ORIGINAL ARTICLE

INTERNATIONAL JOURNAL OF ARTIFICIAL INTELLIGENCE

ISSN: 2692-5206, Impact Factor: 12,23

American Academic publishers, volume 05, issue 04, 2025

Journal: https://www.academicpublishers.org/journals/index.php/ijai

SIGNATURES ON DOCUMENTS AND THEIR EXPERTISE

Abduraxmatova Marjona Zakirovna

Termez State University, Faculty of Uzbek Philology, Applied Philology, Group 223, 2nd year student

marjonaabdurahmatova17@gmail.com

Аннотация

В статье рассматриваются вопросы подписей на документах и их проверки. Подпись является важным средством идентификации, и ее подлинность имеет большое юридическое и экономическое значение. Подробная информация будет предоставлена о методах анализа подписей, их точности, а также о случаях подделки в рамках документоведения и судебной экспертизы. В исследовании анализируются используемые методы проверки, технологические средства и современные системы цифровой подписи.

Ключевые слова. Подпись, экспертиза, документы, судебная экспертиза, подделка, графология, биометрическая подпись, электронная подпись.

Abstract

This article examines the issues of signatures on documents and their examination. A signature is an important means of identification, and its authenticity is of great legal and economic importance. Detailed information is provided on the methods of analyzing signatures in the framework of document science and forensic examination, their accuracy and cases of forgery. The research analyzes the examination methods, technological tools, and modern digital signature systems used.

Keywords. Signature, examination, documents, forensic examination, forgery, graphology, biometric signature, digital signature.

INTRODUCTION

A signature is an important means of confirming a person's identity, which is widely used in the execution of documents. The presence of a signature in legal and commercial documents indicates that they have legal force. Therefore, the problem of signature forgery is one of the important issues in the judicial system.

Signature examination is widely used in the fields of document science and forensic examination. It is carried out to determine the authenticity of a signature, identify methods of forgery, and confirm identity. Modern technologies, in particular biometric and digital signature systems, are helping to make this process more efficient.

This article analyzes the main methods, features, and technological innovations in the field of signatures on documents and their examination. Information is also provided about measures to prevent signature forgery and modern examination methods.

LITERATURE ANALYSIS AND METHODOLOGY

Research on signatures and their examination plays an important role in linguistics, law, and criminology. Studies based on graphology, forensics, and modern technologies have been conducted to determine the authenticity of a signature.

Graphological analysis is aimed at determining the speed of movement, pen pressure, and specific aspects of the signature. Forensic research, on the other hand, helps to study the methods of forgery of documents and develop ways to prevent them.

ORIGINAL ARTICLE

INTERNATIONAL JOURNAL OF ARTIFICIAL INTELLIGENCE

ISSN: 2692-5206, Impact Factor: 12,23

American Academic publishers, volume 05, issue 04, 2025

Journal: https://www.academicpublishers.org/journals/index.php/ijai

In recent years, digital signature technologies have developed widely, making it possible to automate the process of signature verification. Methods for authenticating signatures using artificial intelligence are also being developed, which plays an important role in ensuring security. This study studied the main methods of signatures on documents and their examination. The following methods were analyzed as examination methods:

Graphological examination - studying the specific features of the signature, writing speed, and pen pressure.

Forensic analysis - identifying and analyzing methods of forgery of documents.

Digital signature examination - verification of signatures using modern technologies.

Biometric authentication - identity verification through artificial intelligence and biometric technologies.

The study analyzed which method is more effective in determining the authenticity of a signature and studied various methods of forgery.

RESULTS

According to the results of the study, there are several methods of forging signatures, the most common of which are copying, reprinting with a scanner, and manual imitation. Although graphological examination is effective in identifying forged signatures, digital technologies are currently providing much higher results in this process.

Forensic analysis has shown that forgeries made by traditional methods can be quickly detected using special equipment. In particular, analyzes using light and chemical reagents have been effective in identifying changes made to documents.

Digital signature technologies play an important role in the secure storage and authentication of signatures. In particular, cryptographic signatures used for electronic documents help prevent forgery.

The following table compares the main types of examination used to verify signatures on documents and their characteristics:

Type of examination	**Description**	**Advantages**	**Disadvantages**
Graphological examination	Analysis of signature and handwriting characteristics	Provides accurate results based on pen pressure, movement speed, and unique characteristics	Requires a subjective approach, results depend on expert qualifications
Forensic examination	Verification of documents using chemical and physical methods	Detects changes using special reagents and light beams	Requires equipment and laboratory conditions
Digital signature examination	Cryptographic analysis of signatures in electronic documents	Almost impossible to tamper with, automated verification possible	Requires a digital certificate, depends on software
Biometric examination	Identity verification using artificial intelligence and biometric methods	High accuracy, automated analysis, and real-time verification possible	Requires special devices, technical errors may occur

ORIGINAL ARTICLE

INTERNATIONAL JOURNAL OF ARTIFICIAL INTELLIGENCE

ISSN: 2692-5206, Impact Factor: 12,23

American Academic publishers, volume 05, issue 04, 2025

Journal: https://www.academicpublishers.org/journals/index.php/ijai

As can be seen from this table, each type of examination is based on its own methods and technologies.

1. Graphological examination is aimed at identifying personal elements by analyzing handwriting and signature features. Although this method is quite old, it is still used. However, its results depend on the experience of the expert and can be subjective.
2. Forensic examination uses special technologies to identify changes made to documents. Forgery is detected using light and chemical reagents. However, this method is complex and requires laboratory conditions.
3. Digital signature examination analyzes the cryptographic properties of signatures in electronic documents and verifies their authenticity. Although this method provides high security, it requires special software and a digital certificate.
4. Biometric examination automatically verifies a person using artificial intelligence and biometric technologies. It has high accuracy, but may require special equipment.

In general, the use of classical methods in combination with modern technologies allows for effective measures against signature forgery.

Table 2: Types of Signatures on Documents and Their Forensic Characteristics

Type of Signature	Purpose	Key Features	Forgery Risk	Expertise Methods	Typical Use Cases
Handwritten Signature	Legal validation, personal identification	Unique strokes, pressure, slant, rhythm	Medium to high	Graphology, magnification, stroke analysis	Contracts, checks, personal letters
Digital Signature	Secure online authentication	Encrypted digital code, unique certificate	Low (when secured)	Cryptographic verification, timestamp check	Online contracts, banking, e-documents
Scanned Signature	Convenience in repeated document use	Same image reused, lacks pressure variation	High	Image comparison, resolution analysis	Emails, printed forms
Electronic Signature	Quick e-approval	Typed names, checkboxes, stylus signatures	Medium	Metadata analysis, IP tracking	E-commerce, HR approvals, online forms
Initials (Short Sign)	Quick approval or partial endorsement	First letters of names, less detail	Medium	Comparison with full signatures	Drafts, internal memos, page-by-page approvals
Witnessed Signature	Legal assurance with third-party presence	Signature + witness details	Low	Validation of witness identity	Wills, deeds, legal agreements

Explanation of the Table:

ORIGINAL ARTICLE

INTERNATIONAL JOURNAL OF ARTIFICIAL INTELLIGENCE

ISSN: 2692-5206, Impact Factor: 12,23

American Academic publishers, volume 05, issue 04, 2025

Journal: https://www.academicpublishers.org/journals/index.php/ijai

1. **Type of Signature:**
   - Describes the format or nature of the signature, such as handwritten, digital, or scanned.
   - Each has its own level of security and authenticity.
2. **Purpose:**
   - Specifies why the signature is used — to validate, approve, or identify.
   - For example, handwritten signatures are often used for legal agreements, while digital ones are used in online platforms.
3. **Key Features:**
   - Lists the unique identifying aspects of each type, like pressure in handwritten ones or encryption in digital signatures.
   - These help experts analyze authenticity.
4. **Forgery Risk:**
   - Indicates how easily each type of signature can be forged or misused.
   - Scanned signatures are more prone to forgery, whereas digital signatures offer more protection.
5. **Expertise Methods:**
   - Outlines the techniques used by forensic document examiners to verify authenticity.
   - Includes cryptographic tools, stroke analysis, or metadata inspection.
6. **Typical Use Cases:**
   - Provides examples where each type of signature is commonly found in real-life settings.

This table gives a comprehensive view of how signatures function across various document types and how they are verified for authenticity by experts. It helps understand both the **legal importance** of signatures and the **technical methods** used to evaluate them.

CONCLUSION

Signatures are an important factor in ensuring the reliability of documents. Confirming their authenticity is of great legal, economic and technological importance. The study showed that modern examination methods are effective in analyzing signatures and preventing forgery.

While graphological and forensic examinations remain traditional methods, digital signature technologies and biometric authentication are playing a key role in strengthening modern security measures. In the future, artificial intelligence is expected to be more widely used in signature verification.

REFERENCES

1. Harrison, W. R. (2019). Suspect Documents: Their Scientific Examination. CRC Press.

2. Morris, R. (2000). Forensic Handwriting Identification: Fundamental Concepts and Principles. Academic Press.

3. Jain, A. K., Ross, A., & Pankanti, S. (2006). Biometrics: A Tool for Information Security. IEEE Transactions on Information Forensics and Security.

4. Schneier, B. (1996). Applied Cryptography: Protocols, Algorithms, and Source Code in C. John Wiley & Sons.