Science & Technology in Policing

POLICE STAR FUND 24/25

TRANSPARENT LARGE LANGUAGE MODEL PIPELINE (AMULET)

Summary

We aim to deliver safe, explainable, and auditable data-based decision making, including significant automation and the ability for systems to autonomously and transparently follow lines of inquiry that support investigators and analysts reach insights. This project is pushing the state of the art for the use of Large Language Models (LLMs) whilst ensuring transparency and accountability of decision making.

Organisations

Counter Terrorism Police (CTP)
Defence science technology laboratory (Dstl)

Challenge

Police analysis and investigations involve many questions and lines of inquiry, interacting with a range of datasets, data processing pipelines, analysis methods, tools, and visualisations. Data often sits in isolated silos, where human expertise is required to know what data can answer questions, how to find it, and then how to process and analyse it, all before a decision can be made. This is also true of the tools that can be used to analyse data - there are an ever-increasing number of tools, capabilities and API services, but these are opaque and complex, and require user awareness, and significant expertise to harness. Fusion of both the right data and capabilities is crucial to answer questions and inform decisions.

AI could potentially provide part of the solution; however current AI language models and existing commercial platforms do not provide the level of transparency and auditability required to be safely deployed in high-risk and high consequence scenarios where human experts are making data-based decisions – significantly limiting their use. AI models often lack accuracy, transparency, and explainability, and are prone to 'hallucinations', with very limited visibility into how the AI's answers and solutions have been found, processed, and decided. There are also often issues with data ownership, security and interoperability. These are critical issues for policing, highlighted by the AI Covenant and Information Commissioner's Office (ICO) 25 Strategy.

Innovation or research

Police STAR funding was used to support the development of the Dstl Amulet system, alongside funding from Counter Terrorism Policing. Amulet is a UK-Gov owned novel AI system that unlocks rapid, safe and transparent insights from complex datasets.

The system is designed to explore lines of enquiry intuitively, embedding human expertise and intent at its core using a human-centered approach. Amulet is an interoperable service, integrated as a layer across other datasets and tools, that coordinates complex interactions between users and data via natural language. Amulet delivers safe, explainable, and auditable data-based decision support so that users make best use of available datasets, tools, analysis methods and analytics inc. data processing pipelines, as well as enabling analysis of patterns of interactions and subsequent prediction and automation. Data processing pipelines and API services are complex and ever evolving and Amulet provides a layer of orchestration, between a user and these pipelines, to both answer user questions and ensure consistent and necessary transparency, explainability and audit of what the processes are doing, how they work, and key limitations and caveats.

Findings

This project was primarily related to software development, in order to create a configurable system that can be easily tailored to different use cases as they arise, alongside the activity with CTP.

During this time, Amulet has been developed from an initial proof of concept demonstrating the potential use of LLMs within a transparent pipeline, to a robust product with extensive documentation and administrative capability. The key sprints throughout the project delivered configuration of Amulet to interact with elastic functions and datasets, which aligns well with other potential use cases, capability to manage and administer system components and agents, development and testing of integration with open source and locally deployed smaller models.

Next steps

There are 3 further developments to build on the exciting findings from the Police STAR funded study, ensuring Amulet is continuing development through CTP, with experiments taking place this FY in the context of fusion and other CTP use cases are being considered in parallel. In additional to this, there are wider policing use cases being explored related to the NPCC AI Portfolio.

We are keen to identify and experiment with the system in diverse settings, so please get in touch if interested.