Science & Technology in Policing

POLICE STAR FUND 24/25

REVOLUTIONISING DIGITAL FORENSICS CHILD SEXUAL EXPLOITATION WORKFLOWS THROUGH LINGUISTICS/AI TECHNOLOGY (DRAGON-SPOTTER)

Summary

The DRAGON-Spotter project addresses the escalating challenge of child sexual exploitation (CSE), with a focus on online grooming (OG), by enhancing digital forensic capabilities within UK police forces. Developed by the DRAGON Team at Swansea University, the tool leverages AI and linguistics to detect online grooming language patterns in seized device chatlogs, offering a scalable, privacy-preserving solution tailored to operational policing needs.

Organisations

West Mercia Police
Swansea University

Challenge

The project addresses two interrelated pressing issues:
(i) The exponential growth of child sexual exploitation (CSE), including online grooming (OG).
(ii) An insufficiently unsupported child protection ecosystem to address (i), especially police forces' ability to cope with an increasing number of CSE / OG investigations. If forces are going to keep up with this demand, then digital forensic examinations need to be faster and more efficient at producing relevant data for investigators.

Innovation or research

This project directly addressed these challenges by avoiding reliance on high-cost, high-resource models. Instead, it focused on creating a mechanism for digital forensic analysts to transfer their domain expertise into the model, improving its reliability and contextual accuracy. The DRAGON-Spotter tool was designed to support transparent reporting of model performance metrics, enabling analysts to better understand and trust the system's outputs. This approach not only enhances confidence in the model's ability to detect Online Grooming but also lays the groundwork for more responsible and effective integration of AI into digital forensic workflows.

Findings

The project provided a valuable opportunity to rigorously test the DRAGON-Spotter tool on operational datasets, successfully processing over 28,000 messages in 10 hours and offering critical benchmarking data for future scalability. Despite some UI limitations, the tool was effectively integrated into digital forensic workflows, with adaptations ensuring compatibility with evidentiary standards and existing forensic tools. There are still further adaptations to be made to enhance its functionality, but the knowledge of how to do this is now known. A 7B LLM (Mistral) was used for feasibility, though larger models would be preferable for deployment. The collaboration fostered significant knowledge exchange between the DRAGON-Spotter and WMP teams, enhancing mutual understanding of AI deployment in policing contexts. WMP gained insights into LLM evaluation and operational requirements, while the DRAGON-Spotter team advanced its ability to align AI tools with forensic rigor. This partnership marked a key step in bridging academic innovation with real-world policing needs, emphasizing reliability, accountability, and operational trust in AI integration.

Next steps

As a natural progression from the pilot, we applied for follow-on funding through the 2024–2025 Police STAR Fund to evolve the project into a fully operational nine-month initiative. This next phase aimed to build on the operational model developed during the pilot, including the establishment of a virtual lab where selected users could apply DRAGON-Spotter in real-world scenarios, integrating it into digital forensic workflows for CSE identification. Although the application was shortlisted, it was ultimately unsuccessful. Nonetheless, we remain confident in the project's viability and are prepared to provide a detailed brief outlining the cost, time, and resource requirements upon request.