will cooperate in five technology areas, including **Natural Language Processing (NLP), Geographic Information Systems (GIS), Simultaneous Localisation and Mapping (SLAM), Augmented Reality (AR), and Search and Rescue Operations-related (SAR) technologies.** Through tech ventures connected by HKSTP, the Police Force will develop customized innovative solutions and jointly test these solutions in actual operational environments to enhance their applicability.

This cooperation is tremendously significant for both parties. **Not only is this the first MoU between a government bureau/department and HKSTP, but it also represents the fruit of Hong Kong Government and HKSTP's efforts over the years in connecting industry, academia and research,** which is now gaining widespread recognition across public and private sectors. In the first year, more than 50 Parks-based companies were referred by HKSTP for Solution Scouting and Brain Storming with 40 odd matching meetings arranged.

This level of engagement underscores the meaningful collaboration achieved between the organizations. It is believed that this cooperation will inspire more organizations to leverage technology and provide valuable application opportunities for tech ventures' technologies.

To commemorate the first anniversary of signing of the MoU, this special bulletin is published to highlight various projects in collaboration between the Police Force and the Hong Kong Science and Technology Parks Corporation.

Information Systems Wing
Hong Kong Police Force

Awards

Co-development of Smart Rescue Solutions with ALTAI Technologies Limited won three Gold Medals with the Congratulations of the Jury in Geneva Inventions

Utilizing advanced technologies and streamlining processes for improving public safety and saving lives

In search and rescue ("SAR") operations, every second counts. In the past four years, the number of SAR missions in Hong Kong has rapidly increased by 370%. The dangerous terrain and remote coastline often pose great challenges to rescuers. Particularly where mobile network signal coverage is limited, locating the person at risk becomes extremely difficult.

With a view to enhancing SAR capability in various conditions, the Police Force has jointly invented "Signal Radar" with **ALTAI Technologies Limited ("ALTAI")** soon after the signing of MoU with HKSTP in September 2022. Signal Radar is based on ALTAI's patented long range Super Wi-Fi technology that picks up unique SOS signals generated by mobile application "HKSOS", another newly developed SAR solution by the Police Force.

With models of different sizes, Signal Radars can be deployed on helicopters, drones and ground rescue duties. It has the capability to detect SOS signals from a distance of over 500 meters even under densely covered forest canopy and in open sea without relying on mobile network signal coverage. Even in extreme situations, Signal Radar can still transmit the location information obtained from the missing person's GNSS-enabled mobile device to the rescue teams.

In April 2023, the Police Force participated for the first time in the 48th Geneva International Exhibition of Inventions ("Geneva Inventions") to showcase the smart rescue solutions consisting 3R (R-Watch, R-Map and R-Cam) & HKSOS, Signal Radar, and Rescue AI (AI prediction model on search areas in rescue missions). The innovative solutions were examined by the international expert jury panel and all three entries from the Police Force were awarded "Gold Medals with the Congratulations of the Jury" in the category of "Security – Rescue - Alarm". This is a remarkable achievement given that only five such awards were handed out in the same category.

Utilizing advanced technologies and streamlining processes for improving public safety and saving lives is part of the Police Force's Digital Policing. The achievements of the Police Force at the Geneva Inventions represent a significant milestone in the digitalization of Policing.

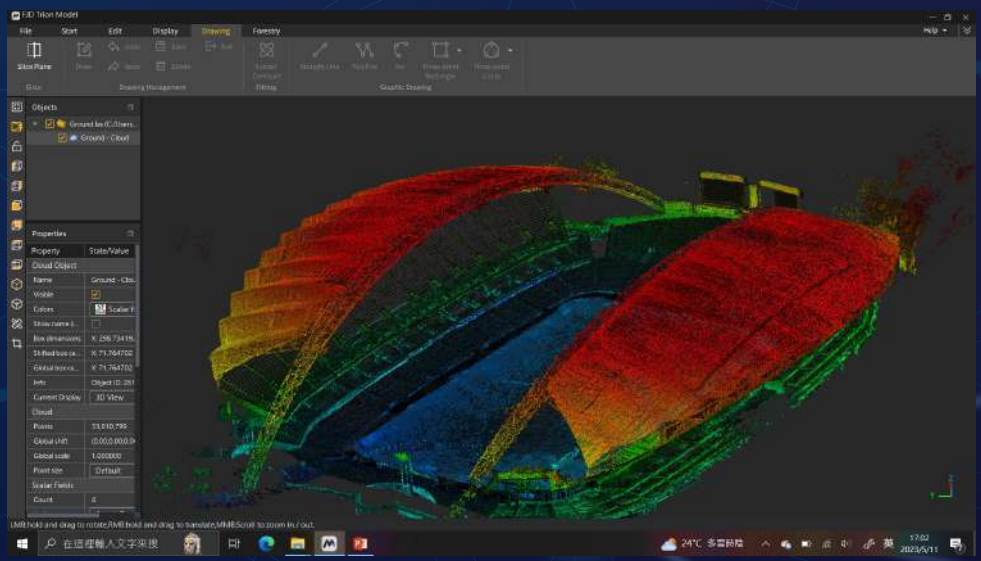
SLAM Technology

Generate high-resolution 3D maps of the surrounding in real-time to support decision-making and guide appropriate actions in various police operations

Simultaneous Localisation and Mapping ("SLAM") is a technology to create an environmental map including location and shape of objects in the vicinity while simultaneously tracking the user's location within it. The technology's ability to operate autonomously in dynamic environments makes it a versatile tool with a wide range of potential policing applications. SLAM commonly uses a combination of sensors such as LiDAR, gyroscope and camera.

In the collaboration between the Police Force and **FJ Dynamics**, a technology venture based in Science Park, SLAM technologies are being utilised into the development of a high-performance handheld LiDAR scanner that can generate high-resolution 3D maps of the surrounding in real-time. The device has a measuring range of up to 120 meters, a field of view of 270 degrees, with an accuracy of 2 cm, making it an efficient tool for mapping and surveying large areas. Police officers can use the scanner to quickly and accurately scan a location of interest to produce a 3D model. This detailed view of the scene and floor plan can support decision-making and guide appropriate actions in various police operations. Furthermore, a customised module will be developed to accurately record scenes of traffic accidents, providing useful information that can aid investigations.

Handheld LiDAR scanner integrated with camera module for generating colour 3D model.



GIS

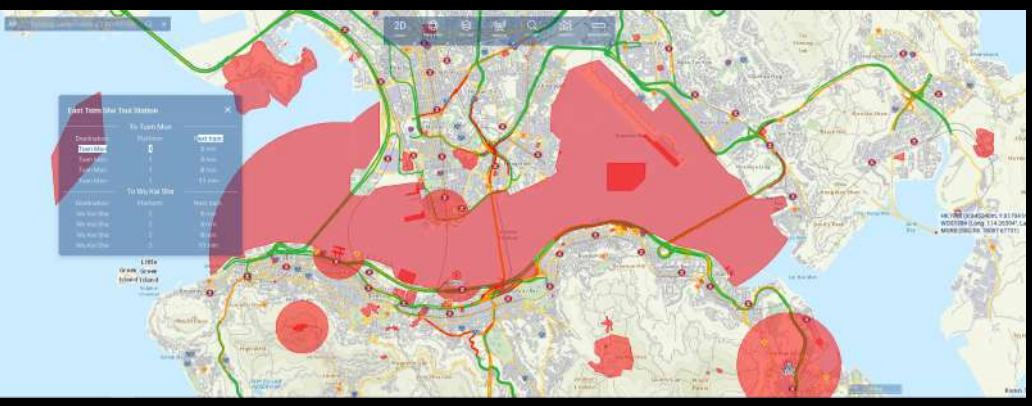
Geographic Information System

To improve situational awareness, aid in decision-making, manage field operations, and promote community engagement

Spatial visualization and analysis have been utilised in policing for operational planning, traffic management and crime analytics. With Hong Kong's transition to a smart city, Geographic Information System ("GIS") technology can be leveraged to improve situational awareness, aid in decision-making, manage field operations, and promote community engagement.

To this end, the Police Force has partnered with **Geosys Hong Kong Limited ("GEOSYS")**, a company based in Science Park, in developing a customised GIS-powered system for policing known as Geospatial Analytics, Information, and Applications ("GAIA"). GAIA incorporates spatial data from the Government's Common Spatial Data Infrastructure ("CSDI") and the Hong Kong Police Force's internal databases to create tailored map layers for specific policing needs.

One of the latest developments of GAIA is the Traffic Module, which provides customised support to traffic officers by integrating lamppost locations and road markings throughout the territory for their need in location sketch. This expedites business processes with enhanced accuracy and efficiency. The Police Force is also exploring other applications of geospatial technologies, such as Building Information Modelling (BIM), to further enhance policing operations.

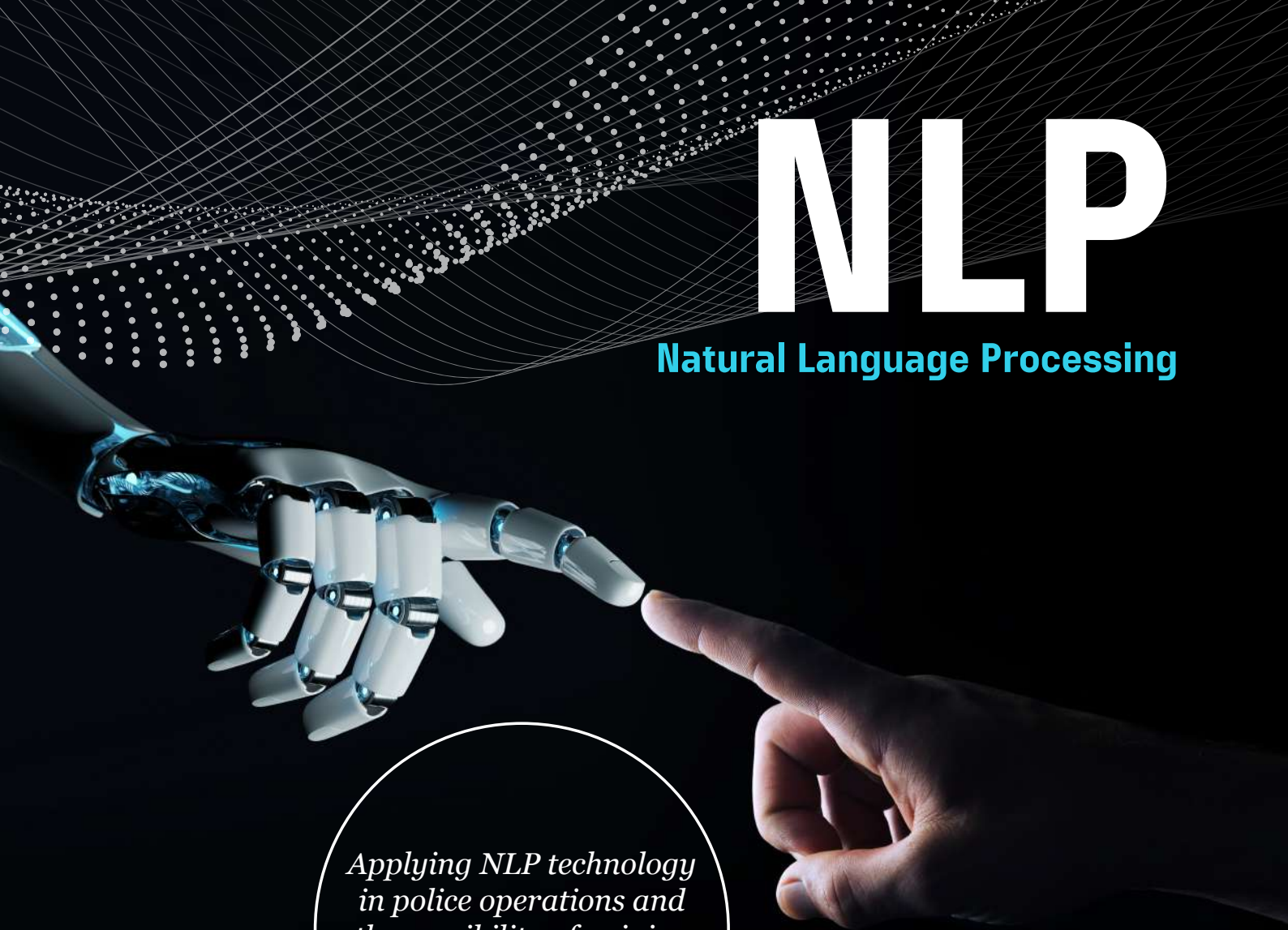


GAIA adopts an intuitive design that most of the functions could be completed by point and click while incorporating various public, government wide and internal geospatial data under one interface.

GAIA supports 3D model with overlaying of dynamic data such as real time traffic flow and MTR arrival time.

NLP

Natural Language Processing



Applying NLP technology in police operations and the possibility of gaining meaningful insights from unstructured data

The Police Force conducted a Proof of Concept (PoC) project on Natural Language Processing (NLP) technology, which is currently one of the fast developing areas of AI. The PoC project aimed to study the feasibility of deploying NLP technology in the Police Force operational settings. A vendor **Neural Lab**, which is based in Science Park, was awarded the PoC project.

In the PoC project, NLP technology was used to extract key data such as date, time, address, and vehicle license plate, as well as other unstructured information from textual records obtained from Force applications. Based on a small set of "sanitized" sample data, the PoC project covered various aspects including system architecture, user interface, and model formulation.

A hybrid approach combining Name Entity Recognition (NER) and Classification was taken for model formulation. A satisfactory accuracy rate of over 70% was achieved.

The successful completion of the PoC project demonstrates the potential of applying NLP technology in police operations and the possibility of gaining meaningful insights from unstructured data. The Police Force will continue to evaluate the suitability of NLP technology for further implementation in operational environments.

Video Analytics

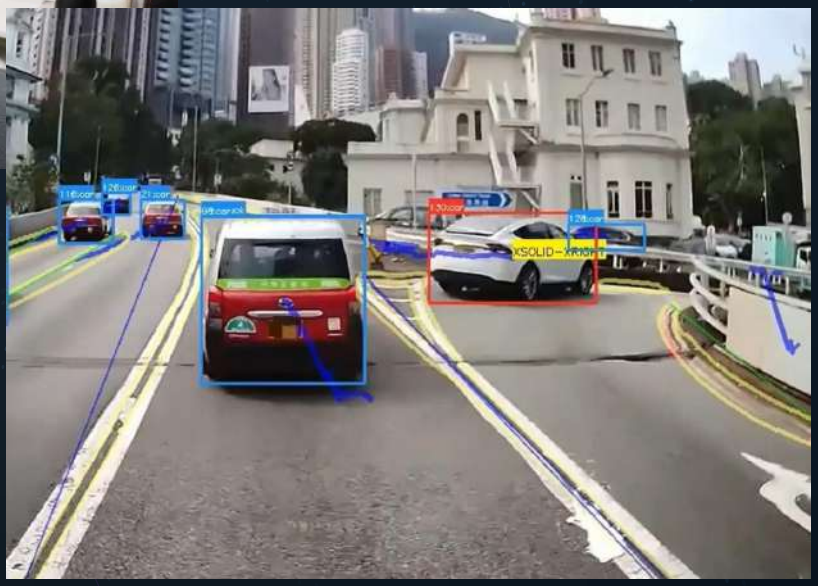
Traffic Violation Detection

Starting from May of 2022, members of the public can report non-emergency traffic offences to the Police Force by uploading videos or photos to the social media. The aim of this new initiative is to raise the awareness of law-abiding driving practices and improve general road safety. By the end of September 2023, more than 107,000 reports have been received. However, the large number of reports require a significant amount of manpower to review, which is very time-consuming.

To address this issue, the Police Force is collaborating with HKSTP to study how artificial intelligence (AI) can be used to identify the traffic violations automatically. Facilitated by HKSTP, ISW and Traffic Branch Headquarters (TBHQ) of the Police Force collaborated to identify **SagaDigits**, an AI technology company based in Science Park, to explore the use of AI in video analytics for traffic violations detection. A proof-of-concept (PoC) trial is being conducted based on sample video clips received. As a start, the PoC trial aims to automatically identify four types of traffic violations: 'Crossing Continuous Double White Lines', 'Failing to Comply with Road Markings', 'Failing to Comply with Traffic Signals' and 'Failing to Comply with Traffic Signals'.

To explore the use of AI in video analytics for traffic violations detection

The process of reviewing the submitted videos one by one is a highly labor-intensive task that requires officers to dedicate significant time and effort



For illustrative purposes only: Automatic Detection of Traffic Offence Violation by Video Analytics System

RFID

Radio Frequency Identification

The Police Force also supported a Science Park-based company **Ji-wit** to apply funding of Public Service Trial Scheme (PSTS) under Innovation and Technology Fund (ITF) to conduct RFID PoC for the Police Force.

Radio Frequency Identification ("RFID") technology has been around for many years. The application for RFID technology in retail or logistic industries continues to expand as it brings numerous benefits such as increasing effectiveness and productivity.

The Police Force and Ji-wit have collaborated to create a customised integrated system for inventory management using RFID technology. This system has been successfully tested in a variety of settings including police vehicles, launches, and storerooms. By simply tapping on a tablet, the system can automatically stock-take all RFID-tagged equipment in the vicinity, making the entire process more efficient and accurate. This RFID-based inventory management system enables officers to better manage their resources, streamline their operations, and improve overall operational quality by providing traceable records for future reference.

A customised integrated system for inventory managment using RFID technology to better manage resources, streamline operations, and improve overall operational quality by providing traceable records for future reference

Instant Stock-taking can be performed with just a single tap on the tablet

Way Forward

The signing of the Memorandum of Understanding between Hong Kong Police Force and Hong Kong Science and Technology Parks Corporation in September 2022 inaugurated government-industry cooperation on innovation and technology. Over the past year, the two parties have embarked on pioneering collaborative projects across five technology areas and beyond, demonstrating the government's commitment to embrace innovation and the HKSTP's vital role in driving Hong Kong's innovation ecosystem.

As the MoU period continues, the collaboration will expand through new approaches like setting up Living Labs with police venues and scenarios to validate HKSTP ventures' technologies. The Police Force will also identify high-potential tech-ventures in HKSTP for co-incubation in prevalent AI technologies like NLP and chatbots that could enhance efficiency of Police operations.

Looking ahead, the Hong Kong Police Force will continue working closely with the Hong Kong Science and Technology Parks Corporation to optimize police operations through technological innovations and enhance public service quality with innovative thinking. At the same time, the two parties will keep encouraging wider adoption of new technologies and provide valuable product validation opportunities for tech-ventures, while jointly nurturing talents to build a more robust innovation ecosystem in Hong Kong. Ultimately, these efforts will contribute to developing Hong Kong into a smart city and strengthening its position as an international I&T hub in the Asia region. The signing of the MoU set the stage for this shared vision to become reality.

Enquiry

Enquiry on the content of this Bulletin?

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