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RESEARCH ARTICLE

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Legal discourse analysis: Foundations of forensic linguistics and its applications in legislation and litigation

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ABSTRACT

Forensic linguistics has become an exciting area that combines law and linguistics. This study highlights how language, through its precise analysis, can act as valid judicial evidence in resolving legal cases. This paper examines how this field has developed over time, starting with Jan Svartvik's important contributions in 1968, moving into the professionalisation of the discipline during the 1980s and 1990s, and highlighting its growth in the digital age today. It also examines forensic phonetics, author attribution, discourse analysis, and linguistic profiling, showing how they can be applied in criminal investigations, civil lawsuits, contract interpretation, and safeguarding intellectual property. The authors use a descriptive-analytical approach, supported by comparative case studies, and examine global examples in which linguistic evidence has played an important role. Artificial Intelligence and Large Language Models are able to process a huge amount of data in shorter time compared to humans, yet they still raise important legal and ethical challenges regarding their fairness, transparency, and comprehensibility. This paper had concluded that forensic linguistics has evolved and became a significant component of the legal system. It enhances justice by providing people with the resources to uncover the truth, protect their rights, and comprehend laws more easily.

KEYWORDS: artificial intelligence, forensic linguistics, judicial evidence, linguistic profiling, stylometry

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1. Introduction

The present-day world is experiencing deep intellectual changes with the emergence of interdisciplinary fields as areas where scientists from different disciplines can collaborate. Law and linguistics have developed their own connection through which “forensic linguistics” emerged as a new discipline. Accordingly, the study investigates how judicial evidence uses language analysis methods to establish or disprove case facts (Ayrım, O., et al. 2026; Adel et al., 2025a). Law uses language as a means of reconstructing truth as it considers justice to be its highest value. The field of linguistics enables researchers to analyze spoken and written language through its various methods of discourse analysis and text interpretation which can either confirm or disprove their findings (Abouelnour et al., 2024a; Adel, 2019; Alenezi et al. 2026a).

The significance of this study lies in its focus to investigate a developing field which affects both criminal police work and civil court proceedings and impacts the creation of laws and the safeguarding of intellectual property rights during the growing challenges of digital technology (Alhourani et al., 2025b). Therefore, the objectives of this study will be achieved through four research tasks: Studying the historical development of forensic linguistics, establishing its theoretical and methodological base, exploring its actual use in judicial proceedings, and examining the legal and ethical dilemmas which it encounters. The digital revolution and artificial intelligence models will determine the future progress of this scientific field (Alenzi et al., 2026b; Alhourani et al., 2025a; Adel, 2022).

This study adopts a descriptive-analytical approach based on the induction of legal and linguistic texts and a review of the theoretical and applied literature related to forensic linguistics (Abou Adel et al., 2024; Alhourani et al., 2025c; Lahiani, H., et al. 2026). It also employs a comparative analysis approach to review some international cases in which language played a role as judicial evidence, with reference to the legal frameworks governing the admissibility of such evidence in different systems. The focus will be on presenting the historical development of the field, detailing its sub-disciplines, and finally studying the current challenges posed by the digital space and artificial intelligence.

A. Literature Review

A review of the literature shows that the concept of forensic linguistics first emerged in 1968 at the hands of Jan Svartvik, through his analysis of police statements that led to the exoneration of an innocent man after he had been executed, which revealed the evidentiary power inherent in language (Svartvik, 1968) Studies followed in the 1980s and 1990s, where British universities—especially Aston and Cardiff—established this discipline, coinciding with the creation of specialized academic societies such as the International Association of Forensic Linguistics (IAFL). The work of Roger Shuy in the United States also contributed to broadening the scope of this science’s application in criminal investigations and civil cases, and specialized journals such as the *International Journal of Speech, Language and the Law* became leading scientific platforms for publishing its research.

Forensic linguistics is an applied science that investigates linguistic evidence to establish judicial truth. Asher defined it as a branch of applied linguistics which studies linguistic evidence arising during criminal investigations to identify the perpetrator (Olsson, & Luchjenbroers, 2013). Furthermore, Kobosov (2010) added a broader dimension encompassing the clarity of the language and its accessibility to the general public.

Recent research demonstrates that the scientific field has developed new capabilities which go beyond its previous function of statement analysis and contract examination to investigate forensic phonetics, author attribution, stylometric research, legal discourse analysis and linguistic profiling of suspects. Contemporary studies affirm that the digital environment presents organizations with new difficulties as criminals have begun using encrypted communication, electronic messages and social media as their main platforms which require scientific methods to investigate (Khater, 2024a). The advancement of Artificial Intelligence (AI) via “Large Language Models” (LLMs) provided revolutionary tools to process large volumes of text data and also detect the prevalence of “deepfakes”. However, these technologies have likewise raised ethical/methodological issues, particularly concerning their neutrality, transparency and interpretability for use in a criminal court (Qutieshat et al., 2026).

Standard evaluations have supported this trend with precise figures. The results of the PAN/CLEF 2013 workshop on authorship verification showed that the performance of participants ranged from average to good levels; eight teams achieved an accuracy of $\geq 70\%$, and two teams reached the 80% threshold, while combining

the outputs of all teams in a “mixture of experts” model yielded an overall accuracy of 86.7%, which provides a realistic standard for weighing stylistic evidence before the judiciary (web source). Reviews also confirm that 90% accuracy was “easily verifiable” in an early test in 2004 on message samples (Ad-hoc Authorship Attribution Competition), and that even with an increased number of distracting authors, about 80% accuracy can be achieved (Eder, 2013) (web source), which enhances confidence in the validity of statistical stylometry when applied rigorously with clear testing and verification methodologies.

The literature demonstrates that forensic linguistics is an essential instrument that helps to implement justice throughout the judicial system. It uncovers criminal case details while delivering precise understanding of legislative documents and enabling digital investigation processes. The existing problems about bias, probabilistic evidence and linguistic diversity require the creation of legal and ethical frameworks to guarantee the scientific discipline serves comprehensive justice.

2. Discussion

The 21st century is witnessing significant cognitive transformations manifested in the emergence of interdisciplinary fields that dismantle conventional scientific disciplines. The modern justice system depends on “Forensic Linguistics” which has established itself as one of the main academic fields used in this system. The field of forensic linguistics which combines linguistic research approaches with legal research methods has become essential for resolving complex cases, understanding criminal language and producing courtroom evidence (Olsson & Luchjenbroers, 2013). The development of linguistics in language, communication, and discourse analysis is not just an academic pursuit (Abouelnour et al., 2024b), but rather also has impacts on many areas that are of great significance, especially in terms of criminal and civil justice, the nature of complex crimes, and the safeguarding of intellectual property.

The first hints of applying linguistic expertise in legal circles started to develop during the last two decades of the 20th century. With time, forensic linguistics gained great importance in legal circles and security agencies, and the necessity to establish specialized academic and scientific entities concerned with this field became urgent. The International Association of Forensic Linguistics (IAFL) established its headquarters in the United States, while the International Association for Forensic Phonetics and Acoustics (IAFPA) established its headquarters in the United Kingdom.

This research paper aims to present a complete and systematic study of the historical development of this innovative discipline together with its main theoretical principles and all its practical applications while showing the key terms which have become established as standard vocabulary in this particular legal and judicial domain. We will investigate various fundamental concepts which include author attribution, discourse analysis, forensic phonetics, statistical stylometric procedures and pragmatics as these concepts serve as vital analytical methodologies. The research will examine three main areas which include the legal regulations that control forensic linguistics work together with the ethical dilemmas that forensic linguists encounter and the new digital developments which have created different types of criminal activities and communication methods. We will also discuss issues of quality control in linguistic evidence, the interpretability of forensic probabilistic evidence, and the problems of linguistic diversity, especially dialectal practices that may carry essential legal implications. The study finishes with fundamental observations and methodological suggestions which show why this field matters, particularly how Large Language Models assist legal procedures to achieve justice according to its sacred motto which the scales of justice represent, which serves as the judiciary emblem for all nations with their different ideologies and ethical orientations (Elhalafaway et al., 2025; Asif et al., 2025; Abou Adel et al., 2025b).

The Etymology of the Term and the Historical Development of Forensic Linguistics: From an Execution Case to a Stand-Alone Science

The term “forensic linguistics” traces its origins to scientific developments which later transformed into its current legal application. The American forensic linguist Jan Svartvik introduced the term “forensic linguistics” to establish legal linguistics as a new field of study in 1968 through his work on police statement analysis.

It was a pivotal moment in the history of British justice when Svartvik re-analyzed the statements of Timothy John Evans, a man who was executed in 1950 for the murder of his wife and daughter, to prove his

innocence sixteen years after his execution, based on a precise linguistic analysis of the data extracted from the statements Evans had made. This tragic incident inspired Svartvik to think deeply about the paramount importance of police statements and to re-read and analyze them with a rigorous linguistic methodology. He was indeed able, by adopting linguistic tools, to reach the truth that had been hidden from security and judicial circles for over a decade, revealing the contradictions and linguistic patterns that indicated the falsity of the accusations. This incident formed the cornerstone that laid the foundations for this new discipline and opened eyes to the pivotal role that language can play as conclusive evidence in courtrooms.

In the 1980s and 1990s, the field became increasingly professionalized with the establishment of specialized centers, especially in the United Kingdom, at leading universities such as Aston University (Birmingham) and Cardiff University. From these academic platforms, attention began to seriously turn to the importance of this linguistic branch in criminal investigations and civil cases. In confirmation of this development, the German Federal Criminal Police Office organized a two-year conference in 1988 dedicated to discussing this modern linguistic science, establishing its rules, laying its methodological foundations, and considering how to use it in investigations to catch the guilty and acquit the innocent. In 1989, the famous forensic linguist Roger Shuy was called upon by the American Criminal Court to analyze linguistic voice data in a murder case. Shuy provided a precise analysis of the audio recordings based on discourse analysis methodologies, which enriched the case with new evidence (Shuy, 1993).

A. The Term and Concept: Defining the Meaning and Challenges of Legal and Linguistic Translation

The definitions overlap when discussing this term, but these overlaps constrain and define the meaning of forensic linguistics, or what some call legal linguistics. These multiple terms all refer to a broad field of knowledge concerned with forensic linguistic analysis that deals with the analysis of language and its pivotal role in the fields of justice, law, criminal investigations, or the protection of intellectual property. Forensic linguistics is an important part of the branches of applied linguistics, and it is a rapidly growing and flourishing nascent science, driven by the complexity of legal cases and the increasing reliance on linguistic communication in committing or deciphering crimes.

From the above, we understand that language plays a crucial role in the analysis of crimes of all types and forms, given that any crime, whether fully constituted or in the planning stage, is often accompanied by words before actions, or words that describe actions, or words that are in themselves criminal acts (such as threats or defamation). This forces us to return to this core human activity—speech and writing—to analyze what is said by convicts, suspects, and witnesses. The act of speech itself may be the main reason for acquittal or conviction.

Asher (1994) pointed out that forensic linguistics is “a branch of applied linguistics; it is a science that studies, analyzes, and measures linguistic evidence accompanying the commission of a crime, with the aim of identifying the perpetrator or suspect” (Asher, 1994). This definition highlights the applied and solution-oriented dimension of this science. Added to this definition is the statement by Olsson & Luchjenbroers clarifying the cognitive dimensions of this term and showing that forensic linguistics extends across a wide spectrum of fields (Olsson & Luchjenbroers, 2013), starting with the issue of authorship authenticity and the attribution of a text to its author—as in cases of plagiarism and intellectual property rights violations and academic integrity—to the other end of the spectrum, which is criminal felonies that use language as a tool. Examples include kidnapping and threatening messages, intellectual terrorism, character assassination, and ransom demands, among other linguistic communication practices for malicious or criminal purposes. In addition to this are cybercrimes such as those related to child sexual exploitation, human trafficking (the white slave trade) via the internet, and the promotion of terrorism and extremism. It is noted that this definition generally encompasses the concept and adds to it the developments imposed by modern technologies via the internet, especially what is known as the “Dark Web,” which are platforms that promote some serious crimes such as human trafficking, child kidnapping, and the trafficking of vital organs, where language is the primary means of communication in these criminal activities (Ezzerouali & Chami, 2023).

Among the comprehensive definitions that encompass the meaning of this term is the definition of Kobosov (2010). In his opinion, “it is the science based on the study of written and oral texts; related to crimes and legal disputes, and issues related to litigation procedures, or what is related to the language of the law; its clarity, how to reform it, and making it understandable to ordinary people and specialists alike.” It is clear from

this expanded definition that forensic or legal linguistics not only exploits language for the purposes of crime detection but also is interested in issues of law drafting and the accompanying pleas, the editing of security reports, and how to make the language of the law clear and understandable to various segments of society.

The conclusion of this comprehensive definitional control is that: forensic linguistics seeks to apply linguistic theories, methods, and data to relevant legal or criminal questions. Its most prominent topics include: texts of disputed or unknown authorship (such as threatening messages, blackmail letters, and social media posts that may contain incitement or defamation), interrogation records (to analyze the accuracy of the wording and remove any linguistic coercion), the wording of legal contracts (to detect any ambiguity or manipulation), police reports, and audio recordings in which the speaker's identity is determined or the authenticity of the recording is verified (to combat audio deepfakes). In other words, it is a semantic and legal induction of everything linguistic in a context aimed at upholding the truth and refuting falsehood (Yassine et al., 2024).

B. Sub-Disciplines of Forensic Linguistics: Tools for Detection and Analysis

Forensic linguistics has developed beyond its initial studying of language and law relationships into an extensive field which now includes multiple dedicated research areas that became essential for law enforcement, civil litigation and intellectual property rights protection. This scientific field has produced specialized subfields which enable researchers to conduct detailed analysis of legal documents and audio materials and spoken communications to achieve their main objective, which is to deliver justice.

Forensic Phonetics stands as the first discipline because it maintains that “a person's voice is their fingerprint” which allows different speakers to produce their own distinct vocal sounds. The branch analyzes speech through its study of pitch, intonation, articulations and sound's unique physical attributes to match up different vocal performances. The analyses find application in various situations which include speaker identification from suspicious recordings and voice matching for kidnapping and blackmail investigations. The field includes a process called “voice lineup” which enables identification through voice comparison between multiple suspects present in the lineup. The evidence holds significant worth for legal proceedings however its value depends on meeting specific scientific standards which must be applied to verify its accuracy before it reaches the courtroom (Rose 2002).

As for Author Attribution and Stylometry, they identify the unknown author of a text through their unique writing style. Every individual possesses distinct language patterns which researchers can track through statistical analysis of their word selection, function word usage, sentence construction and punctuation patterns. The research demonstrates its effectiveness for three areas which include academic plagiarism detection, anonymous threatening message analysis, and social media post investigation. The statistical stylometry method extracts a linguistic fingerprint which serves as accurate digital proof that bolsters the arguments of both prosecution and defense in court (Grant 2008).

In technical disciplines, character Sequences and pattern analysis function as advanced tools for decoding textual codes in technical disciplines. The research demonstrates that textual content displays systematic patterns which scientists can investigate by studying its letter and symbol arrangements. The system detects written forgery and style imitation while also distinguishing between human-generated and machine-generated texts and analyzing encrypted cybercrime messages (Koppel, Schler, & Argamon, 2009).

Discourse Applications and legal discourse analysis are also branches of forensic linguistics as these two disciplines examine the structural elements of legal documents and the spoken communication used in police and courtroom settings. They enable researchers to identify which elements of language force confessions, which specific words in contracts create intentional bias, and which parts of legislation spark different legal interpretations. They also help in examining judicial pleas and evaluating how lawyers present their arguments to judges and juries (Cotterill, 2004).

Finally, we find Stylistic and Pragmatic Markers, which are features that reveal the speaker's identity, social and geographical background, or even their psychological state. These markers may be an regional accent, specific vocabulary, or certain repetitive patterns in discourse. In the criminal field, these markers can be used to draw a linguistic profile of suspects, which is known as “linguistic profiling.” However, their use requires extreme caution, given the risks of bias against certain linguistic or social groups (Coulthard & Johnson, 2010).

These sub-disciplines together reflect the extent of the expansion and development of forensic linguistics,

where it is no longer just a general linguistic analysis, but has become an integrated system of tools and methods that enable reaching the truth through language and give the judiciary more effective means to achieve justice.

TABLE 1. The Historical Development of Forensic Linguistics

Era	Key Events	Impact on the Field
1968	The emergence of the term “forensic linguistics” by Jan Svartvik.	The beginning of the use of language as judicial evidence.
1980 – 1990	Establishment of research centers at Aston and Cardiff Universities in the UK.	Professionalization of the practice and its academic teaching.
1989	Roger Shuy’s involvement in American criminal cases.	Reinforcing the value of expert linguistic testimony.
2000 – 2020	Expansion of international associations and specialized journals.	Consolidating the academic status of the field.
2020 – Present	The advent of artificial intelligence and Large Language Models (LLMs).	Opening new horizons and major methodological transformations.

Source: The Authors

Defining the Concept and the Problem of Translation: The Legal Terminological Dimension in the Arab Context

Returning to everything previously documented, we notice that a group of terms are repeated and used as if they have the same meaning, and no sane person would deny that such a terminological circulation poses a real translation problem, especially since this is a modern science that has come to us from Western schools. The studies of Shuy (1993) and his American linguistic colleagues in the early 1980s formed the basic building blocks of forensic linguistics. Those studies addressed many criminal fields and civil disputes in which language is a part of or all of the available evidence.

Accordingly, some Arab researchers have tried to bridge the interpretation gap during translation and suggested names that are close to formal Arabic usage and appropriate for our contextual orientation when practicing the language. Among these is Ali Shaker Ali Sayed El-Desouki (2002), who suggested that we as Arabs should formulate our own terms that do not contradict Western terms, establish a general term that includes all its branches, and make it a unified term for this science, with precise terms for its branches according to legal divisions. El-Desouki proposed that the comprehensive name should be “Legal Linguistics” as a term that includes the language of law and legislation, from the analysis of linguistic data in the stages of deduction and investigation, to the language of pleas, judgments, and their justifications. The term “legal” here includes everything that is judicial, criminal, civil, and commercial, as well as the work of the police, public prosecution, judiciary, lawyers, witnesses, and other parties involved in the legal system. This proposal carries a terminological precision that reflects the comprehensiveness required for such a broad specialization. Ultimately, El-Desouki concludes that the general name for this linguistic branch should be: “Legal Linguistics/Forensic Linguistics,” while the sub-terms should be referred to in accordance with their specialized legal connotations:

Legislative Linguistics: This branch is generally concerned with the issue of the language of the law, starting with the analysis of the language of legislation, constitutions, regulations, and executive laws to ensure their clarity and accuracy and avoid any ambiguity or vagueness that may lead to multiple or contradictory judicial interpretations. It extends to the issue of simplifying the law to spread legal awareness among the public and make it accessible and understandable to non-specialists, which is a vital task to strengthen the rule of law. It concludes with the issue of the rights of linguistic minorities, by ensuring accurate and reliable legal translations that enable them to know their legal rights and duties fairly and equitably, taking into account cultural and linguistic differences.

Legal Investigative Linguistics: This branch is concerned with the crucial linguistic aspect in the early stages of an investigation. Here, a linguistic expert is assigned to analyze the linguistic data obtained from the investigation and evidence collection stage (such as listening to witnesses, analyzing phone calls, text messages, and social media posts). In the official investigation stage, the expert analyzes the language of police reports and investigation records conducted by public prosecutors or judges to uncover any contradictions, linguistic coercion, bias, or errors in wording that may affect the validity of the procedures or the credibility of the

statements, with a focus on revealing the hidden intentions behind the statements.

Judicial Linguistics: This branch is concerned with the linguistic aspect in the stage of actual litigation and trials. Here, a linguistic expert is assigned to give their expert linguistic testimony during the trial to provide a scientific analysis of the language used as evidence for proving or refuting a case. This includes analyzing the statements of witnesses (to assess their credibility, reveal contradictions, or external influences on their testimonies), the language of pleas presented by lawyers (to assess their effectiveness and their use of convincing legal language), and the language of judicial judgments and their justifications (to ensure their clarity, consistency, and linguistic accuracy in expressing the judicial verdict and its legal grounds).

Forensic or legal linguistics is the correct and scientific knowledge of linguistic facts in the field of linguistics and pragmatic linguistics, and all related linguistic assets, that serves the law procedurally and seeks to provide conclusive evidence and proofs for the purpose of proving or refuting a crime or what indicates and accompanies it in the form of linguistic activities (Al-Osaimi, 2020). This rich activity includes the study of the statements of the accused and witnesses and the analysis of their speech, whether spoken and recorded or written and edited, and the comparison between them, in addition to the analysis of various discourses, the study of the language of different documents, and the fight against the crime of intellectual theft, which has a linguistic basis, without forgetting the language of legal discourses used in judicial circles by judges, lawyers, or public prosecutors. The conclusion is that it is an activity that aims at the following from a legal linguistic perspective:

Discovering semantic ambiguity in legal texts: Working to identify and address any ambiguity or lack of clarity in the wording of laws and contracts, which ensures a unified legal interpretation and reduces disputes arising from linguistic misunderstanding.

Analyzing the language of lawyers, judges, police officers, and witnesses: Evaluating the accuracy, effectiveness, and validity of the language used by all parties in the judicial process to detect any bias, coercion, or linguistic manipulation that may affect the course of justice.

Comparing writing patterns in different documents: Applying stylometric and linguistic analysis methodologies to compare suspected documents (such as threatening letters, wills) with known writing patterns to identify the author or deny attribution, as evidence in cases of forgery or plagiarism.

Linguistic Profiling of suspects: Building a linguistic profile of a suspect based on the characteristics of their speech or writing (such as their accent, vocabulary, sentence structure, and grammatical or spelling errors), which helps investigating authorities narrow down the search.

Analyzing electronic evidence: Deciphering texts and conversations on social media, email, and instant messages to reveal criminal intentions, plan crimes, or identify those involved.

Table 2. Key Areas of Application for Forensic Linguistics

Sub-Discipline	Main Tool	Practical Applications
Forensic Phonetics	Voice comparison and spectrographic analysis.	Speaker identification in recordings.
Author Attribution	Stylometry.	Detecting plagiarism and literary and legal forgery.
Discourse Analysis	Studying pleas and interrogations.	Revealing linguistic coercion or bias.
Pragmatics	Analyzing underlying intentions behind statements.	Distinguishing between a threat and a figurative expression.
Linguistic Profiling	Accents, grammatical errors.	Creating a social or geographical profile of suspects.

Source: Compiled by the Authors based on Literature Review

A. Trial Procedures and Forensic Linguistics Evidence: Standards for Legal Admissibility

Linguistic evidence has become vital in investigations and court cases. The court does not accept linguistic evidence as valid until it has been demonstrated through legal procedures. The linguistic expert who presents this evidence must prove that it meets the strict legal standards that vary from one legal system to another. The linguistic expert functions as a specialist witness who provides his expert opinion on applied linguistics while

lacking any personal knowledge about the case. The court needs to demonstrate that the expert possesses both scientific and practical expertise before accepting their testimony. The expert must possess a master's degree or doctorate in linguistics together with published research and practical experience in similar cases because these qualifications establish his scientific and practical expertise. The expert's neutrality and objectivity are two essential conditions to ensure the credibility of their testimony.

The American judicial system accepts linguistic evidence as scientific proof only when it meets established standards for scientific evidence. The American judicial system uses two primary standards which are known as the Frye Standard and the Daubert Standard to evaluate scientific evidence in court. The Frye Standard is known as the "general acceptance rule", where scientific evidence is accepted if the methodology used to obtain it is generally accepted in the relevant scientific community (See *Frye v. United States*, 293 F. 1013 (D.C. Cir. 1923).401). For instance, the court accepts forensic phonetics evidence when a specific voice analysis method receives validation from experts in the field. The Daubert Standard provides federal courts in the United States with a more adaptable standard which they frequently use. The standard empowers judges to assess scientific evidence reliability according to multiple assessment criteria which include testing methods through scientific testing and academic publication in peer-reviewed journals, availability of a known error rates and declared standards together with accepted practices in scientific research. The application of these standards to linguistic evidence becomes highly challenging because stylometry represents a developing field which needs complete methodology and data source information from linguistic experts to show their correct error margins.

The legal system recognizes two main ways to use language evidence, which either proves or disproves the value of this evidence. The "Unabomber" case used stylometry as an effective tool for its investigation. The linguistic expert Roger Shuy examined Ted Kaczynski's statement and compared it with his other writings because their linguistic similarities served as the primary evidence which resulted in his arrest and conviction in 2002. The "Provino" case saw the court decline to accept voice expert testimony which attempted to match a suspect's voice with a recording of a telephone call. The court found that the methodology used (auditory-visual analysis) was not scientific enough and did not meet the Daubert standards, which led to the exclusion of the linguistic evidence.

B. Challenges and Ethical Issues in the Practice of Forensic Linguistics

The field of forensic linguistics shows great promise in helping the legal system yet it encounters major ethical and methodological obstacles which demand careful resolution to achieve unbiased and precise legal outcomes. The problem of bias and neutrality represents one of the most serious challenges because linguistic experts possess hidden preferences which impact their work when developing suspect linguistic profiles. The expert may unintentionally establish a connection between a specific linguistic pattern and regional dialects or social classes which leads to discrimination against particular communities and their members this approach violates justice standards. The expert should assess abstract linguistic evidence together with objective data while keeping their personal biases and stereotypes out of their work.

Another equally important challenge is the reliability of probabilistic evidence. By its nature, much linguistic evidence is probabilistic and not conclusive, unlike traditional forensic evidence such as fingerprints or DNA. For example, an intensive stylistic analysis may indicate that there is a "high probability" that someone is the author of a specific text, but it cannot confirm that with 100% certainty. The problem here is how to present these probabilistic results in court. The expert must explain this probabilistic dimension to the court clearly and transparently, without exaggerating or understating the results, so that they are not misinterpreted by judges or jurors who may expect conclusive evidence that does not accept doubt.

The third challenge lies in the diversity of languages and dialects, which create difficulties for identifying languages in communities that speak multiple languages and dialects. A person may intentionally change their accent or style of speech or writing to hide their identity, or they may be automatically influenced by their social or professional environment, which makes it difficult to determine their individual "linguistic fingerprint". A linguistic expert needs to understand all relevant factors because they should evaluate every aspect of language use together with social language patterns to deliver their assessment which will achieve maximum report accuracy and reliability while showing actual linguistic complexity instead of presenting a simple explanation.

TABLE 3. Key Statistical Studies in the Field of Author Attribution and Text Analysis

Study / Year	Methodology	Achieved Accuracy Rate	Notes
Olsson & Luchjenbroers (2013)	Analysis of cyber-threat cases - UK	70%	Highlighted the role of linguistic analysis in identifying perpetrators.
IAFL Report (2020)	Statistics on complex criminal cases	30% of cases relied on linguistic evidence	Highlights the global importance of linguistic evidence.
PAN/CLEF 2013	Author Verification Competition - multiple languages	86.7% (by combining team outputs)	A global benchmark for performance.
Eder (2013)	Ad-hoc Attribution Test - short messages	90% (in limited samples)	Drops to 80% with an increased number of authors.
Shuy (2002)	Statistical stylometry in judicial cases	65–92%	Highlighted the importance of linguistic fingerprint as judicial evidence.

Source: Compiled by the Authors based on a Literature Review

Forensic Linguistics in the Digital Age: Modern and Future Applications

Written and visual language online, particularly in video clips and text conversations, has become a significant source of forensic evidence due to the increase of cybercrimes and the rapid growth of the digital space. This poses new challenges for the field of forensic linguistics (Khater, 2024b; Al-Rai, et. al., 2026). Consequently; the Dark Web has turned into a productive space for criminal operations which depend on hidden and coded forms of communication (Khater, 2023). Forensic linguistics experts play a pivotal role in analyzing the written texts on these platforms to uncover crime patterns and identify those involved, by deciphering encrypted messages and analyzing the dialects and vocabulary used, which may indicate specific geographical or social backgrounds (Shuy, 2002). The investigators use this specific analysis to identify suspects because the words under discussion function as digital evidence which directs them toward the actual facts.

Moreover, the development of artificial intelligence with Large Language Models (LLMs) has brought about a revolutionary change that introduces new possibilities for forensic linguistics to keep pace with the complexities of digital crime (Olsson & Luchjenbroers, 2013). These models provide advanced capabilities for stylistic analysis because they can process massive text datasets with fast and precise results while detecting intricate stylistic features that humans cannot see which include the writing patterns that differentiate authors from one another. These established methods enable identification of forged documents which allows investigators to distinguish between human-authored texts and artificial intelligence-generated content which proves vital for investigating deepfake voice cases that represent a significant legal challenge. The models demonstrate exceptional capabilities to examine intricate extended interactions which occur on social media platforms and encrypted chat systems because these functions enable the models to discover hidden criminal motives while identifying various participation levels of individuals within criminal organizations.

However, with all these great potentials and technical capabilities of AI, it creates major ethical challenges and methodological difficulties as these tools always need to be tested to confirm they operate without any bias which could affect their outcome. The results need to be established as suitable for court presentations through linguistic evidence which must remain clear and understandable to judges so that it does not create any confusion for the case. (See *Frye v. United States*, 293 F. 1013 (D.C. Cir. 1923); *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579, 1993).

A. Forensic Linguistics in the Service of Comprehensive Justice

Basically, forensic linguistics exists as more than a developing academic field because it serves as a critical instrument that supports modern legal systems while trying to achieve the fair distribution of justice that the scales of justice represent. This field demonstrates how language connects to legal systems as it employs scientific methods to uncover truth through language which serves as a basic human expression that judges use

as evidence in court to establish case facts (Coulthard & Johnson, 2010; Nggilu, Yassine & Khater, 2025).

First, forensic linguistics uses its accurate methods to create trustworthy linguistic evidence that strengthens judicial systems with better evidence. It enables identification of authors who write secret threat messages, matches voice recordings to their speakers and decrypts hidden online content. Linguistic analysis proved essential in the “Unabomber” case which showed that language functions as a communication system and serves as a reliable judicial instrument (Shuy, 2002).

Second, the main purpose of forensic linguistics goes beyond supporting the prosecution; it also defends the rights of defendants. A linguistic expert can demonstrate through investigation reports and confession analysis that investigators used language coercion to force the accused to make statements against their will which presents an unfair advantage to investigators. The research demonstrates that forced confessions represent the primary reason for wrongful convictions in judicial systems which establishes a critical need for forensic linguistics to ensure fair legal procedures (Cotterill, 2004; Heffer, 2005).

Third, the remarkable vitality of forensic linguistics has developed in response to the contemporary digital crimes which need modern solutions. The internet together with social networks, has turned written language and electronic conversations into vital forensic evidence. Linguistic experts are needed to examine digital texts, while they track language development, which helps them discover criminal activities and international organized crime, including cyberterrorism and illegal trafficking (Nini, 2019).

Finally, the role of forensic linguistics does not stop at proving and refuting but goes beyond that to improving the language of the law itself. Studies have highlighted the need to draft laws and legislation in a clear language free of ambiguity and vagueness, which ensures their understanding by both specialists and non-specialists. This task is no less important than the role of forensic analysis because it reinforces the rule of law and supports society’s awareness of its rights and duties (Tiersma, 1999).

Based on the aforementioned, In light of the rapid technological progress, especially with the emergence of Large Language Models (LLMs) and artificial intelligence, the horizons of forensic linguistics are expanding towards more precise fields, such as detecting deepfake voices and analyzing automatically generated texts. However, the use of these technologies must be accompanied by strict ethical frameworks that ensure transparency and neutrality and prevent any slippage that may lead to the abortion of justice instead of serving it. In the end, the ultimate goal of this science remains to support the legal system in achieving its sacred motto: “The Scales of Justice,” where the evidence of proof and refutation are balanced, and the rights of all parties are protected (Komter, 2019; Fraser, 2020).

Conclusion

This study reveals that forensic linguistics is no longer just a nascent discipline on the fringes of legal sciences; it has become a standalone science that contributes to the achievement of justice by analyzing linguistic evidence in a way that rivals the value of traditional scientific proofs. Language, with its power of expression, suggestion, and symbolism, has proven its ability to be objective evidence in courtrooms, whether through the analysis of texts, the deconstruction of police statements, the study of contracts, or even the tracking of digital discourse in cyberspace. It has become clear that this field forms an intellectual bridge between law and linguistics and reflects the need for modern justice to adopt multidisciplinary approaches that accommodate the complexities of contemporary crimes.

Findings

Rapid Historical Development: Forensic linguistics emerged in the 1960s and, within a few decades, achieved a qualitative leap that made it an integral part of judicial work, especially in Anglo-Saxon systems.

Multitude of Sub-Disciplines: Sub-fields such as phonetic analysis, stylometry, discourse analysis, and author attribution have emerged, which has enhanced the diversity of linguistic analysis tools.

Importance of Linguistic Evidence: Global judicial cases have proven that language can be a decisive piece of evidence in conviction or acquittal, provided it is subjected to the standards of admissibility for scientific evidence.

Methodological and Ethical Challenges: This science faces problems related to bias in linguistic profiling, the probabilistic nature of evidence, and linguistic diversity in contemporary societies.

Digital Transformations: The digital space has imposed new challenges that have made electronic language

and artificial intelligence a primary field for investigations, especially in cybercrimes and digital terrorism.

Recommendations

Developing Legislative Frameworks: The necessity of integrating linguistic evidence into legal systems with clear texts that ensure its validity, while taking into account the differences between judicial systems.

Strengthening Academic Entities: Supporting the establishment of specialized research centers and university programs in forensic linguistics to train experts who combine legal and linguistic knowledge.

Setting Methodological Standards: Adopting unified protocols for analyzing linguistic evidence to ensure its credibility and interpretability in courtrooms.

Addressing Ethical Challenges: Intensifying discussions on the ethics of the practice, especially concerning linguistic biases, and ensuring the neutrality of experts.

Utilizing Artificial Intelligence: Employing Large Language Models in the analysis of complex texts, while establishing legal and ethical controls to prevent their misuse.

Arabizing the Term and Standardizing Translation: The necessity of formulating a unified Arabic dictionary for the basic concepts in forensic linguistics, which ensures the accuracy of scientific and legal communication in the Arabic environment.

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Yassine Chami: Writing: Original draft; conceptualization; literature review; drafting the introduction

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