



**Behaviour-based AI Algorithm for Crime
Against a Person and Inchoate Crime in Sri
Lanka**

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I certify that I have read this thesis and that in my opinion it is fully adequate, in scope and in quality, as a thesis for the degree of Master of Science.

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DECLARATION

This is to certify that the work is entirely my own and not of any other person, unless explicitly acknowledged (including citation of published and unpublished sources). The work has not previously been submitted in any form to the Sri Lanka Institute of Information Technology or to any other institution for assessment for any other purpose.

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ABSTRACT

Behaviour-based AI Algorithm for Crime Against a Person and Inchoate Crime in Sri Lanka

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The growing integration of digital technologies into daily life has led to a steady rise in crimes that leave behind digital footsteps in the form of text logs, voice recordings, and observation footage. In Sri Lanka, crime investigation systems such as the On-Scene Crime Reporting System (OSCRS-LK) have built up evidence collection practices and improved documentation at crime scenes. Although, these systems remain limited in their ability to perform automated behaviour analysis and often rely heavily on manual explanation by investigators, which can be time-consuming and prone to human error. This research addresses this gap by proposing a behaviour-based artificial intelligence (AI) algorithm capable of analyzing multimodal evidence including text, audio, and video to detect unsure behaviour associated with crimes against a person and inchoate crimes, such as threats, harassment, and attempted violence. The proposed system employs machine learning models tailored to each data type; LLM for text processing, CNN for image processing, and YOLOv8 for video-based behavioural recognition. Extracted features from these models are combined into a unified representation, which is then used to calculate a risk score for each incident. To ensure transparency, fairness, and accountability in decision-making, SHAP explainability techniques are integrated, enabling law enforcement officers to explain the model's predictions and understand the underlying reasoning. By combining multimodal evidence with understandable AI, this research aims to improve early threat detection, increase digital forensic capabilities, and accelerate criminal investigations in the Sri Lankan context. The proposed framework not only strengthens OSCRS-LK but also provides a scalable foundation for future AI-driven crime solutions.

Keywords: Behaviour Detection, Digital Forensics, OSCRS-LK, Artificial Intelligence, Multimodal Analysis, SHAP Explainability

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