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Research Paper

GEN AI BASED INTELLIGENT RESEARCH PAPER VERIFICATION AND AUTHENTICITY ASSESSMENT SYSTEM

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Abstract

The Gen AI Based Intelligent Research Paper Verification and Authenticity Assessment System is an Artificial Intelligence-based platform designed to assist researchers, students, reviewers, and academic institutions in evaluating the quality and authenticity of research papers. The increasing availability of online publications and AI-generated content has made it difficult to manually verify every research document. The proposed system uses Generative AI, Natural Language Processing, and information retrieval techniques to support the verification process.

The system allows users to upload a research paper in formats such as PDF or DOCX. It extracts important information including the title, authors, abstract, keywords, references, citations, methodology, results, and conclusions. NLP techniques are then used to analyze the document structure, writing patterns, claims, and relationships between different sections. The system can identify missing sections, inconsistent information, citation issues, and potentially unsupported claims.

A major feature of the proposed system is source and citation verification. The system can compare references and bibliographic information with available trusted academic sources and identify potential mismatches or incomplete references. It can also analyze whether citations appear relevant to the claims they are associated with. Similarity analysis can be used to identify potentially overlapping content with documents available in the selected reference sources.

Generative AI is used to summarize verification findings and present them in an understandable format. The system can generate an authenticity assessment report containing indicators such as citation consistency, structural completeness, content similarity, claim-support observations, and detected anomalies. These indicators are presented as evidence for human review rather than as a final declaration that a paper is authentic or fraudulent.

Overall, the proposed system aims to make research-paper verification faster, more systematic, and easier to review. It can assist students, researchers, academic reviewers, journals, and institutions in identifying potential issues before publication or submission. The system should be treated as a decision-support tool because AI-based assessments cannot independently guarantee that a research paper is genuine, scientifically correct, or free from plagiarism. Future enhancements can include

integration with academic databases, stronger citation verification, multilingual support, advanced similarity analysis, and expert-review workflows.

I. INTRODUCTION

Research papers are an important means of communicating scientific and academic knowledge. A research paper normally contains a research problem, literature review, methodology, results, discussion, conclusion, and references. The credibility of academic communication depends heavily on the reliability of these elements. Researchers and reviewers therefore need to examine papers carefully before accepting, publishing, or using their findings.

The growth of digital publishing has made research papers easier to create and distribute. At the same time, the increasing use of Artificial Intelligence and Generative AI has introduced new challenges in academic verification. Research documents may contain incorrect citations, unsupported claims, fabricated references, inconsistent results, or content that is highly similar to existing publications. Manually identifying all these issues can require considerable time and expertise.

Traditional verification processes involve plagiarism checking, reference verification, manual proofreading, peer review, and comparison with existing research. These processes are valuable, but they are often performed using separate tools. A reviewer may need to use one application for similarity checking, another for reference verification, and additional resources for evaluating research structure and claims. This fragmented process can make comprehensive verification difficult.

The proposed **Gen AI Based Intelligent Research Paper Verification and Authenticity Assessment System** combines multiple verification activities into a unified platform. The system processes uploaded research papers and analyzes their structure, citations, references, textual similarity, claims, and consistency. Generative AI can summarize the findings and highlight areas that deserve closer human examination.

The main objective of the system is not to replace academic reviewers but to provide them with intelligent decision-support information. The system identifies potential concerns and organizes them into an assessment report, allowing researchers or reviewers to investigate the findings further. This human-in-the-loop approach is important because authenticity, scientific validity, and research integrity cannot always be determined automatically.

II. LITERATURE SURVEY

Traditional research-paper verification mainly depends on peer review, manual proofreading, plagiarism checking, and reference verification. Peer review allows experts to evaluate research methodology, results, and conclusions, while plagiarism-detection systems compare textual content against available databases. These methods are important for academic quality control but may require significant time and human effort.

Plagiarism and text-similarity detection systems use techniques such as string matching, fingerprinting, document comparison, and similarity scoring. These systems can identify potentially overlapping text between documents. However, simple textual similarity does not necessarily indicate plagiarism because legitimate quotations, common terminology, or properly cited material can also produce similar content. Therefore, similarity results require human interpretation.

Natural Language Processing has been applied to academic document analysis, including information extraction, citation analysis, topic classification, summarization, and semantic similarity detection. NLP systems can identify sections, entities, claims, references, and relationships within research documents. Semantic methods can detect conceptually similar content even when different words are used.

Citation analysis research has explored the relationships between research claims and cited sources. Citation-context analysis can help determine whether a reference is associated with a particular statement and whether the citation appears relevant. Bibliographic metadata can also be checked for missing or inconsistent information. However, automated citation verification can be challenging because academic databases differ in coverage and access.

Recent advances in **Generative AI and Large Language Models** have created opportunities for analyzing long academic documents and generating structured verification summaries. These models can identify potential inconsistencies, summarize research methodology, compare claims with retrieved evidence, and explain detected issues. However, Generative AI can produce incorrect conclusions or hallucinated information, so its outputs should be grounded in reliable sources and reviewed by humans.

Existing research shows that combining document analysis, semantic similarity, citation verification, information retrieval, and Generative AI can improve research-paper assessment. However, challenges remain in verifying scientific claims, detecting fabricated references, handling AI-generated content, and distinguishing legitimate similarity from problematic copying. The proposed system addresses these challenges by integrating document extraction, citation analysis, similarity assessment, claim verification, anomaly detection, AI summarization, and human review.

III. SYSTEM ANALYSIS

The **Gen AI Based Intelligent Research Paper Verification and Authenticity Assessment System** is designed to assist users in evaluating research papers systematically. The user first uploads a research paper through the application interface. The document-processing module validates the file and extracts text, headings, tables, references, and metadata. NLP techniques identify important sections, research claims, citations, authors, keywords, and other entities. A structural analysis module checks whether important research-paper components are present and logically organized. The citation verification module analyzes references and compares bibliographic information with available trusted sources. A similarity-analysis module identifies potentially overlapping content with the selected reference collection. The system also examines relationships between claims and their cited sources when evidence is available. An AI analysis engine identifies potential inconsistencies, unsupported

statements, missing information, and unusual patterns. A Generative AI module summarizes the findings and creates an understandable assessment report. The system assigns evidence-based indicators rather than making an absolute authenticity decision. Users can inspect highlighted issues, supporting evidence, and source information. Finally, a human reviewer evaluates the findings and makes the final academic decision.

Existing System

Existing research-paper verification is generally performed using multiple independent methods and tools. Plagiarism-detection systems are used to identify textual similarity with previously available documents. Reference managers help researchers organize citations and bibliographic information but do not necessarily verify whether every reference supports the associated claim. Peer reviewers manually examine methodology, results, arguments, and conclusions. Search engines and academic databases are often used to verify papers, authors, and publication information. These approaches can provide valuable evidence but require reviewers to move between multiple platforms. Traditional similarity tools may identify matching text without understanding its context or meaning. Basic verification systems may not identify inconsistencies between the abstract, methodology, results, and conclusion. Detecting fabricated or incorrect references can also require manual checking. AI-generated content creates additional challenges because fluent writing does not guarantee research accuracy. Reviewers may therefore spend significant time combining results from different sources. Existing systems provide useful individual capabilities but often lack an integrated AI-assisted verification workflow.

Disadvantages of Existing System

- Verification often requires multiple separate tools.
- Manual review can be time-consuming.
- Basic similarity detection may not understand semantic meaning.
- Textual similarity does not automatically indicate plagiarism.
- Citation verification may require manual searching.
- Difficult to verify large numbers of references efficiently.
- Limited analysis of claim-to-citation relationships.
- Results from different tools may not be integrated.
- Reviewers may have difficulty prioritizing important issues.

Proposed System

The proposed **Gen AI Based Intelligent Research Paper Verification and Authenticity Assessment System** integrates multiple research-verification capabilities into a single platform. Users can upload research papers in supported formats such as PDF and DOCX. The system extracts textual content, document structure, metadata, citations, and references for further analysis. NLP techniques identify research claims, important entities, keywords, and relationships between sections. A document-quality module checks structural completeness and identifies missing or inconsistent sections. A citation-verification module examines reference metadata and checks available trusted academic sources. A semantic similarity engine compares content with selected reference documents and identifies potentially overlapping information. The system can analyze citation contexts and determine whether cited sources appear relevant to

specific claims when sufficient evidence is available. A consistency-analysis module compares statements across the abstract, methodology, results, and conclusion. Generative AI summarizes the detected issues and provides explanations supported by retrieved evidence. The system generates an assessment dashboard containing verification indicators, highlighted concerns, and source information. Users can inspect the evidence behind each finding before making a decision. The final authenticity assessment remains under human control rather than being determined solely by AI.

Advantages of Proposed System

- Integrates multiple verification processes into one platform.
- Reduces manual effort during initial paper screening.
- Performs structural and content analysis automatically.
- Supports semantic as well as textual similarity analysis.
- Helps verify citation and reference information.
- Identifies potentially unsupported or inconsistent claims.
- Can highlight unusual or suspicious document patterns.
- Generates an easy-to-understand verification summary.
- Can process large research documents efficiently.

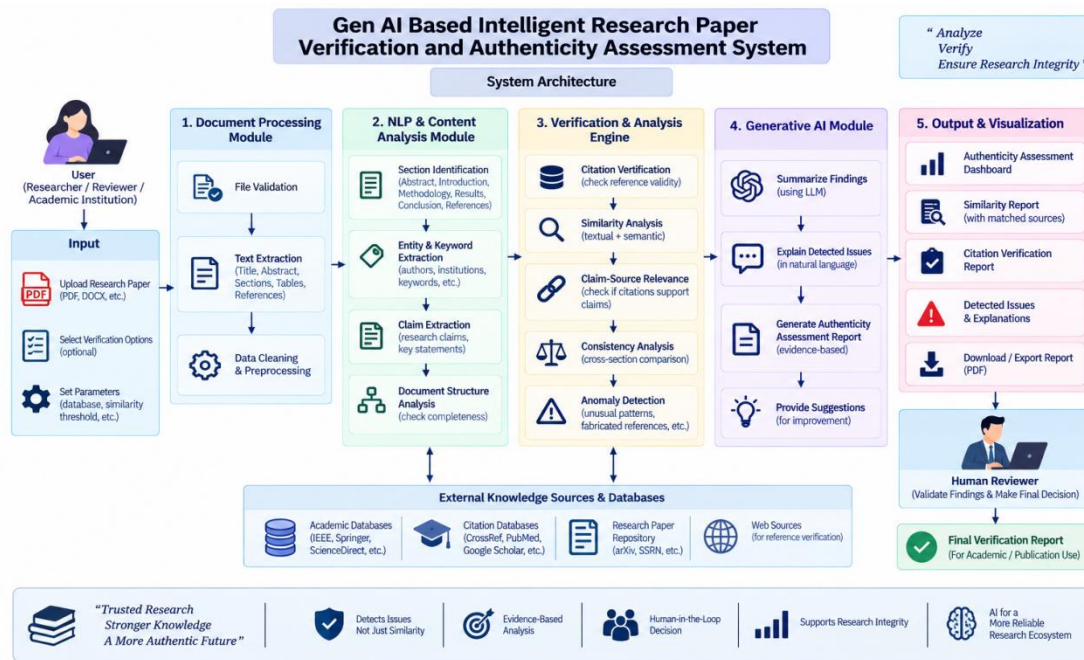
IV. METHODOLOGY

The methodology begins when the user uploads a research paper through the system interface. The document is first validated and processed to extract text, metadata, headings, tables, citations, and references. A preprocessing module cleans and organizes the extracted content into meaningful sections. NLP techniques identify important entities, research claims, keywords, and citation contexts. A structural-analysis module evaluates the completeness and organization of the research paper. The citation-verification module extracts bibliographic information and compares it with available trusted academic sources. A similarity-analysis engine compares the document with selected reference collections using textual and semantic techniques. A claim-analysis module identifies statements that may require supporting evidence and checks available cited sources. A consistency engine compares important information across different sections of the paper. Generative AI then summarizes detected issues and produces explanations based on the available evidence. A verification dashboard presents similarity indicators, citation observations, structural issues, and other potential concerns. The reviewer examines the findings and supporting evidence before reaching a final decision. Finally, the system generates and stores an assessment report for future academic review.

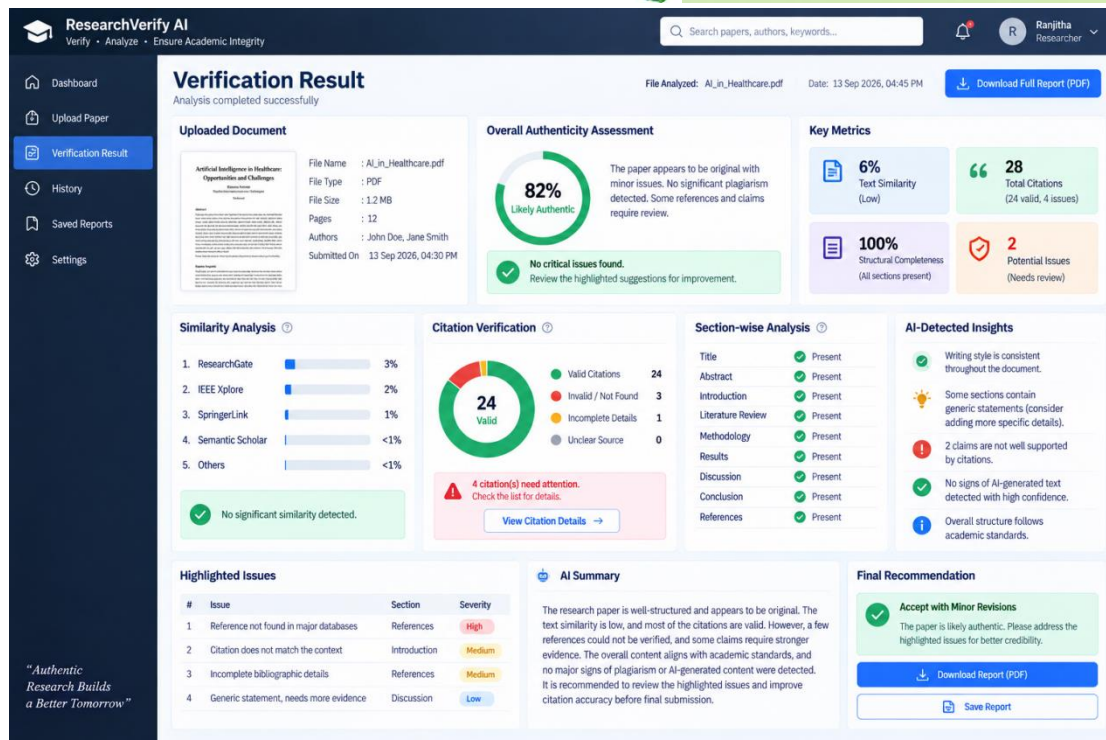
SYSTEM ARCHITECTURE

The Gen AI Based Intelligent Research Paper Verification and Authenticity Assessment System consists of several interconnected modules for analyzing research documents. The User Interface allows researchers or reviewers to upload papers and configure verification options. The Document Processing Module extracts text, metadata, tables, headings, citations, and references from uploaded files. The NLP Analysis Module identifies research claims, entities, keywords, and important sections. The Document Structure Analyzer checks the organization and completeness of the paper. The Academic Knowledge and Reference Layer provides access to curated

reference information and available academic sources. The Citation Verification Engine checks bibliographic details and citation relationships. The Similarity Analysis Engine performs textual and semantic comparison against selected reference documents. The Claim and Evidence Analysis Module examines claims and available supporting citations. The Consistency Analysis Module compares important information across different sections of the paper. The Generative AI Verification Engine summarizes evidence and explains potential issues. The Assessment and Reporting Module creates an authenticity-assessment report and visual dashboard. Finally, the Human Review Module allows researchers or reviewers to inspect evidence, verify findings, and make the final decision.



V. RESULT AND OUTPUT



VI. CONCLUSION

The Gen AI Based Intelligent Research Paper Verification and Authenticity Assessment System provides an intelligent approach for assisting researchers, students, reviewers, and academic institutions in evaluating research papers. The system reduces the manual effort involved in checking document structure, citations, references, textual similarity, and potential inconsistencies.

By combining Generative AI, Natural Language Processing, semantic analysis, information retrieval, citation verification, and similarity analysis, the system can examine different aspects of a research paper and organize the findings into a structured verification report. It can identify potential citation problems, unsupported claims, incomplete references, structural issues, and content similarities that may require further investigation.

The system also provides an AI-generated summary of the verification results, allowing reviewers to quickly understand the major findings. Instead of making an absolute decision about whether a paper is genuine or fraudulent, the system presents evidence-based indicators and potential issues for human review. This human-in-the-loop approach helps maintain responsible use of AI in academic verification.

Overall, the proposed system can make research-paper screening faster, more systematic, and efficient while supporting academic integrity. It can be useful for students, researchers, journals, universities, and research organizations. Future enhancements can include integration with more academic databases, advanced citation-to-claim verification, multilingual document analysis, improved semantic similarity detection, stronger reference verification, and expert-review collaboration features.

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