

## Enhancing Digital Policing Through AI Technology

### 透過人工智能技術提升數碼警政

Interviewed by: Dr. Hubert Chan | 採訪者：陳重義博士



**Ms. Kwan Chui-ching, Catherine**  
**關翠貞女士**

PDSM, Assistant Commissioner of Police  
Information Systems Wing, Hong Kong Police Force  
助理處長  
香港警務處資訊系統部

Digital policing was firstly introduced to the Hong Kong Police's (HK Police) strategic direction in 2019. Since then, the HK Police has proactively explored the possible deployment of AI mainly covering four key areas: machine learning, visual technology, large language model (LLM) and robotics, for enhancing public safety or security administration, amongst other policing activities.

There have been two recent significant projects in the works that focus on public safety. These include the HKSOS Mobile Application and Intelligence Patrol (iPatrol), both of which involve the use of AI. Our policing model is more traditional and as such focuses more on responsive policing, which mainly focuses on preventing and fighting crime. In the future, AI will empower smart policing, ranging from responsive policing to pre-emptive policing.

We believe that the current policing tends to be segmented in terms of technology. We aim to enhance public safety and public order comprehensively through using AI and big data analysis for better utilization of our resources.

### **Award-winning HKSOS - RescueAI**

HKSOS is an outdoor safety app which holds direct connectivity to the police emergency response centre. The mobile app provides a lifeline to users during emergency situations, with automatic and dynamic risk assessment and unmatched prediction function utilizing cutting-edge local technology. RescueAI is an AI component uniquely designed to work with HKSOS. RescueAI employs patented technology analyzing and recommending possible routes or areas that the rescue subject would have gone based on environmental, geographic and biometric data captured by the app.

If users download and activate HKSOS in advance of their outdoor journey, key data such as walking pace, steps, temperature, humidity, and weather during the journey will be collected. This information allows the HK Police to piece together clues and predict the distressed individual's potential location, effectively speeding up the search and rescue missions, in addition to aiding commanders to make well-informed decision and optimize resource allocation for rescue operations, especially when the user's phones disconnect from mobile network or run out of battery.

In addition, HKSOS also generates a unique SOS signal which is detectable by the patented long-range Wi-Fi technology called "Signal Radar". The Signal Radar overcomes mobile coverage issues during search and rescue operations. The Signal Radar can detect SOS signals from distances to kilometers, depending on the terrain. Testing has been massively conducted in different terrains and environments both locally and overseas, which confirmed that Signal Radar's strong penetration power allows it to detect signals under deep forest canopy, sand and snow. The Signal Radar can also be deployed via rescue drones or helicopters, giving it an advantage over challenging environments. Consequently, HKSOS forms crucial part of an "ecosystem" dedicated to save lives. This smart solution has been shining light and positively representing Hong Kong in various prestigious international stages in the past two years. HK Police won the "Best Use of Advanced Technology" award in the International Critical Communications Awards 2024, and gold medals with the congratulations of the jury at the 48th and 49th International Exhibition of Inventions of Geneva.

As technology-driven policing remains a rather new innovation, there must be concerns about collecting sufficient data for accurate responses. HK Police will strike a balance between privacy protection

香港警務處於 2019 年首次將數碼警政納入其策略方向。自此以後，香港警察積極探索 AI 的應用，主要涵蓋四個重點領域，包括機器學習、視覺技術、大型語言模型 (LLM) 及機械人技術，以提升公共安全、維持治安及其他相關警務工作。

近期，我們著重於兩個與公共安全相關的重要項目，分別是「緊急救援應用程式」HKSOS 及「智慧巡邏系統」iPatrol 手機應用程式，兩者均涉及人工智能技術的應用。目前的警務模式較為傳統，側重於應對式警務，主要集中於預防及打擊犯罪。展望未來，人工智能將促進數碼警務的發展，從現有的應對式警務進一步擴展至預防式警務。

然而，我們認為現時的警務在技術應用上相對分散。我們的目標是通過運用人工智能及大數據分析，全面提升公共安全及社會秩序，並更有效地分配和運用資源。

### **屢獲殊榮的 HKSOS - RescueAI**

HKSOS 是一款戶外安全應用程式，與警察 999 緊急報案中心直接連接。該應用程式在緊急情況下為用戶提供救生索，具備自動和動態風險評估功能，並利用本地尖端技術，備有出色的意外偵測功能。RescueAI 是專為 HKSOS 設計的人工智能組件，採用專利技術，根據應用程式所記錄的環境、地理和身體數據進行分析，並推測求救人士可能行經的路線或範圍。

若市民在戶外活動前下載並啟用 HKSOS，應用程式將會收集包括步行速度、步數、溫度、濕度及天氣等關鍵數據。即使沒有流動網絡覆蓋或電量耗盡的情況下，這些數據都能夠供警方作分析用途，從而估計遇險者的位置，有效加快搜救行動，並幫助指揮官作出決策，優化救援資源的分配。

此外，HKSOS 還會發出獨特的 SOS 訊號，可以透過警方的長距離 Wi-Fi 專利技術 Signal Radar 偵測到。Signal Radar 能夠應對在搜救行動中流動網絡覆蓋所帶來的問題，該技術可以偵測到在遠達一公里以外所發出的 SOS 訊號。經過在本地及海外不同地形和環境中的多次實地測試證實，Signal Radar 具有強大的穿透力，能夠在茂密的森林、沙地和雪地環境下偵測到 SOS 訊號。Signal Radar 還可以配合救援無人機或直升機使用，在險峻的環境中仍能有所發揮。因此，HKSOS 成為了救援生態系統中的一個重要部分。在過去兩年中，這個智慧數碼方案代表香港在多個國際頂尖舞台上大放異彩。香港警察在 2024 世界關鍵通訊大會中榮獲「先進技術最佳應用獎」，並在第 48 屆和第 49 屆日內瓦國際發明展中榮獲評審團嘉許金獎。

在發展創新的數碼警政方案初期，大家必然關注警方能否收集足夠數據以作出精準的部署及應對。首先，警方必需在隱私保護和行動效率之

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and operational efficiency. Since the roll-out of HKSOS in January 2024, it has reached 100,000 download figures. In addition, the app has successfully helped over 90 users in life-saving operations thus far, indicating the receptiveness of Hong Kong citizens to this new piece of innovation. HKSOS operates as an AI platform and requires adequate on-going data input for machine learning to train its engine and complete the overall process.

### Enhanced Policing with iPatrol

The second AI-driven initiative by HK Police is “iPatrol”, which employs AI technology to optimize police resources and response strategies in daily street-level patrol. Previously, officers were required to physically sign a visiting book on the street, which was cumbersome and difficult to manage. Now, with the introduction of the Electronic Visiting Book (eVB), officers can use NFC technology to record their attendance with mobile phone at designated checkpoints. Apart from NFC, GPS and Wi-Fi technologies will also be considered to accommodate faster and easier beat registration.

In traditional policing, when a crime occurs, police officers will manually analyze intelligence, and communicate the crime trend and crime hotspots during duty briefings. iPatrol will employ AI to effectively improve the management of frontline patrol, for example analyzing data to determine where and when beat patrol should cover based on timely update of crime reports on the beat. Beat register will become more agile for recording police presence on beat for analyzing the effectiveness of crime deterrence.

As such, this AI-driven solution will undoubtedly enhance police situational awareness and intelligence-led policing capabilities, which in turn helps crime prediction and eradication. A significant component of iPatrol focuses on collecting and analyzing big data and developing actionable insights from reactive to proactive approaches.

iPatrol is still in development stage and expected to be rolled out in 2025.

間取得平衡。自 HKSOS 於 2024 年 1 月推出至今，下載量已高達 10 萬次。此外，該應用程式至今已成功在不同的拯救行動中幫助超過 90 位市民，數字已反映了公眾對這項創新科技的接受程度。HKSOS 作為一個具人工智能的方案，需要大量數據以用作機器學習，以全面提升方案的完整性及準確性。

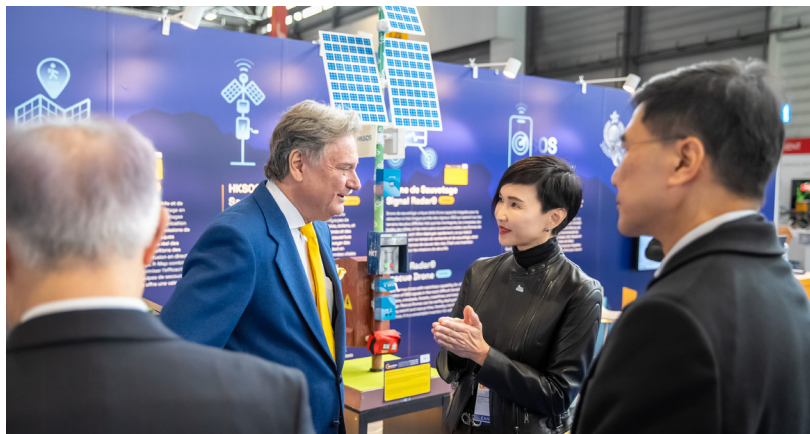
### 透過 iPatrol 提升警政能力

香港警察的第二項利用人工智能技術的方案是 iPatrol。該項目運用 AI 技術優化日常街道巡邏中的警力資源及應對策略。從前，警員需在街頭巡邏時需要以手寫方法在巡邏冊上作記錄，既繁瑣又難以管理。如今，隨著電子巡邏冊 (eVB) 的引入，警員可使用近距離無線通訊技術 (NFC)，在指定檢查點通過手機紀錄巡邏情況。除了 NFC 之外，警方亦會考慮使用 GPS 和 Wi-Fi 技術，以便更快捷地完成記錄。

在傳統警務工作中，當有罪案發生時警員通常會以人手分析情報，並在交班時向人員簡報罪案趨勢和犯罪熱點。iPatrol 將利用 AI 技術有效地改善前線人員巡邏的管理，例如根據實時更新的罪案數據，分析何時何地應進行巡邏。巡邏記錄將變得更加靈活，以更有效分析及打擊罪案。

這一項 AI 數碼方案將大大提升警隊罪案形勢評估和預測，以及警方以情報為主導打擊罪案的能力。iPatrol 其中一個重要元素是以收集和分析大數據而制定出相應行動，使警政策略從被動變為主動。

iPatrol 目前仍處於開發階段，預計將於 2025 年推出。



*The HK Police's digital solutions consecutively shine in the 48th and 49th International Exhibition of Inventions of Geneva.*

香港警察的數碼方案連續兩年於第四十八及第四十九屆日內瓦國際發明展勇創佳績。



### Visual Technology in Policing

In response to a recent incident involving a prisoner switching identities with another inmate in court, as per Ms. Kwan Chui-ching, Catherine, PDSM, Assistant Commissioner of Police, Information Systems Wing, Hong Kong Police Force, the HK Police has immediately worked out a facial recognition solution, to be implemented at the entry and exit point of the courts' detention facilities in order to prevent abscondence and improve prisoner management. This initiative greatly assists in court management by accurately identifying who should be in court, at what time and where.

Visual technology is also employed by the HK Police during crowd management in public events. Nowadays, drones are deployed in public events for head counting to help assess venue and road capacity and conditions, which thus determine appropriate police deployment to ensure public safety.

### Applying Large Language Model in Police Operations

In addition to machine learning and visual technologies, HK Police has also applied Large Language Model (LLM) in its internal chatbot, named "IQ", which assists police officers in searching procedural information from the HK Police internal database. To reduce the risk of misinterpretation by AI, IQ is specifically trained with due care to ensure its accuracy.

In the meantime, the HK Police are developing a user-centric mobile app tentatively called "Police SuperApp" which will be launched in the near foreseeable future. The SuperApp is an integrated platform consolidating most of the police public services, including online reports for non-emergency cases and online applications for different licenses, aiming to streamline the procedural workflow and enhance the quality of police service. A chatbot embedded in the app will assist the public with inquiries, such as online application procedures for security personnel permit, lion dance permits, or license for arms possession etc. The public will also be timely updated with their application status or progress of their report via the app.

### 視覺技術在警政上的應用

針對近期有囚犯在法庭與另一名囚犯互換身份的事件，據香港警務處資訊系統部助理處長關翠貞女士所述，香港警察已立即探討應用面部識別技術方案，並計劃在法院羈留設施的出入口實施，以防止囚犯逃脫及改善囚犯管理減少相關風險。警隊相信此項措施能夠準確識別囚犯身份並且確保囚犯安排在預設的時間地點出庭，加強法庭管理。

此外，香港警察在大型活動的人群管理中亦運用了視覺技術。目前，無人機已在公眾活動的人群數目估算中廣泛使用，以協助評估場地及道路的承載能力和狀況，從而調配適當的警力以確保公共安全。

### 大語言模型在警隊行動中的應用

除了機器學習和視覺技術外，香港警務處亦在其內部聊天機械人「IQ」中加入了大語言模型(LLM)技術。該技術協助警務人員從警隊內部資料庫中搜尋有關警務工作程序的訊息。為了減低人工智能錯誤解讀訊息的風險，「IQ」經過謹慎調教，以確保其準確性。

同時，香港警務處正在開發一個多合一手機應用程式(Police SuperApp)，預計在不久的將來推出。這款 SuperApp 提供一個綜合平台以市民的需要為中心，整合了大部分警隊的公共服務，包括非緊急案件的網上報案及各類型牌照的申請，旨在簡化流程，提升警隊服務質素。應用程式內嵌的聊天機械人將協助解答市民查詢，例如保安人員許可證、舞獅活動許可證或持槍牌照等網上申請程序。市民亦可透過應用程式獲取申請狀態或報案進度的更新。



The HK Police's digital team showcased their Smart Rescue Ecosystem at the 2024 World Police Summit in Dubai. 香港警察的數碼警政團隊於迪拜 2024 年世界警察高峰會中展示警隊智慧搜救生態系統。

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To enhance police efficiency and accuracy in public emergency report responses, a new emergency reporting system will be implemented which will allow the general public to send photos, videos and audio clips to operators of the emergency centre. In addition, HK Police are considering the possibility to deploy AI to handle non-emergency calls, of which create overwhelming stress and workload in the emergency centre. This occurs frequently during typhoons or major accidents. Deploying AI will spare manpower in responding to those 999 emergency reports. HK Police aims to leverage AI to alleviate workload and enhance operational efficiency. However, further deliberation and research will be required as challenges may occur, such as citizens possibly feeling frustrated when attempting to communicate to a robot instead of a live operator.

### Patrol Robots in Hong Kong

The HK Police Force has been experimenting with patrol robots at the Hong Kong International Airport and the Hong Kong-Zhuhai-Macao Bridge. Citizens can report incidents to the robots, which can direct users to the relevant police departments for assistance or allow citizens to have a live chat with police officer through its screen.

The primary function of these robots is to enhance situational awareness and public engagement in confined areas. HK Police strides to retain the pace of the advancement of technology in the modern world. It is believed that robotics technology will lead to greater improvement in policing works.

### Next Generation Communications System

HK Police has been using a narrowband communications technology form called “TETRA” in its daily policing for decades. However, this is only limited to voice communication. Nonetheless, the emergence of 5G mobile broadband networks technology provides unprecedented opportunities to significantly enhance HK police’s operational capability. Once the Next Generation Communications System (NGCS) is put in place, this mission critical communications will encompass a wide range of solutions including a mix of devices, equipment, systems and infrastructure that enable officers to communicate efficiently and effectively.

NGCS, with higher data transmission capabilities and diverse features, will address the increasing operational demands for high capacity and high-speed data transmission, such as live streaming of multimedia formats. To ensure agency interoperability for public safety communications, first responders to incidents need to be able to communicate and share data including voice, images and videos across agencies, who require reliable dispatch connections and real-time situational awareness.

In the modern day and age, cybersecurity is often a major concern in the development process of ICT projects. The dedicated network can increase work efficiency whilst strengthening HK Police’s capability for fending off emerging cyber threats. It is within our hopes that funding approval and support can be obtained from the Legislative Council soonest.

為了提升警隊處理緊急報案的效率和準確性，警隊將推出一套新的緊急報案系統，市民可以透過該系統向緊急中心的通訊員發送照片、影片和音頻片段以作報案之用。此外，警方正考慮部署人工智能技術處理非緊急的求助，這些非緊急報案在颱風或重大事故期間對緊急中心構成巨大的壓力和工作量。藉人工智能應用，警隊可將更多人力資源集中於處理 999 緊急報案。一直以來，香港警務處的目標是利用人工智能減輕人員工作負擔，並提高行動效率。然而，警隊仍需進一步探討和研究避免為市民帶來不便，特別在市民與機器人而非真人通訊員溝通時。

### 巡邏機械人

香港警務處已在香港國際機場和港珠澳大橋開始測試巡邏機械人。市民可以向這些機械人報案，機械人會將市民轉介至相關的警察部門提供協助，市民亦可透過其屏幕與警務人員進行即時對話。

機械人的主要功能是增強警隊的形勢掌握及評估能力和公眾參與度。香港警務處致力追上現代科技發展的步伐，並相信機械人技術將會大大提升警務的優質服務。

### 新一代的通訊系統

香港警務處目前使用名為「TETRA」的加密通訊系統支持日常警務工作已經數十年。然而，該技術僅限於支援語音通訊。5G 流動寬頻網絡技術的出現為香港警務處提供了前所未有的機會，以大幅提升行動能力。新一代通訊系統 (NGCS) 將能夠兼容廣泛的智慧方案應用，包括多種設備、器材、系統和基礎設施，確保警務人員能夠有效地進行溝通。

NGCS 具有更高效的數據傳輸能力和多樣化的功能，應對日益增加的行動需求，例如多媒體實時串流傳輸。為加強跨部門在公共安全上協同，我們必需為應急救援人員提供跨機構的溝通和數據共享技術，包括語音、圖像和視頻等資料傳輸能力，以協助他們作出可靠的調配以及實時形勢評估。

在現今世代，網絡安全必然是在資訊科技項目發展過程中的重點之一。NGCS 不僅能提升工作效率，還能加強香港警務處應對新興網絡威脅的能力。警隊期望此項目能夠盡快獲得立法會的撥款批准和支持。




## Human Vs. AI

It is essential to recruit and retain right tech-savvy talents to take part in the development of AI-driven projects which are indeed costly and resource-consuming. People play a crucial role in providing annotations and validating AI outputs. The user experience on the streamlined interactions between humans and AI robots should not be overlooked, as our citizens may feel frustrated for not having timely and responsive services from real police officers.

In short, AI could serve as a virtual assistant, but public safety still fundamentally rely on police officers. Resources, talents, and the ability to meet public expectations are to remain to be our largest focus.

## Collaboration within and outside the Force

To keep abreast of the global cyber threat landscape and ever-evolving technology, HK Police have been maintaining close collaboration and partnership with universities, tech companies and industry experts. In September 2022, the Information Systems Wing of HK Police signed a Memorandum of Understanding with the Hong Kong Science and Technology Parks Corporation (HKSTP) to explore more innovative and value-added technological solutions as well as nurture IT talents.


Since our promulgation of digital policing in 2019, the Force has rolled out over 70 solutions which have effectively re-engineered work process, saved manpower and delivered quality police services to the public. We are adopting people-centric approach to address the needs of our officers, and always welcome ideas. We encourage our officers to think outside the box or even think like there is no box. 

## 人類跟人工智能的互動

發展與人工智能相關的項目需要大量金錢和資源，而如何招攬及挽留科技人才參與項目發展最為關鍵。由人工智能技術產生的結果很多時需要人手作驗證及覆核，因此人才仍然擔當無可取代的重要角色。為避免市民因無法及時與真實的警務人員溝通而感到不便，我們必需仔細考慮人與人工智能之間的互動和使用者的體驗。總概而言，人工智能可以擔當虛擬助手，但公共安全的基石仍然依賴每位警務人員，因此我們最關注的依然是資源、人才以及符合公眾期望的能力。

## 警務處內外的合作

為了緊貼全球網絡威脅的形勢以及不斷演進的科技，香港警隊一直與大學、科技公司及行業專家保持緊密合作的夥伴關係。在 2022 年 9 月，香港警隊資訊系統部與香港科技園公司正式簽署備忘錄，以共同探索及發展更多創新及實用的智慧方案，並且培育科技人才。

自 2019 年警隊推行數碼警政以來，已推出超過 70 項數碼方案，有效地精簡工作流程，節省人力資源，並為公眾提供優質的警政服務。我們採用了以人為本的方法，收集不同警務人員的意見，以應對人員的實際需求。我們鼓勵人員跳出舊有框架，甚至在創意思維上不應存在框架。 



Ms. Catherine Kwan of the HK Police shared their strategies in advancing intelligence-led policing through cutting-edge technical capabilities.

關翠貞女士代表香港警察分享他們透過利用先進科技，以情報為主導打擊罪案的能力及策略。