SCOTTISH POLICE AUTHORITY: INVESTIGATING CRIME SCENES IN VIRTUAL REALITY

The Scottish Police Authority is able to use virtual reality (VR) technologies for the investigation of crime scenes. A cooperation with researchers from the University of Dundee and emergency services constructed mock crime scenes, to be rebuilt in VR for training purposes and recreation of the crime scene, with potential addition of missing evidence or other related data.

The team was able to determine crucial factors relating to evidence, while rebuilding the crime scene in a VR environment.

These developments ensure that staff are able to work from several locations, instead of traveling to the locations where the investigation takes place. The same goes for training that could be given in other locations.

Current trainings involve controlled 'burning' of simulated scenes. Fire data are used for the virtual representation of the scene. Through VR, the Scottish Police Authority can also show examples of a sexual assault and a drugs lab. The actual testing scenes will be made available in VR training scenes.

Contributor: Samuel Curran, Police Lead at the Scottish Police Authority
Video: https://www.bbc.co.uk/programmes/p0j3lktt

DIGITAL TWINS IN OMNIVERSE: AN EVOLUTION TOWARDS ROBOTIC POLICE

Robots and autonomous systems can effectively enhance the capabilities of police officers, helping them perform missions with less exposure to risks, more accuracy, easy repeatability, and less strain. For instance, they can be first responders to incidents for crime scene documentation or for securing critical infrastructure and monitoring crowd gatherings. AI-driven digital twins evolving in an omniverse can train themselves with deep learning to cross harsh terrains, maneuver critical obstructions, or detect targeted objects. The robots will learn how to support a law enforcer's role with such reinforced and autonomous learning in diverse environments simulated in an omniverse.

A digital twin is a virtual replica of a physical system usually in a 3D interactive digital platform, be it a robot with neural reconstruction or a whole industrial system. Creating a virtual copy of physical assets enables data monitoring in real-time through swarms of sensors and simulated behaviors under endless scenarios, and failures are repetitively tested.

Using a digital representation also enables the advantages of compressing time and running thousands of simulations in parallel. Thus, the combination of digital twins and omniverse allows for the anticipation of problems and the identification of the most efficient solutions. In many sectors, especially in the manufacturing and construction industry, such digital twin results in increased reliability, improved sustainability, proactive maintenance, reduced costs, and a more productive system leading to gain competitive edge. Popular solutions for such digital twin and omniverse include the NVIDIA Isaac platform.

Such pragmatic developments using digital twin simulation is pioneered at Carnegie Mellon University using deep learning in IsaacGym for Unitree quadruped dogs to independently learn how to walk and integrate the use of a robotic arm. Other developments in integrating AI in robots surfaced in October 2023 with the integration of ChatGPT by Boston Dynamics into their Spot robot so it can respond correctly when asked questions and interacting from voice commands.

Recently, the international workshop on Robotics for Environmental Sustainability in Malaysia from 3 to 5 July 2024 highlighted the prospects of digital twin simulation in omniverse as the beginning of 'Robotic Police'. Fast-paced evolutions in robotics gaits (movements) and apprehension of the object in their environment is now supercharged with the use of digital twins training themselves with deep learning in omniverses. Such AI-driven robotics are of great interest to support police missions in harsh terrains or in handling automated crime scene documentation. A partnership with leading developers of reinforced learning would be beneficial to deploy pragmatic solutions for law enforcement agencies in INTERPOL member countries.

Sources: https://www.nvidia.com/en-us/industries/robotics/

https://static.generation-robots.com/media/deep-whole-body-control.pdf

https://bostondynamics.com/blog/robots-that-can-chat/

MAHARASHTRA POLICE IN INDIA AIM TO FIGHT CRIME WITH AI

The Maharashtra Police aim to use AI technologies to efficiently leverage powerful tools in solving crimes with enhanced intelligence capabilities and improve crime prediction. In collaboration with the company MARVEL, Maharashtra Police will be aided by AI for several crime types such as missing children and women, fatal accidents, stolen vehicles organized crime, and fraud-related cases.

MARVEL is a multi-use platform where different modules are created for crime detection assistance. All police units are able to send their cases to MARVEL for technical support. For example, MARVEL can support with tracing a car involved in a crime by using footage from CCTV. The platform analyzes the data by using AI to support on perceiving and identifying the suspect, but multiple complex tools could also be used such as data mining.

Maharashtra Police shared that the tools can be used for handling large datasets and are capable to narrow down police investigations by tracing the location of malicious people or identifying crime scenes which could lead to concrete police investigations. This partner initiative is the first formal Indian implementation of AI within a police system.

Source: https://indianexpress.com/ article/cities/mumbai/to-fight-crime-using-ai-maharashtra-police-create-marvel-9460472/

FUTURE POLICE TOOLS AND EQUIPMENT: CHALLENGES AND OPPORTUNITIES AT INTERPOL STRATALKS 2024

The STRATalks Annual Expert Meeting is a global initiative in the field of strategic development and futures thinking for law enforcement. The STRATalks 2024, which took place on 2-3 July and welcomed 29 participants from 12 member countries, delved into innovative tools and equipment that can be used by law enforcement to aid their activities in the future.

The discussions held over 1.5 days were conducted under the moderation of industry collaborator Deloitte Center for the Edge Singapore, alongside presentations of speakers from law enforcement including the Korean National Police Agency (KNPA), INTERPOL Criminal Analysis Sub Directorate (CAS), and speakers from academia partners such as Nanyang Technological University (NTU Singapore) and Singapore University of Social Sciences (SUSS).

The themes of 'Futures Scenarios for Investigations', 'Technology as a Partner in the Field', 'Tools for Data Criminal Intelligence Analysis', and 'Cooperation as a Key Strategy for Police to Leap Out from Technology Silos' were the major sessions of the event.

The main technologies highlighted by participants that will be needed in the future as tools and equipment are highlighted in the word cloud below.

AI-enabled systems for data analysis and investigations
AI-enabled translation tools   Drones
3D mapping   Satellite communications
Robots (dog, snake, insect)   CCTVs
Mobile Apps   Quantum Technology
Sensors   6G/7G   Smart Handcuffs
Smart Helmet   Biometrics
Augmented Reality/Virtual Reality

Besides these, topics raised as most concerning by the participants with regard to the future of law enforcement included aging population, lack of trust, officers' safety, operational models, industry collaboration, and leadership.

Are you interested in learning more about the outcomes of the STRATalks 2024 or being part of the STRATalks Futures Network? Please send us a message expressing your interest to FFL@interpol.int.

INNOVATION CENTRE EVENTS

25-29 AUG	05 SEP	10 SEP
4th INTERPOL Young Global Police Leaders Programme	AI in Digital Forensics Series Session 1	Defending Against AI-Driven Threats and Futuristic Digital Forensics
Dubai, UAE	IC VDR	IC VDR
19 SEP	**24-26 SEP**	**30 SEP**	**1-2 OCT**
Enhancing Future LE Communication: Leveraging Emerging Technologies	Artificial Intelligence Forum for Law Enforcement Uses	Introduction to Synthetic Media for LE: Types, Technologies, and Trends	New Technologies Forum: Law Enforcement in Web 4.0
IC VDR	Riyadh, Saudi Arabia	IC VDR	Singapore
03 OCT	**10 OCT**	**16 OCT**	**17-18 OCT**
AI in Digital Forensics Series Session 2	Crime of Ecocide and Global Implications for Law Enforcement	The Use of Immersive Technology Applications in Law enforcement Practices	Project COURAGEOUS Closing Meeting
IC VDR	IC VDR	IC VDR	Lyon, France

FOR MORE INFORMATION: Please contact the INTERPOL Innovation Centre (*innovation@interpol.int*)

INTERPOL DIGITAL FORENSICS EXPERT GROUP: AI AND NON-TRADITIONAL DATA SOURCES

INTERPOL hosted the 9th Digital Forensics Expert Group meeting at Napier University, Edinburgh, Scotland in June 2024. The group focused on new and emerging technologies that law enforcement digital forensics units will be facing in the coming years.

Areas of interest were the use and adoption of Artificial Intelligence in digital forensics investigations, and non-traditional digital forensic data sources such as cars, drones, and Internet of Things. Various technologies such as virtual assets, blockchain, and encryption were also discussed as these are becoming more prevalent during investigations.

Digital forensics experts are poised to face several significant challenges in the coming years. One of the primary issues is the rapid evolution of technology. As new devices, operating systems, and applications emerge, forensic tools and methodologies must continuously adapt to keep pace. This constant evolution requires ongoing training and investment in cutting-edge tools.

Another challenge is the increasing volume of data. With the proliferation of IoT devices, cloud storage, and social media, the amount of data that needs to be analyzed in investigations is growing exponentially. This data deluge can overwhelm forensic teams and complicate the extraction and analysis of relevant information.

Encryption and privacy concerns also pose significant hurdles. While encryption is essential for protecting user data, it can impede forensic investigations. Balancing the need for privacy with the requirements of law enforcement is a delicate and ongoing debate.

Additionally, legal and regulatory frameworks are struggling to keep up with technological advancements. Digital forensics experts must navigate a complex landscape of laws and regulations that vary by jurisdiction, which can hinder cross-border investigations.
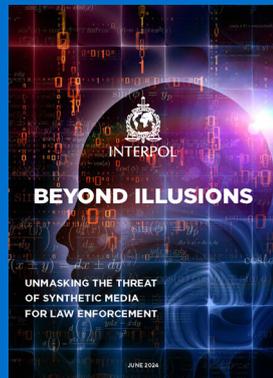
Finally, the rise of AI and machine learning introduces both opportunities and challenges. While these technologies can enhance forensic capabilities, they also require new skills and understanding to be effectively utilized.

Staying ahead in this dynamic field demands continuous learning, adaptability, and collaboration among digital forensics professionals. INTERPOL hosts the Digital Forensics Expert Group every year and this is supported by the Innovation Centre's Virtual Discussion Rooms and specialized meetings that examine specific areas such as drones, car forensics, metaverse, synthetic media, and AI in digital forensics.

DID YOU KNOW?

INTERPOL recently published the report 'Beyond Illusions: Unmasking the Threat of Synthetic Media for Law Enforcement' to provide member countries an introduction to the technology, creation, distribution, and impact of synthetic media.

Download the report here: https://www.interpol.int/en/How-we-work/Innovation/INTERPOL-Innovation-Centre

---

Contributor for this issue:

Innovation Spotter - Samuel Curran, Police Lead at the Scottish Police Authority, Scottland

INTERPOL

Innovation Centre
INTERPOL Global Complex for Innovation
18 Napier Road
Singapore 258510
T: +65 65503569
Email: IC-Snapshots@interpol.int

Call for Contributions

Join Our Mission to Highlight Innovations in Law Enforcement

The world of law enforcement is rapidly evolving, with groundbreaking innovations and collaborations reshaping how safety and security are maintained. Our *Innovation Snapshots* newsletter is dedicated to showcasing these advancements, and we welcome your insights and contributions. Whether you're involved in law enforcement, technology development, or academic research, we invite you to share your stories of innovation and collaboration.

What We're Looking For:

Innovative Developments in Law Enforcement: Have you or your organization developed new technologies or methodologies that are changing the game in law enforcement? We're interested in hearing about innovative tools, software, or strategies that are being implemented in your country.

Collaborative Efforts: Stories of successful partnerships between law enforcement agencies and external entities like universities, think tanks, or tech companies are highly encouraged. How have these collaborations led to innovative solutions or improved outcomes?

Submission Guidelines:

Word Limit: Please keep your contributions to approximately 400 words.

Photos: Submissions with relevant and high-quality photos are highly appreciated. Ensure you have the right to use any photos you submit.

Neutrality: Stay neutral and factual in your descriptions.

Structure: Follow our suggested structure for clarity:

[Law enforcement agency and country]

[Innovation development]

[What the development provides/does]

[Any additional information]

How to Submit:

Please send your contributions to IC-Snapshots@interpol.int, including any photos (with credits) and a brief bio of yourself or your organization. Join us in highlighting the innovative spirit within law enforcement and the collaborative efforts that are making our communities safer. Your insights and experiences are invaluable to this mission.