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TRANSFORMATION OF TACTICS FOR CONDUCTING VERBAL INVESTIGATIVE ACTIONS IN THE CONTEXT OF ARTIFICIAL INTELLIGENCE TOOLS: STRENGTHENING JUSTICE, STRONG INSTITUTIONS AND RESPONSIBLE INNOVATION

Evgeniy Shulgin [(a)] *Larissa Kussainova* [(b)1] *Ainura Omarova* [(c)] *Shiryn Baikenzhina* [(d)] *Madina Albekova* [(e)]

[(a)] *Associate professor, School of Law, Karaganda Academy of the Ministry of Internal Affairs of the Republic of Kazakhstan named after B.S. Beisenov, Karaganda, Kazakhstan; E-mail: shulgin_e@internet.ru*
[(b)] *Professor, Department of Criminal Law, Procedure and Criminalistics, Karaganda Buketov University, Karaganda, Kazakhstan; E-mail: Klarisa_777@mail.ru*
[(c)] *Professor, School of Economics, Karaganda Buketov University, Karaganda, Kazakhstan; E-mail: ainuraphd@mail.ru*
[(d)] *Master in Juridical Sciences, Karaganda Buketov University, Karaganda, Kazakhstan; E-mail: baikenzhina.shirin@gmail.com*
[(e)] *PhD Student, Karaganda Buketov University, Karaganda, Kazakhstan, E-mail: albekova_m@mail.ru*

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ABSTRACT

Artificial intelligence (AI) is entering criminal proceedings faster than forensic tactics governing interrogations, confrontations, on-site verification, and clarification of testimony can be rethought. These verbal investigative actions remain the stage at which the fairness of a criminal process, and hence access to justice and strong institutions, is most exposed to coercion, error and false confession. The study develops a scientifically grounded model of how the tactics of verbal investigative actions are transformed when an investigator gains access to AI tools, and it tests three propositions about the assistive nature of AI, the loop structure of its influence, and the need for legally informed data labelling. The study employs a doctrinal, comparative-legal, and modelling design, applied to 25 scholarly sources published in 2010–2026, five normative acts of the Republic of Kazakhstan and the European Union, the practice of five European jurisdictions, and the technical specification of a patented prototype developed under project BR28712219. The results show that the tactical effect of AI is distributed across four functionally linked loops (preparatory, communicative, recording-analytical and control), that each loop carries one dominant risk and one procedural safeguard, and that the prototype records four synchronized video channels at 1920×1080 and at least 25 fps together with 16 kHz PCM audio, the format required by current speech-recognition engines. The findings of this study suggest that AI transforms verbal investigative actions by changing the quality of information support rather than the subject of decision-making, that a human-centric model is the only one compatible with procedural safeguards, and that responsible innovation in this field depends on a systematic annotation methodology, because arbitrary labeling reproduces annotator errors instead of forensic patterns.

INTRODUCTION

Artificial intelligence (AI) is gradually being integrated into legally significant procedures crucial to scientific and technological progress, specifically in criminal proceedings, forensic examinations, criminalistics, and the analytical support of investigations. This process has acquired a new regulatory and political significance for the Republic of Kazakhstan, which declared 2026 the year of digitalization and artificial intelligence. A legal framework governing social relations related to the creation, implementation and use of AI systems has been established by the Law of the Republic of Kazakhstan "On Artificial Intelligence" (2025), while the Concept for the Development of Artificial Intelligence for 2024–2029 (2024) has set the institutional parameters for the field's advancement. At the supranational level, Regulation (EU) 2024/1689, the Artificial Intelligence Act (2024), classifies most law-enforcement uses of AI as high-risk and subordinates them to

[1]Corresponding author: *ORCID ID: 0000-0002-3411-7659*

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requirements of transparency, human oversight and data quality. Under these circumstances, the question is no longer whether AI will be applied within law enforcement agencies, but how to integrate its use into procedural and forensic frameworks while upholding guarantees of legality, a task that belongs to the agenda of peace, justice and strong institutions (Sustainable Development Goal 16) as much as to that of responsible innovation and infrastructure (Sustainable Development Goal 9).

Verbal investigative actions, which involve speech, conversation, recollection, explanation, responses to questions and the interviewee's emotions and behaviour, represent the area most sensitive to the introduction of AI. Interrogations, confrontations, on-site verification and clarification of testimony, lineup identifications and other actions involving the oral collection of information entail far more than the mechanical recording of text. Their outcomes depend on the quality of preparation, the nature of the questions asked, the structure of the narrative, the observance of rights, the minimization of pressure and the investigator's ability to maintain rapport and identify contradictions without imposing a preferred version of events on the participant (May et al., 2025; Kelly & Redlich, 2026). The most recent systematic evidence confirms that the chosen interrogation approach remains a primary determinant of true and false confessions (Catlin et al., 2024), which makes the tactical design of these actions a question of access to justice rather than a purely technical one. Criminal Procedure Code of the Republic of Kazakhstan (2014) regulates the forms of collecting, recording and analyzing information, including the procedure for conducting investigative actions and drafting official records, while the processing of audio, video, biometric and speech data must comply with the Law "On Personal Data and Their Protection" (2013).

On the technological side, automatic speech recognition (ASR) can already produce a usable preliminary draft of a police interview (Harrington, 2023). However, it remains unreliable for indistinct forensic audio (Loakes, 2024) and raises distinct legal risks when applied to investigative interviews (Stoykova et al., 2024). Integrated platforms for the digitalization of interrogation (Garcia et al., 2025), large language models used to formulate questions (Sun et al., 2025; Järvilehto et al., 2026) and emotion-aware deception models (Zhou et al., 2025) expand the toolkit, while experiments with AI personas reveal serious biases in machine judgements of truthfulness (Markowitz & Levine, 2025). Contemporary publications therefore tend to approach AI in criminal proceedings either too broadly, as an element of the digitalization of justice as a whole, or too narrowly, as a tool for transcription, sentiment analysis or predictive analytics. The scientific problem addressed here is that a fundamental forensic question remains insufficiently explored: how does the actual conduct of a verbal investigative action change when the investigator gains access to AI tools at the stages of preparation, execution, documentation, analysis and review?

The purpose of the study is to develop a scientifically grounded model of the transformation of the tactics of verbal investigative actions in the context of AI use, one that takes into account criminal procedural safeguards, forensic tactics, international best practice and the requirements for the preparation of training data. Achieving this purpose requires solving three intermediate problems: identifying the functional stages of an investigative action at which AI can operate, determining the dominant risk and procedural safeguard for each stage, and specifying the technical and methodological conditions under which the model can be implemented.

The remainder of the article is organized as follows. The literature review analyses research on interrogation and investigative interviewing, ASR, and generative models in forensic settings, and identifies the gap that motivates the study. The materials and methods section describes the sources, the normative base and the analytical procedure. The results section presents the four-loop model and its verification against the hypotheses. The discussion compares the model with other researchers' findings and international practice, describes the prototype, and formulates the requirements for data labelling. The conclusions summarise the contribution, its implications, its limitations and directions for future research.

LITERATURE REVIEW

The theoretical basis of the study lies at the intersection of three bodies of literature: research on interrogation and investigative interviewing, research on automatic speech recognition in forensic contexts, and research on generative and analytical AI models applied to investigative dialogue. Each is examined below in the order in which it bears on the purpose of the study, from the tactical foundations of the verbal investigative action to the technologies that now claim to support it. In recent decades, scientific discourse on methods for eliciting oral information in criminal cases has evolved from a confession-oriented model to an information-oriented one. Research into the risks of false confessions shows that pressure, the duration of interrogation, the interviewee's susceptibility, promises, threats, deception and an accusatory style all increase the probability of a false confession. The white paper by Kassin et al. (2010) structured the risk factors associated with police-induced confessions and proposed procedural safeguards, including the mandatory recording of interrogations and enhanced oversight of interrogation techniques, noting that the interrogation style influences not only the volume of information obtained but also the ratio of true to false confessions. A systematic review contrasting accusatory methods with information-gathering techniques demonstrated the impact of the tactical model on the quality of the information obtained (Meissner et al., 2012). Its update and extension confirmed that the chosen approach is a primary factor in the likelihood of false confessions and emphasised policies that foster truthful confessions and minimise false ones (Catlin et al., 2024).

The modern concept of investigative interviewing does not deny the investigator's active role but reinterprets its essence. The investigator should not turn the interaction into a process of psychological subjugation aimed at verifying a theory held before the investigation began; the task is to create conditions for obtaining complete, verifiable, and minimally distorted information (May et al., 2025). Investigative interviewing is a scientifically and practically grounded method for gathering reliable, case-relevant information, and errors or misconceptions about this process have been shown to lead to unlawful court decisions. In the international literature, it is viewed as an inquiry-based approach aimed at obtaining complete, reliable, and objective information through evidence-based communication techniques rather than securing a

confession at any cost, and the landscape of police interviewing is described as shifting decisively in that direction (Kelly & Redlich, 2026).

The training of investigators and the quality of the tactical techniques they employ are significant in this research. A systematic review of investigative interviewing training courses found mixed results: basic instruction, such as explaining rights, is acquired quickly, whereas comprehensive training covering question sequencing, thematic structure and the formulation of open-ended and clarifying questions requires more extensive organizational and methodological support (Akca et al., 2021). This finding is directly relevant to the deployment of AI: an algorithm can exert some control over the structure and quality of questions, but it cannot replicate an investigator's professional reasoning. Establishing psychological contact remains the most critical aspect of tactics. A survey of law enforcement practices showed that rapport-building is recognized as a vital element of standard interviewing protocols for witnesses and suspects (Vallano et al., 2015). For AI-based tools, this implies that algorithmic prompts must not disrupt natural rapport, turn the investigative task into a technical assessment of reflexes or force the investigator into an over-formalized conversation.

A distinct body of literature concerns automatic speech recognition, which is undoubtedly a key area of development. An analysis of police interviews with suspects demonstrated that automatic transcription can serve as a preliminary draft, provided it undergoes subsequent manual verification, with quality depending on acoustic conditions, accents, the recognition system, and the nature of the errors involved (Harrington, 2023). A more cautious conclusion was reached for modern ASR systems, including Whisper, applied to the low-quality recordings typical of forensic contexts: automated analysis remains unreliable for indistinct audio. It cannot replace professional transcription (Loakes, 2024). The legal risks of ASR in law enforcement are analyzed in the context of the AI Act: agencies that currently transcribe investigative interviews manually could automate the process to gain efficiency, but the legal and technical risks must be assessed carefully in light of the evolving regulation of general-purpose models (Stoykova et al., 2024). These aspects are crucial because ASR changes how data are recorded and subsequently analyzed, while still requiring verification, transcript analysis, and accountability for the outcome. The technological trajectory is nevertheless clear: a model trained on 680,000 hours of multilingual and multitask audio has become the reference point for modern speech recognition (Radford et al., 2023), and for Kazakhstan, an open-source corpus of approximately 332 hours of transcribed Kazakh speech has established an initial recognition baseline (Khassanov et al., 2021). Access to such resources does not, however, make systems ready for actual interrogations; legal terminology, Kazakh–Russian code-switching, accents, poor recording quality and multiple speakers all necessitate adaptation.

Broader solutions are emerging in the form of platform-based digitalization of interrogations. The INTU-AI system, for example, automates police interrogations through automatic transcription and analysis of participants' emotions during the procedure (Garcia et al., 2025). The practical significance of such developments lies in viewing interrogation as a multimodal information process in which speech, intonation, pauses, behaviour and the temporal structure of the dialogue are measured within an integrated digital environment rather than in isolation. Research evaluating large language models (LLMs) in investigative interviewing warrants particular attention. A comparison of an LLM with inexperienced interviewers questioning children about a simulated event indicated that the model showed advantages on specific questioning parameters, but that its implementation requires caution to avoid disrupting the interviewer's attention and metacognitive processes (Sun et al., 2025). In question-formulation tasks, LLMs generate more suggested questions than professionals in static settings but perform worse in dynamic conversation, which makes them useful in preparation and post-analysis while raising concerns about handing over control of the procedure (Järvilehto et al., 2026).

Even greater caution is required where AI is used to assess truthfulness. Experiments with AI personas in deception-detection tasks revealed significant biases and low accuracy in several scenarios, including interrogation (Markowitz & Levine, 2025). At the same time, models that integrate an LLM with emotion features and RoBERTa for analyzing interrogation transcripts confirm the technical promise of such approaches while leaving open the legal boundaries of their interpretation (Zhou et al., 2025). Comparative experience adds a further dimension: criminal intelligence environments with spatial analysis tools have long been used in Poland as supplementary instruments (Marcjan et al., 2014), speech recognition supports the recording of court hearings in Estonia (Härmand, 2023), and automated anonymization of judgments has been introduced in Croatia (Šamanić Matijević & Tičić, 2025), in each case as an auxiliary rather than a decision-making technology.

Taken together, the reviewed research convincingly demonstrates the risks of coercive interrogation, characterizes non-coercive investigative interviewing, documents the capabilities and limits of ASR, and evaluates LLM- and emotion-based analyses of investigative dialogue. What remains insufficiently explored is how these technologies collectively alter the tactics of the verbal investigative action itself, from preparation to review, and what a legally admissible division of labour between investigator and algorithm looks like. A contradiction is also evident: the technical literature reports growing accuracy, whereas the legal and psychological literature reports persistent unreliability and bias in exactly the situations where accuracy matters most. This gap and this contradiction justify the present study and the hypotheses formulated above, which propose not a model for verifying truth but a model for the tactical restructuring of the investigator's work in a digital environment. The study is theoretical and doctrinal in design, so the hypotheses are:

H_1: The integration of AI transforms the tactics of verbal investigative actions according to a human-centric (assistive) model rather than an algorithm-replacing-the-investigator (substitutive) model.

H_2: The tactical effect of AI is concentrated in four functionally linked loops (preparatory, communicative, recording-analytical and control), each with its own dominant risk and procedural safeguard.

H_3: The lawful application of AI in verbal investigative actions requires a dedicated, legally informed methodology for annotating audio and video recordings, in the absence of which the trained model reproduces annotator errors rather than forensic patterns.

The hypotheses are tested using formal-legal, comparative-legal, and systems-structural methods applied to scholarly sources, normative acts, and the technical specification of a prototype developed under project BR28712219, supplemented by scientific modelling.

MATERIALS AND METHODS

The materials of the study comprise three groups of sources. The first group consists of 25 scholarly publications on interrogation and investigative interviewing, forensic speech technology and AI in criminal proceedings, published between 2010 and 2026 in peer-reviewed journals and conference proceedings and selected on the criteria of direct relevance to verbal investigative actions, methodological transparency and, for empirical work, reported effect estimates or accuracy figures. The second group consists of five normative acts: Criminal Procedure Code of the Republic of Kazakhstan (2014), the Law "On Personal Data and Their Protection" (2013), the Law "On Artificial Intelligence" (2025), the Concept for the Development of Artificial Intelligence for 2024–2029 (2024) and the Artificial Intelligence Act (2024) of the European Union. The third group consists of the documented practice of five European jurisdictions (Poland, Estonia, Croatia, Lithuania and the Czech Republic) and the technical specification of the prototype developed under project BR28712219 and protected by Eurasian patent No. 054102.

The study employed both general scientific and specialized legal methods, using a four-step procedure. First, a formal-legal method was used to analyze the normative acts governing the social relations under study and to derive the procedural constraints (admissibility, reliability, relevance, personal data protection, and human oversight) that any AI-assisted tactic must satisfy. Second, methods of analysis and synthesis were applied to scholarly sources to extract, for each stage of a verbal investigative action, the documented capabilities and failure modes of AI tools. Third, a comparative legal method was used to compare national and international regulation and the operational practices of the five jurisdictions, and a systems-structural method was applied to situate the analyzed institutions within the criminal procedural system and the forensic support framework for investigations. Fourth, scientific modelling was used to structure the findings into a functional model and formulate practical recommendations. A logical-legal method was applied to identify internal connections, conflicts, and contradictions in the resulting constructs. A dialectical approach framed the whole procedure, allowing phenomena to be examined in their interconnection and development amid digital transformation.

The model's variables are defined conceptually as follows. The transformation stage is the functionally distinct phase of the investigator's activity (preparatory, communicative, recording-analytical or control). The traditional tactical model is the set of techniques applied at that stage without AI support. The AI-assisted model is the set of auxiliary functions that an algorithm can lawfully perform at that stage. The primary risk is that AI support may distort the procedure, and the procedural aspect is the safeguard that neutralises that risk. Hypothesis H_1 is considered supported if every lawful AI function identified is auxiliary to a decision retained by the investigator; H_2 if the functions cluster into exactly four loops with distinct risks; and H_3 if the technical specification of the prototype and the reviewed evidence show that model behaviour depends on the annotation scheme. The strength of the design is that it combines legal, forensic and technological analysis on a single object; its weakness is that it is doctrinal and does not yet include field testing of the model.

RESULTS

The study results in a four-loop model for reimagining the tactics of verbal investigative actions by integrating AI. Each loop represents a functionally linked component of the investigator's activity in which AI can provide support without violating procedural boundaries: the preparatory loop, the communicative loop, the recording-analytical loop and the control loop. The central methodological proposition is that AI does not alter tactics by sidelining the investigator; it transforms tactics by changing the information landscape of the investigative action. The investigator gains access to memory, experience, and case materials, alongside digital tools for preliminary analysis, prompts for structuring questions, automatic transcription, a dialogue timeline, indicators of incomplete recording, a list of potentially problematic segments, and the capability for subsequent expert evaluation. What changes is not the subject of the decision, but the quality of the information supporting that decision.

In the preparatory loop, traditional preparation for an interrogation involves reviewing case materials, defining the topic, formulating theories, drafting questions, considering the interviewee's personality and predicting behavioural patterns. AI advances this stage through automated analysis of case materials that identifies topics, event chronologies, contradictions, gaps and existing testimony and documents. At this stage, AI can also provide a preliminary quality assessment of questions: the system can indicate whether a question contains a predetermined answer, combines multiple circumstances, involves a value judgement, effectively solicits a confession or could be perceived as promising a benefit. The final decision on the investigation plan rests with the investigator, and AI-based preparation modules must not determine guilt, select an indictment as the primary option or employ language derived from pressure tactics. What is needed is an evidence-based model that supports information-gathering methods: open-ended questions, sequential clarification, a neutral tone, verification of the person's understanding of their rights, attention to vulnerable status, and documentation of the conditions under which the action is conducted.

In the communicative loop, the interaction between investigator and participant remains the central element of the verbal investigative action. Even with efficient AI, the tactical factors remain decisive: establishing rapport, the sequence of questions, reaction to free narrative, the ability not to interrupt, the capacity to ask about inconsistencies without coercion, monitoring of rights compliance and the presence of defence counsel, interpreter, educator or other required person. When used correctly, AI transforms this loop in three ways. First, by supporting structure: the system displays the stages of the action, issues reminders to explain rights and to warn about technical recording, documents the presence of individuals and facilitates the transition from free narrative to clarifying questions. Second, by maintaining question quality: the system

identifies leading, multiple, evaluative and repetitive questions in real time or after the action. Third, by helping the investigator monitor their own behaviour: the system detects changes in intonation or pace, interruptions, prolonged pauses after answers and repeated returns to the same question, the latter a potential indicator of pressure.

In the recording-analytical loop, the first obvious change concerns recording. A traditional written record, even a well-prepared one, does not always capture pacing, pauses, intonation, interruptions, emotions, non-verbal actions, the reactions of other participants or the context. Video and audio recordings supplement the body of evidence, yet without analytical support, lengthy recordings are difficult to process: they require manual reading to locate relevant segments and subsequent comparison of the record against the spoken content. AI can transform the transcript into a multimodal map of the investigative process comprising automatic transcription, speaker diarization, timestamps, thematic segments, markers for stages of the action, pauses or silences, variations in speech tempo, repetitive questions, potentially leading statements, sequences of emotionally charged remarks, the presence of other speakers and a final analytical assessment. In the control loop, this map serves as the basis for verification: when every significant tactical move is documented chronologically, with its speaker and context, it becomes more difficult to overlook improper influence, alter the meaning of testimony, or compile a summary that fails to reflect the action. The AI report serves as a guide for verification, not as an independent evidentiary conclusion. Table 1 summarises the model, contrasting the traditional and AI-assisted tactical models and specifying the primary risk and the procedural safeguard for each loop.

Table 1. Four-loop model of the transformation of verbal investigative action tactics under AI implementation

Transformation loop	Traditional tactical model	AI-assisted model	Primary risk	Procedural aspect
Preparatory	The investigator independently formulates a plan and questions based on the case materials.	AI helps identify themes, gaps, contradictions, and the risk of leading wording.	The algorithm could reinforce a bias towards conviction.	The investigator approves the plan; AI does not conclude guilt.
Communicative	The investigator intuitively controls the rapport, tone, and sequence of questions.	AI supports the stage structure, question quality, and speech self-monitoring.	The investigator might begin to follow the prompts mechanically.	The prompts are for reference purposes only and do not control the interrogation.
Recording-analytical	Written record and, if available, a recording.	Automatic transcription, timeline, speaker separation, segment map.	ASR errors can distort legally significant information.	Mandatory human review of the transcript and preservation of the original recording.
Control	Verification based on the log, complaints, and selective review of the recording.	Report on question quality, pauses, repetitions, signs of pressure, and inconsistencies.	An AI report could be mistaken for evidence.	The report serves as a guide for verification rather than an independent evidentiary conclusion.

With respect to the hypotheses, the results support H_1: each of the fourteen AI functions identified across the four loops is auxiliary, and in every loop the decision (approval of the plan, conduct of the dialogue, acceptance of the transcript, evidentiary assessment) is retained by the investigator or by another procedural authority. They support H_2: the functions cluster into four loops, each with a distinct dominant risk (bias towards conviction, mechanical following of prompts, distortion of legally significant information by ASR errors, and the mistaking of an AI report for evidence) and a distinct safeguard. They also support H_3 at the level of design requirements: the model can only be operationalized on annotated multimodal data, and the reviewed evidence on ASR error rates for indistinct audio and on LLM bias shows that the annotation scheme, not the algorithm alone, determines whether the system reproduces forensic patterns or annotator errors.

DISCUSSIONS

The results support all three hypotheses, with the reservation that H_3 has been verified at the level of design requirements rather than empirical performance. The model of an AI-assisted verbal investigative action must be integrated into the broader concept of investigative interviewing; this represents far more than a technical upgrade to record-keeping or the automated conversion of speech into text. It marks a shift in tactical focus from obtaining an acknowledgement to securing complete, reliable and verifiable information. In this respect, the four-loop model is consistent with the information-gathering paradigm documented by Meissner et al. (2012) and Catlin et al. (2024) and with the ethos of investigative interviewing described by May et al. (2025) and Kelly and Redlich (2026); what the model adds is a specification of where, in the sequence of an actual investigative action, an algorithm may operate and where it may not. The insistence that the AI report is a guide for verification rather than evidence follows directly from the low accuracy and bias found by Markowitz and Levine (2025) and from the legal caution expressed by Stoykova et al. (2024). It converges with the conclusion of Järvilehto et al. (2026) that LLMs belong in preparation and post-analysis rather than in the dynamic conversation itself.

The model has been given practical form. As part of project BR28712219, "Innovative Approaches to Conducting Verbal Investigative Actions Using Artificial Intelligence Tools", the research team is developing an intelligent device to automate the recording of interrogation minutes and to protect the rights of all participants in investigative actions in the Republic of Kazakhstan; this is the first comprehensive integration of AI into the conduct of verbal investigative actions in the country. On this basis, a device was developed and Eurasian patent No. 054102, "Artificial Intelligence-Based Device for Automated Record-Keeping", was obtained (inventors Yergali Mabiyev and Larissa Kussainova). The prototype's hardware architecture is based on a single computing node with peripheral subsystems. The central element is a Jetson AGX

Xavier module to which four IP cameras are connected via an internal Ethernet switch; the device is controlled through an HDMI touchscreen, all session data are stored on an NVMe SSD, and connectivity to the organization's server is provided via Gigabit Ethernet. A block diagram of the hardware interconnections is shown in Figure 1.

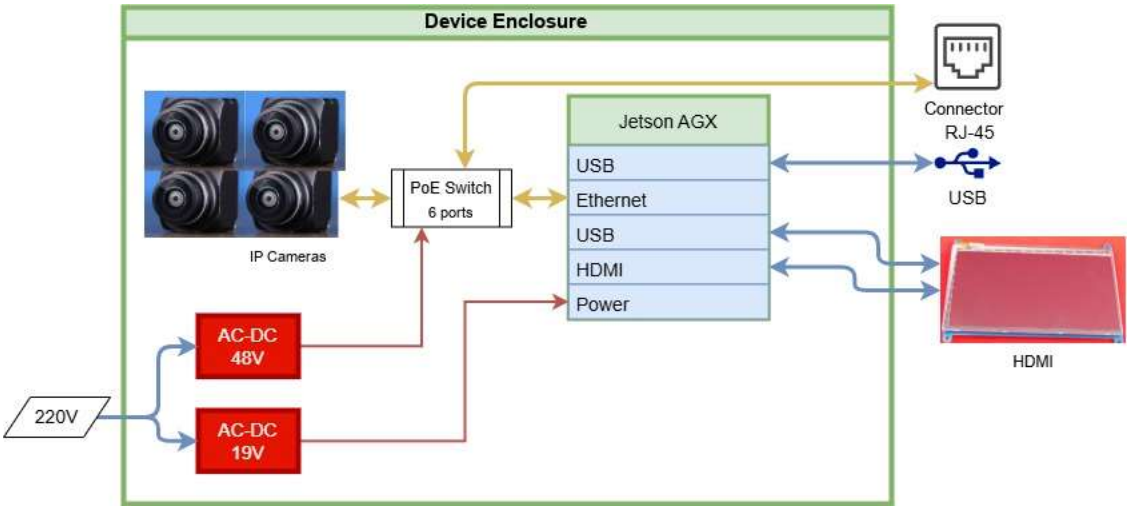

Figure 1. Hardware architecture of the prototype for AI-assisted recording of verbal investigative actions

A key function of the prototype is the synchronous multi-channel recording of an investigative action from four IP cameras. Multi-angle capture is required to cover all participants (investigator, suspect, defence counsel, witness) and to eliminate blind spots in subsequent analysis. Each video stream is received via the RTSP protocol over Ethernet, decoded and recorded into a single container with hardware-based timestamp synchronization. Video parameters are Full HD resolution (1920×1080), a frame rate of at least 25 fps, H.264/H.265 codecs and a total bitrate of approximately 32 Mbps; audio is captured in WAV format (PCM, 16 kHz), the standard accepted by most ASR engines, including the Whisper family evaluated by Radford et al. (2023) and Loakes (2024). Upon completion of each session, a structured set of data files is generated, ensuring session atomicity: all data from a single interrogation are stored in a single directory and can be transferred, copied, or processed as a single unit. These specifications matter for the discussion of H3, because the quality of the recorded signal bounds the quality of any transcription or annotation built on it, exactly the dependence reported by Harrington (2023).

The effective application of AI is nevertheless impossible without first training the system on high-quality data. To capture legally significant speech, semantic and behavioural characteristics, the system must be shown which features to record, how to interpret them and in what context to evaluate them. Consequently, annotating audio and video recordings of investigative actions is the project's primary task at this stage. If data are annotated arbitrarily, inconsistently, or without regard for legal considerations, the resulting model will replicate the annotators' errors rather than actual forensic patterns. This is why the authors obtain their result: the model is human-centric not because of a normative preference but because, at every loop, the reviewed evidence shows that the algorithm's output is only as reliable as the human-defined scheme it was trained on and the human review it is subjected to.

International experience reveals that AI in law enforcement is developing along several lines, including ASR, transcription of audio and video, big data analysis, and the drafting of procedural documents, but with markedly different levels of implementation. Poland applies AI to criminal analysis, in which the LINK environment identifies connections among individuals, events, organisations, and financial transactions (Marcjan et al., 2014). However, its agencies treat AI solely as a supplementary tool, incapable of replacing a professional officer. Estonia uses the Salme speech-recognition system to record court hearings and convert participants' speech into text, designed for the specific characteristics of the Estonian language and aimed at reducing manual documentation (Härmand, 2023). Croatia has launched the ANON system, which automatically anonymizes court rulings before publication by removing or replacing identifying information (Šamanić Matijević & Tičić, 2025). The Czech Republic has integrated machine learning for data pre-processing, biometric identification and specific forensic analyses, while Lithuania limits itself to building the technological foundation for future deployment. The common legal basis for further implementation is the risk-based approach of the Artificial Intelligence Act (2024). The four-loop model is consistent with every one of these cases: in none of them does the algorithm hold independent authority over the veracity of testimony, the presence of pressure, guilt or admissibility.

Several problems remain unresolved or arise anew. The reliability of ASR for Kazakh–Russian code-switched, multi-speaker forensic audio is unknown, and the corpus of Khassanov et al. (2021) does not cover interrogation speech. The indicators produced in the control loop (pauses, tempo changes, repeated questions) lack validated thresholds that distinguish tactical pressure from ordinary conversational variation. The procedural status of an AI report, including who may access it and whether the defence is entitled to it, is not yet regulated by the Criminal Procedure Code of the Republic of Kazakhstan (2014). The prospects of the model therefore lie in empirical testing on annotated recordings produced by the prototype, in the development of an annotation standard endorsed by legal practitioners, and in legislative clarification of the evidentiary status of algorithmic reports.

CONCLUSIONS

The purpose of the study was to develop a scientifically grounded model of the transformation of tactics in verbal investigative actions in the context of artificial intelligence tools, consistent with criminal procedural safeguards, forensic tactics, international practice, and the requirements of training data. The study developed a four-loop model comprising preparatory, communicative, recording-analytical, and control loops, in each of which AI performs auxiliary functions. At the same time, the investigator retains the decision, and identified one dominant risk and one procedural safeguard for each loop. It follows that integrating AI into verbal investigative actions is not a technical upgrade to interrogation, confrontation, or on-site verification of testimony, but a transformation of tactics, training, communication structures, recording, and control that is admissible only under a human-centric model of criminal procedure.

The article's unique contribution is threefold. It reframes the question of AI in criminal proceedings from the level of justice digitalization or transcription accuracy to the level of forensic tactics, where the actual conduct of the investigative action changes. It specifies a lawful division of labour between investigator and algorithm across the entire sequence of an investigative action, and it demonstrates, through a patented prototype that records four synchronized video channels and 16 kHz audio, that the model is implementable with current technology. Theoretically, the model links the information-gathering paradigm of investigative interviewing with the risk-based logic of AI regulation. For practice, it implies that investigative bodies should adopt AI first in the preparatory and recording-analytical loops, treat every algorithmic report as a guide for verification rather than as evidence, and invest in annotation methodology before models, because arbitrary labelling reproduces annotator error rather than forensic patterns. The annotation of recordings must cover both neutral procedural elements and problematic segments, since only then can a system distinguish a typical investigative process from a high-risk situation.

The study has limitations. It is doctrinal and comparative in design and has not yet subjected the model to field testing; the prototype has been specified and patented, but the performance of transcription and indicator extraction on real Kazakh interrogation recordings has not been measured; and the comparative material is limited to five European jurisdictions. Future research should test the four-loop model empirically on annotated recordings produced by the prototype, develop and validate an annotation standard for verbal investigative actions with the participation of investigators, prosecutors, defence counsel and forensic experts, establish evidence-based thresholds for the control-loop indicators, and examine the legislative changes required to define the procedural status of AI-generated reports, thereby contributing to justice systems that are both innovative and accountable.

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