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Bibliometric Analysis of Publications on Visual Communication and Artificial Intelligence in the Web of Science Database (1996-2024)

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ABSTRACT

This study aims to analyze the scientific literature focused on "visual communication" and "artificial intelligence" published in the Web of Science (WoS) database between 1996 and 2024 using bibliometric methods. Research data were obtained by searching different indexes within the WoS Core Collection; VOSviewer and Microsoft Excel software were used for data analysis and visualization. The analysis results reveal that publication output in the field has shown a marked increase since 2016 and that a large portion of the documents consist of research articles. While the People's Republic of China plays a dominant role in the country-based distribution, it has been determined that the studies are thematically concentrated in technical fields such as computer science, artificial intelligence, and software engineering. Keyword analyses show that the concepts of "visual communication" and "artificial intelligence" are centrally intertwined with the themes of machine learning and image processing. Consequently, it has been determined that academic interest at the intersection of these two disciplines is rapidly increasing and that the field is maturing into an interdisciplinary structure.

Keywords : Visual Communication, Artificial Intelligence, Publication Trends, Keyword Co-occurrence, Citation Analysis

Web of Science Veri Tabanında Görsel İletişim ve Yapay Zeka Konulu Yayınların Bibliyometrik Analizi (1996-2024)

ÖZ

Bu çalışma, 1996-2024 yılları arasında Web of Science (WoS) veri tabanında yayımlanan "görsel iletişim" ve "yapay zekâ" odaklı bilimsel literatürü bibliyometrik yöntemlerle analiz etmeyi amaçlamaktadır. Araştırma verileri, WoS Core Collection bünyesindeki farklı indekslerden taranarak elde edilmiş; verilerin analizi ve görselleştirilmesinde VOSviewer ile Microsoft Excel yazılımları kullanılmıştır. Analiz sonuçları, 2016 yılından itibaren alandaki yayın üretiminin belirgin bir artış gösterdiğini ve dokümanların büyük bir kısmının araştırma makalelerinden oluştuğunu ortaya koymaktadır. Ülke bazlı dağılımda Çin Halk Cumhuriyeti'nin baskın bir rol oynadığı görülürken; çalışmaların tematik olarak bilgisayar bilimleri, yapay zeka ve yazılım mühendisliği gibi teknik alanlarda yoğunlaştığı saptanmıştır. Anahtar kelime analizleri ise "görsel iletişim" ve "yapay zeka" kavramlarının makine öğrenimi ile görüntü işleme temalarıyla merkezi bir

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etkileşim içinde olduğunu göstermektedir. Sonuç olarak, bu iki disiplinin kesişim noktasındaki akademik ilginin hızla arttığı ve alanın disiplinler arası bir yapıda olgunlaştığı belirlenmiştir.

Anahtar Kelimeler : Görsel iletişim, Yapay Zeka, Yayın Eğilimleri, Anahtar Kelime Birlikteliği, Atıf Analizi

INTRODUCTION

Visual communication (VC) is considered a fundamental and indispensable component of human interaction, a multidimensional process that enables the transmission of information and ideas through visual symbols. Due to its interdisciplinary nature, the concept cannot be limited to a single definition. Lester (2013) defines visual communication as "the transmission of information and ideas using symbols and images," while Berger (1972) emphasized the primary role of visual perception in cognitive processes with the statement, "Seeing precedes language. An individual looks and recognizes before acquiring the ability to speak." Within this framework, visual communication encompasses not only the production of images but also the dynamic interaction between the visual structure and the viewer. Therefore, as a universal form of communication, visual communication mediates the sharing of emotions, thoughts, and information on a non-linguistic level.

Artificial intelligence (AI) is a field of science that models human cognitive abilities and aims to reproduce them through technological systems. Ulaşan (2023) defines "AI" as "*the effort to transfer human activities such as gathering information by imitating human conscious actions, processing this information, learning, reasoning, and decision-making to machines*." Russell and Norvig (2021) define AI as the development of systems that mimic mental processes such as learning, problem-solving, and reasoning, or that perform them rationally. Today, AI research focuses on the design of "intelligent agents" that perceive their environment, act autonomously in decision making, and take actions toward specific goals. These developments, along with the digitalization of communication processes, have brought new opportunities and areas of discussion to the field of visual communication.

The recent adoption of artificial intelligence technologies in visual communication stems from both the innovative opportunities they provide in production processes and the transformation they have wrought in communication formats. Thanks to methods such as deep learning, machine learning, and image processing, AI can analyze, classify, and reproduce visual content without requiring human intervention. This increases production speed, reduces errors, and supports creative processes. Furthermore, AI based systems analyze audience behavior and perceptual responses, enabling the creation of targeted, personalized visual messages. Thus, visual communication has evolved from a purely aesthetic production platform to a data-driven, interactive, and dynamic one. Technologies

such as deep learning and visual data analytics not only accelerate creative production processes but also lay the groundwork for a theoretical transformation in the field of communication by redefining visual representation, meaning-making processes, and audience-perception relationships. This technological and theoretical transformation has also led to a significant increase in the number of AI based studies in visual communication, and academic publications on the subject have begun to proliferate in recent years.

Bibliometric analysis is an important methodological tool for understanding how scientific production is shaped in a particular field, which topics are prominent, and how future research directions will develop. First conceptualized by Alan Pritchard in 1969, bibliometrics focuses on the measurable aspect of information science and aims to reveal trends in academic literature with quantitative data (Sengupta, 1992). This method is an analysis approach frequently used especially in social sciences and educational research. Bibliometric analysis refers to the systematic examination of academic publications produced in a specific field by classifying them within the scope of qualitative research methods. In addition, the connections between these publications are evaluated based on variables such as citation counts, author, country, language, and journal. In this way, it enables assessments of the development process, trends, and tendencies of the scientific field or publication area under study and the development of strategic recommendations for the future (Geçimli and Köksal, 2022; Yegin 2023).

There is no comprehensive bibliometric study that addresses the concepts of visual communication and artificial intelligence together at the international level. The limited number of studies in literature generally focuses on only one of these areas. For example, Huang and Chen (2024) analyzed publications in the field of “Underwater Image Enhancement (UIE)” using Web of Science data; this study revealed increasing research trends and basic technical approaches since 2017. Similarly, Kusumawati et al. (2024) examined studies on “avatar marketing” in the Scopus database between 2004 and 2024 and identified current thematic developments and collaboration networks in the field. Dou et al. (2025) analyzed publications on generative videos for educational purposes using the scientometric method, revealing the most cited authors and institutions, as well as the positive effects of this technology on learning processes. Petković et al. (2025) conducted a comprehensive bibliometric review in the field of Experiential Graphic Design (XGD) using Scopus, Web of Science and Google Scholar data.

In Türkiye, bibliometric studies in the field of "visual communication" are quite limited. Doğan (2015) conducted a general analysis of Visual Communication Design departments in Turkey, presenting findings on the balance between applied and theoretical aspects of university curriculum. Kartal (2025) analyzed graduate theses in the fields of visual communication design and visual design through bibliometric methods. Yegin (2023) analyzed publications from 1983 to 2022, scanned under the title "Graphic Design" in the Web

of Science database, revealing the relationships between productive authors, countries, institutions, and keywords in the field of graphic design. However, none of these studies address visual communication and artificial intelligence together.

This study aims to fill this gap in the literature by conducting a bibliometric analysis of academic publications on visual communication and artificial intelligence published in the Web of Science database between 1996 and 2024. The study aims to provide a more comprehensive assessment of the interaction between the disciplines of visual communication and artificial intelligence by revealing the field's developmental dynamics, prominent research themes, collaboration networks, and future directions.

1. MATERIAL AND METHODS

In this study, bibliographic data were retrieved from the Web of Science (WoS) Core Collection, including the Science Citation İndex Expanded (SCI-EXPANDED), Conference Proceedings Citation İndex – Science (CPCİ-S), Social Science Citation İndex (SSCI), Emerging Sources Citation İndex (ESCI), Art & Humanities Citation İndex (A&HCİ), Books Citation İndex - Science (BKCI-S) and Conference Proceedings Citation İndex – Social Science & Humanities (CPCI-SSH). The search of publications in the Web of Science database was conducted on June 26, 2025, covering the publication period between 1996 and 2024. An advance search was adopted and used the following keywords for searching and retrieving data “visual communication” and ““artificial intelligence”. The query path was: “visual communication " (All Fields) and " artificial intelligence " (All Fields). The results were no restrictions on the language of the articles. The bibliographic data related to visual communication and artificial intelligence included publication trends, publication types, top WoS categories, most productive authors, top journals, top affiliations, most cited publications, highly collaborative authors, highly cited articles and most used keywords. A total of 239 bibliographic records were retrieved, and bibliographic records were analyzed and mapped using the VoSviewer version 1.6.20 (https://www.vosviewer.com/). Additionally, Microsoft Excel 2016 was used to prepare graphical representations of the data.

2. RESULTS

2. 1. Number Of Articles Published by Year

Figure 1 illustrates the yearly distribution of academic publications on visual communication (VC) and artificial intelligence (Aİ) authored globally and indexed in the Web of Science (WoS) database. The analysis shows that a total of 239 publications were published in the Web of Science from 1996 to December 31, 2024. The first publication on the use of VC and Aİ, "*Recognition of facial expressions using HMM with continuous output probabilities*" was written by Otsuka and Ohya (1996).

According to the data presented in Figure 1, the number of publications on visual communication and artificial intelligence remained quite limited between 1996 and 2015, with no more than three publications per year during this period. A noticeable upward trend began in 2016, gaining significant momentum particularly after 2018. The number of publications increased from 11 in 2018 to 20 in 2019, followed by 15 in 2020, 29 in 2021, 39 in 2022, and 44 in 2023. The highest publication output was recorded in 2024, reaching 56 articles. These findings indicate a substantial rise in academic interest and research activity in the fields of visual communication and artificial intelligence in recent years.

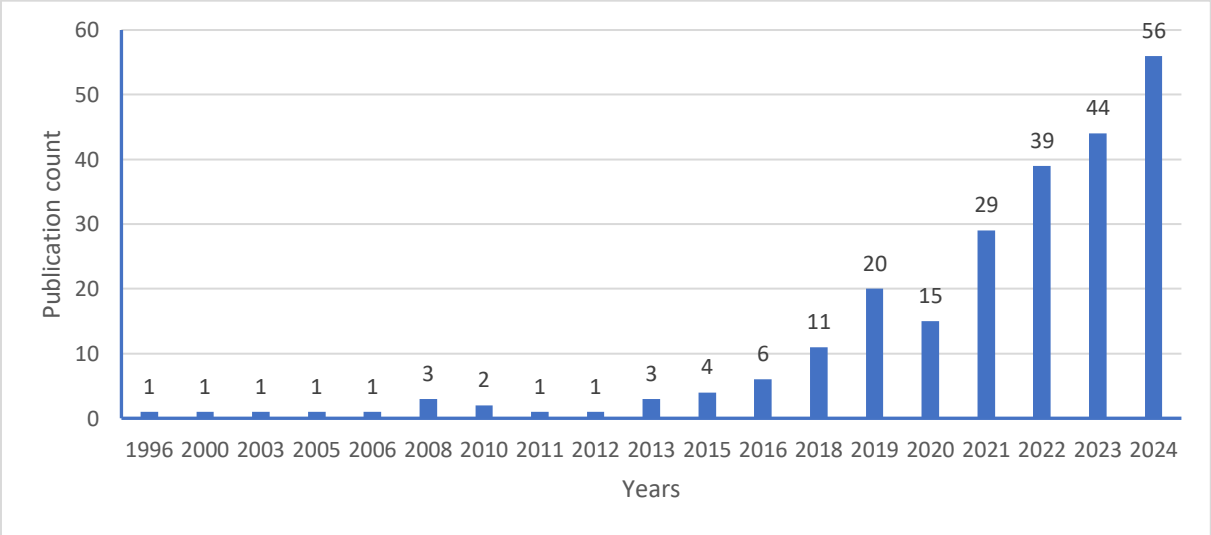

Figure 1: Number of publications on VC and AI use recorded in WoS between 1996 and 2024.

2. 2. Publication Types

According to the data presented in the Figure 2, the majority of the publications related to VC and Aİ fall under the category of original research articles. This dominance of "Article" type documents (199) indicates that scholarly output in the field is primarily based on empirical studies and original research with a total of 239 documents. “Proceedings Papers" represent the second most common document type, though their number is considerably lower. Other types of documents, such as "Early Access," "Review," "Retracted Publication," "Editorial Material," "Meeting Abstract," "Book Chapter," and "Correction," are represented in much smaller quantities. This distribution highlights a strong emphasis on research-driven contributions within the academic literature of the field.

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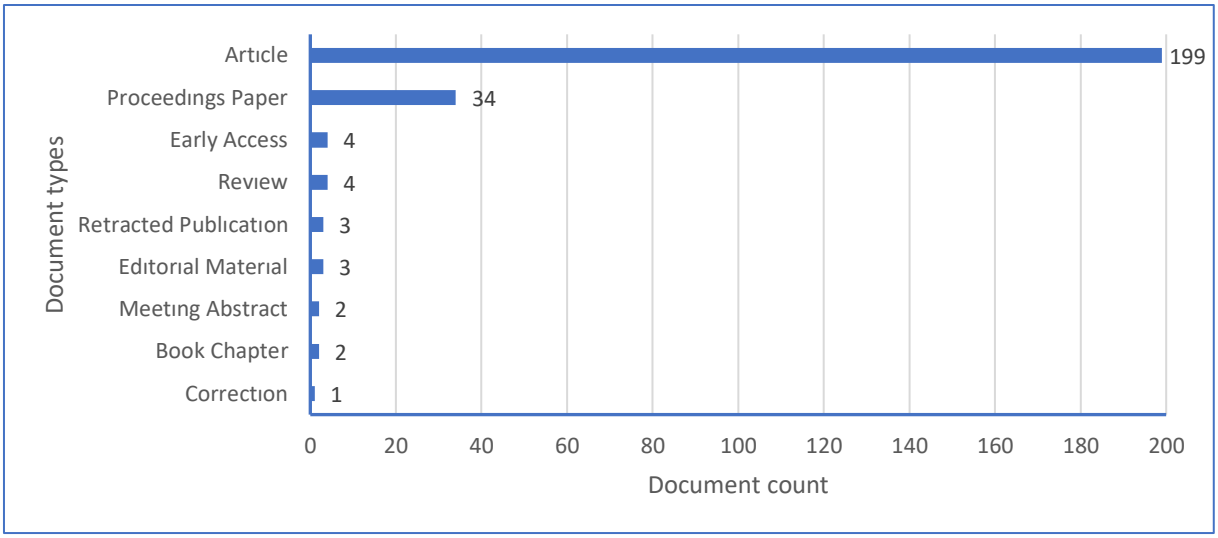

Figure 2: Distribution of document types and their counts about on VC and AI.

2. 3. Countries' Contribution

The Web of Science database shows that 50 different countries have contributed to documents on visual communication and artificial intelligence, and the top 15 contributing countries are shown in Figure 3. When looking at the distribution of documents by country, it is seen that the majority of publications in this field originate from the People's Republic of China (n = 176). This reflects China's leading position and growing research interest in this interdisciplinary field. China is followed by South Korea (n = 16), the United States (n = 13), the United Kingdom (n = 11), and India (n = 11). Additionally, several European countries, such as Italy (n = 8), Spain (n = 5), Germany (n = 5), and Austria (n = 6), have also made significant contributions. The contributions of countries from diverse geographical regions, such as Saudi Arabia, Japan, Malaysia, and Norway, demonstrate the global interest in the fields of visual communication and artificial intelligence. Countries such as Türkiye, Brazil,

Iran, and Pakistan are represented by two publications each.

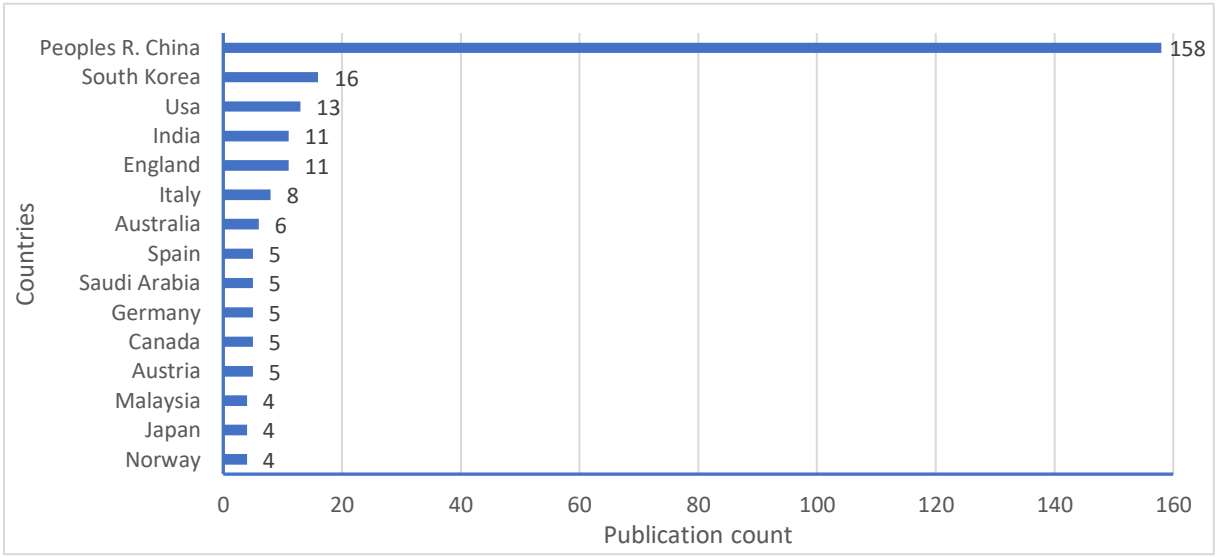

Figure 3: Top 15 countries with the most publications about on VC and AI.

2. 4. Most Productive Authors

An examination of publications in the fields of visual communication and artificial intelligence in the Web of Science (WoS) database revealed that a total of 198 different researchers have contributed to at least one study in these areas. The researcher with the most publications is Shi, Guangming with 7 articles, followed by Xue, Jianru with 4 publications and Zheng, Nanning and Xie, Xuemei with 3 publications each. (Figure 4). In addition, there is a large group of researchers who contributed to only one publication, as well as numerous researchers mentioned in two publications.

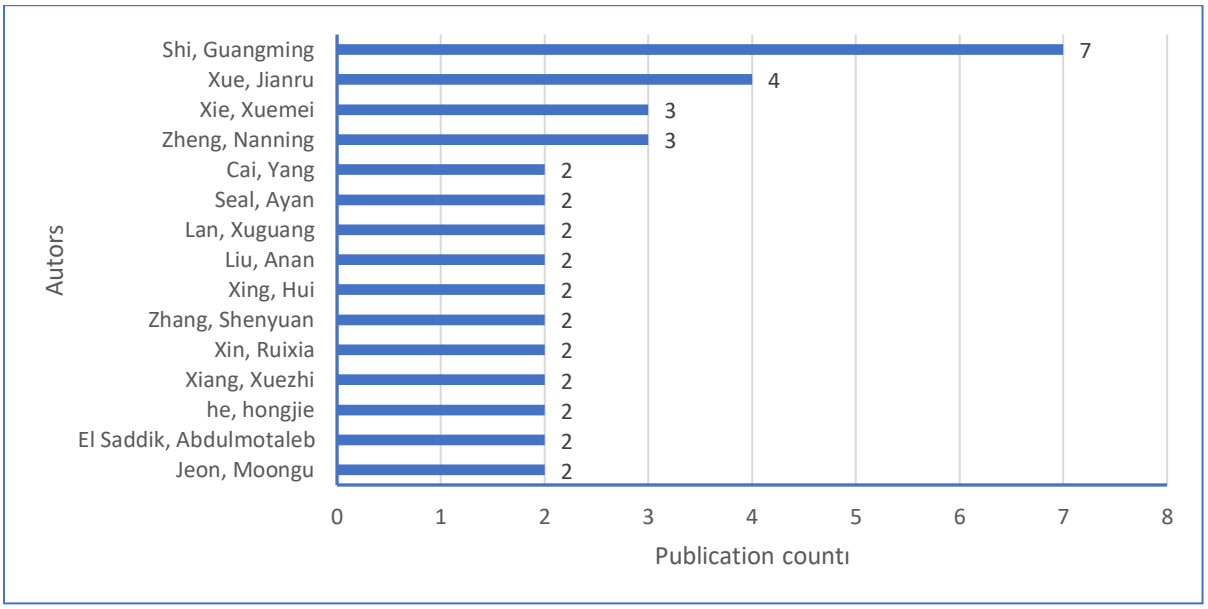

Figure 4: Top 15 most productive authors involved in VC and AI.

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2. 5. Web of Science Categories

When examining the distribution of documents on visual communication and artificial intelligence in the Web of Science (WoS) database according to WoS subject categories, it is seen that publications are made in 51 different categories and are largely concentrated in the fields of computer science and engineering. The highest number of publications were found in the categories "Computer Science Information Systems" (162), "Computer Science Software Engineering" (142), and "Computer Science Artificial Intelligence" (36). However, a significant number of publications were also found in technical engineering fields such as "Engineering Electrical Electronic" (24), "Telecommunications" (16), and "Computer Science Theory Methods" (14). Noteworthy publications were also found in categories reflecting interdisciplinary interaction, such as "Communication," "Computer Science Interdisciplinary Applications" and "Multidisciplinary Sciences" (Figure 5). Furthermore, a limited number of publications were found in various fields such as art, education, psychology, medicine, environmental sciences, and social sciences, revealing that visual communication and artificial intelligence are multidisciplinary topics that are the subject of research in different academic fields.

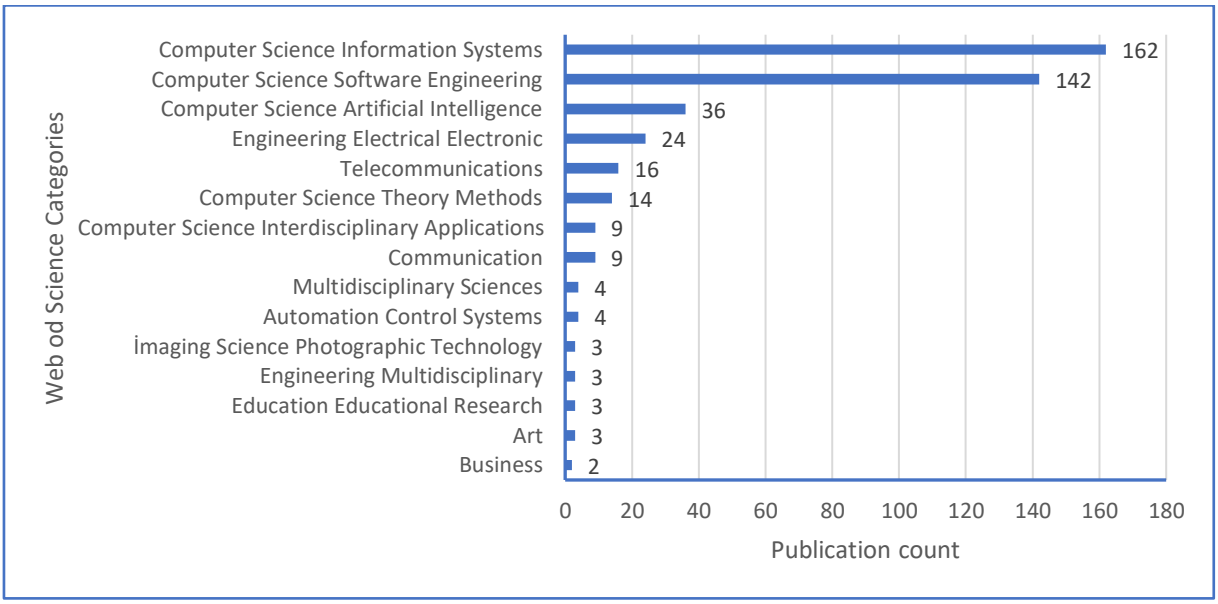

Figure 5: Top 15 Web of Science categories for publications on VC and AI.

2. 6. Top Journals

When examining the journals and conferences in which documents on visual communication and artificial intelligence are published in the Web of Science database, it is seen that they have been published in a total of 106 different journals or conferences and are largely concentrated in a few specific sources. It was determined that the highest number of

publications appeared in the journal titled "Journal of Visual Communication and Image Representation" (n=132), which alone constituted a large portion of the total publications and became the primary publication organ focusing on the subject. This was followed by other publications on artificial intelligence and visual communication, such as "Lecture Notes in Artificial Intelligence" (n=7), "IEEE Access" (n=6), "Lecture Notes in Computer Science" (n=4), and "Visual Communication" (n=4). The remaining publications are scattered across interdisciplinary journals and conference proceedings in various fields.

Table 1: 20 Journals, Symposia, and Article Counts in the Intersection of VC and AI.

Publication Titles	Count
Journal of Visual Communication and Image Representation	132
Lecture Notes in Artificial Intelligence	7
IEEE Access	6
Lecture Notes in Computer Science	4
Visual Communication	4
Peerj Computer Science	3
Scientific Programming	3
Wireless Communications Mobile Computing	3
Advances in Intelligent Systems and Computing	2
Applied Artificial Intelligence	2
Journal of Computational Methods in Sciences and Engineering	2
Mobile İnformation Systems	2
Scientific Reports	2
Soft Computing	2
2013 IEEE 13th Int. Conference on Bioinformatics and Bioengineering BIBE	1
2013 IEEE Tsinghua International Design Management Symposium TIDMS	1
2016 30th Anniversary of Visual Communication and Image Processing VCIP	1
2016 IEEE Int. Conference on Computational İntelligence and Computing Research	1
2020 IEEE 20th Int. Symposium on Computational Intelligence and Informatics CINTI	1
2023 IEEE International Symposium on Circuits and Systems ISCAS	1

2. 7. Keyword Analysis: Frequencies And Co-Occurrences of the Keywords

In the co-occurrence analysis of keywords used in publications on visual communication and artificial intelligence in the Web of Science database, various trends were identified by considering the frequency of use and total link strength of prominent terms. According to WoS data, 124 different keywords were used in the documents. The keywords with the highest frequency of repetition were "visual communication" (14 times, connection strength: 48) and "artificial intelligence" (13 times, connection strength: 50), demonstrating the central position of these concepts in the field. In addition, it was observed that technical and design-oriented terms such as "visual communication design", "convolutional neural network", "machine learning" and "image processing" were also used at a meaningful level.

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Furthermore, the use of more specific concepts such as "graphic design education", "computational creativity", "intelligent system", "generative adversarial networks" and "semantic network analysis" shows that the studies focus not only on technical aspects but also on educational, artistic, and theoretical dimensions (Figure 6). These findings reveal that the literature produced in the field of visual communication and artificial intelligence has an interdisciplinary and multi-layered structure.

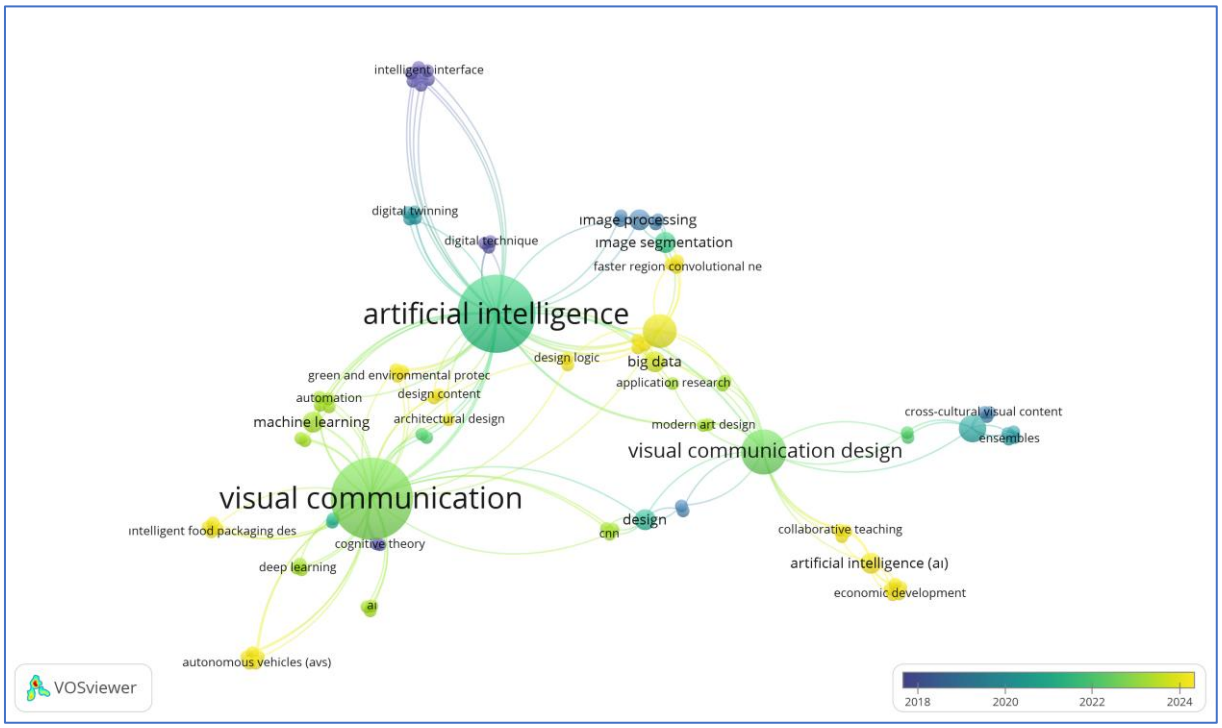

Figure 6: Visual representation of keyword co-occurrence and their links.

2. 8. Bibliographic Coupling and Total Link Strength

Bibliographic coupling analysis reveals the relationships between documents based on the sources they cite in common, while the total link strength value quantitatively expresses the total connection density each document establishes with other documents. Within the scope of the bibliographic coupling analysis conducted in this study, the common citation relationships established by the documents with other publications in the literature were examined. According to the analysis results, some studies stand out among the documents, having both a high number of citations and strong bibliographic links. The analysis revealed that 179 out of 239 documents received one or more citations. The document with the highest number of citations is Vaccari and Chadwick (2020), which received a total of 346 citations. However, the total link strength value of this document was found to be only 13; this indicates that Vaccari and Chadwick (2020), despite being frequently cited, shares a limited number of common references with other documents. On the other hand, the Jay Kuo and Madni (2023)

study has a relatively high total link strength of 158 despite receiving 46 citations, indicating that it shares common sources with numerous studies in the literature (Table 2). Similarly, Zhang et al. (2021) has been one of the publications with the strongest bibliographic relationships, with a total of 117 total link strength despite receiving only 7 citations. This demonstrates that the impact of some documents in the literature can be measured not only by the number of citations but also by the density of knowledge-based connections with other publications. Other documents that stand out in terms of total link strength include Liu et al. (2022) (122 link strength), Wang (2022) (126 link strength), Yang et al. (2023) (123 link strength), and Sun et al. (2023) (119 link strength), which occupy a central position in the network structure by sharing common sources with a large number of publications.

Tablo 2: Ranking of the 20 most cited publications in the VC and AI in WoS*.

Rank	First Author*	Documents	Citations	Total link strength
1	Vaccari (2020)	Vaccari and Chadwick (2020)	346	13
2	Chen (2019a)	Chen et al. (2019a)	85	12
3	Du (2010)	Du et al. (2010)	81	9
4	Sahu (2021)	Sahu et al. (2020)	50	42
5	Kuo (2023)	Jay Kuo and Madni (2023)	46	158
6	Bishop (2015)	Bishop and Goebl (2015)	46	10
7	Chen (2019b)	Chen et al. (2019b)	37	3
8	Wu (2020b)	Wu et al. (2020)	33	54
9	Xin Zhang (2019)	Zhang and Dahu (2019)	32	6
10	Wang (2012)	Wang et al. (2012)	32	4
11	Bishop (2018)	Bishop and Goebl (2018)	29	10
12	Mo (2022)	Mo et al. (2022)	28	90
13	Gao (2018)	Gao et al. (2018)	27	10
14	Du (2016)	Du et al. (2016)	26	16
15	Livatino (2021)	Livatino et al. (2021)	24	0
16	Wu (2019)	Wu et al. (2019)	23	62
17	Bonomi (2021)	Bonomi et al. (2021)	21	15
18	Otsuka (1996)	Otsuka and Ohya (1996)	20	0
19	Niu (2018)	Niu and Chen (2018)	19	32
20	Shang (2022)	Shang et al. (2022)	19	29

**The top 20 most cited articles in the table were automatically obtained from the VoSviewer application, and only the first author's name has been retrieved. The correct sources are displayed in the document's column.*

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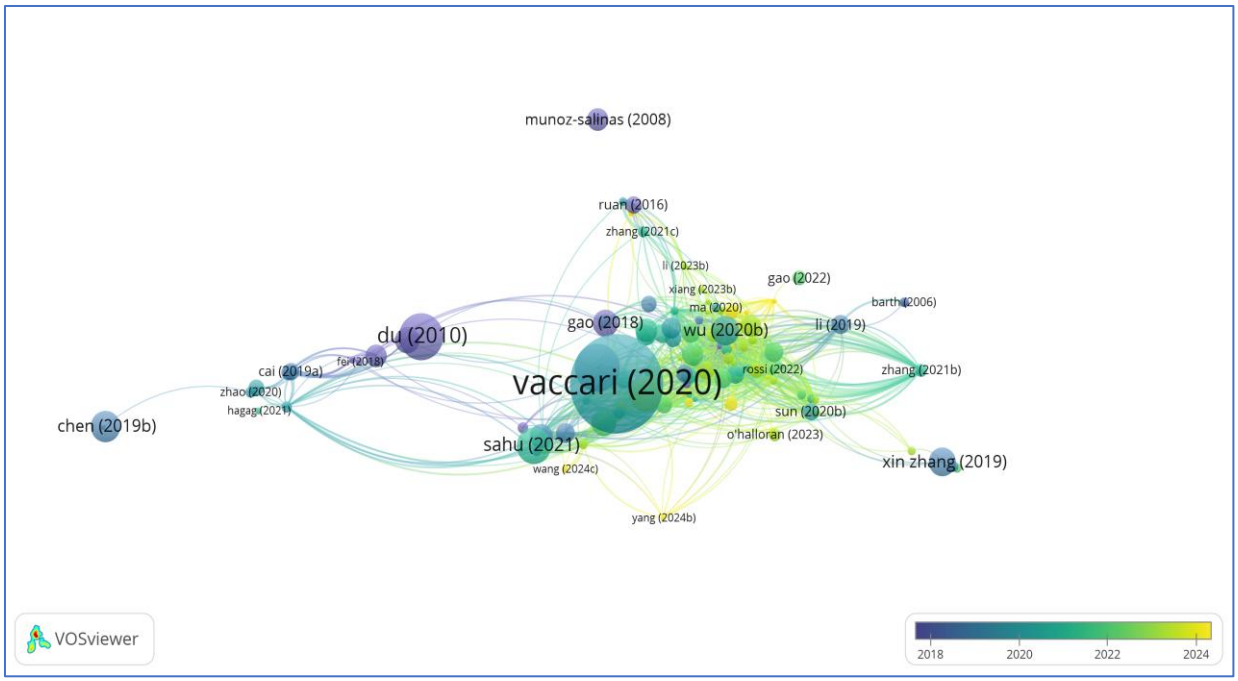

Figure 7: Bibliographic coupling of documents based on total link strength and citation scores.

3. DISCUSSION AND CONCLUSION

In recent years, artificial intelligence technologies have begun to be widely utilized across nearly all fields of science not only within engineering and computer science, but also in disciplines such as the social sciences, health sciences, education, and communication. This development has accelerated the integration of AI based approaches into interdisciplinary research and has significantly contributed to the growth of academic productivity in related fields.

Publication trends indicate that research at the intersection of visual communication and artificial intelligence has gained significant momentum in recent years. This increase suggests that these fields are increasingly being addressed in an interactive manner and forming an interdisciplinary research framework. Developments in AI-based visual production, analysis, and design applications, in particular, have strengthened the integration between these two fields. However, the existing literature is largely technical and engineering-focused, while studies in the context of communication, design, and social sciences remain relatively limited. This points to the need for greater theoretical depth and strengthened interdisciplinary approaches in future research. Addressing the interaction between visual communication and artificial intelligence more comprehensively in different application areas could contribute to the development of the field's conceptual framework and the formation of a more balanced literature structure.

The distribution of document types indicates that research articles constitute the predominant form of scholarly output in studies addressing visual communication and artificial intelligence, followed by conference papers. This pattern reflects the strong presence of empirical and application-oriented research, as well as the role of academic conferences as important platforms for disseminating emerging findings in this interdisciplinary field. In contrast, the relatively small number of review articles and early access publications suggests that comprehensive syntheses of existing knowledge remain limited. The presence of editorial materials and book chapters further demonstrates that the topic is represented across diverse publication formats. Additionally, the inclusion of retracted publications and corrections underscores the evolving nature of research practices and highlights the importance of methodological rigor and transparency in a rapidly developing research area.

The distribution of document types indicates that research articles constitute the dominant form of scholarly output in publications addressing visual communication and artificial intelligence, followed by conference papers. This pattern reflects a strong emphasis on empirical and application-oriented studies, while conferences appear to serve as important venues for presenting ongoing research in this interdisciplinary area. In contrast, the relatively small number of review articles and early access publications suggests that comprehensive syntheses of existing research remain limited. Editorial articles and book chapters demonstrate that the subject is also represented in various publication formats. The presence of retracted publications and corrections also reflects the evolving nature of scholarly communication and underscores the importance of methodological rigor and transparency in bibliometric datasets.

The country-based distribution of publications indicates that research on visual communication and artificial intelligence is geographically diverse, with contributions originating from multiple regions worldwide. The People's Republic of China accounts for the highest number of publications, followed by South Korea, the United States, the United Kingdom, and India. Several European countries, including Italy, Germany, Spain, and Austria, also demonstrate notable levels of scholarly output. In addition, contributions from countries such as Saudi Arabia, Japan, Malaysia, and Norway highlight the broad international participation in this research area. Turkey is represented by two publications within the dataset. Overall, these patterns reflect a globally distributed research landscape, suggesting that scholarly engagement with visual communication and artificial intelligence extends across different academic and geographic contexts.

Analysis of authorship patterns indicates that 198 distinct researchers have contributed to at least one publication on visual communication and artificial intelligence within the WoS dataset. Most authors are associated with a single publication, whereas a smaller group appears across multiple studies. Among the most productive contributors, Shi Guangming authored seven publications, followed by Xue Jianru with four publications, and Zheng Nanning and Xie Xuemei with three publications each. This distribution reflects a broad

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authorship base accompanied by a relatively limited core of recurrent contributors. The prevalence of multi-authored publications suggests collaborative research practices commonly observed in interdisciplinary and technology-driven fields. Overall, these findings indicate that scholarly output in this domain is distributed across a wide network of researchers rather than concentrated among a small group of highly prolific authors. The high proportion of single-publication contributors further highlights the heterogeneous participation of researchers from diverse disciplinary backgrounds, underscoring the open and evolving nature of the research landscape.

Based on the overall findings, research at the intersection of visual communication and artificial intelligence appears to be predominantly shaped by computer science and engineering perspectives. This technology-oriented distribution does not necessarily suggest a departure from communication centered approaches; rather, it reflects the current emphasis on developing and refining algorithmic frameworks that enable the integration of artificial intelligence into visual communication practices. The prominence of engineering related studies indicates that artificial intelligence is primarily approached as an applied technological instrument within this research landscape. In contrast, the comparatively limited presence of communication- and art-oriented investigations suggests that conceptual, theoretical, and socio-cultural dimensions of this interaction remain less extensively explored. Taken together, these patterns point to a field that is presently driven largely by technical implementation, while interpretive and theory-based perspectives are still emerging. From a broader viewpoint, this configuration highlights the need for future research to more fully integrate computational advances with communication theory, design thinking, and social inquiry, thereby fostering a more balanced and comprehensive understanding of how artificial intelligence reshapes visual communication processes.

The distribution of publication venues suggests that research on visual communication and artificial intelligence is disseminated across a diverse range of academic platforms, including journals, conference proceedings, and book-based sources. This diversity reflects the interdisciplinary character of the field, which draws upon contributions from artificial intelligence, computer science, visual communication, and related applied domains. The prominence of specialized outlets focusing on visual representation and image-based technologies highlights the central role of computational approaches in shaping current research directions. At the same time, the presence of multiple publication formats indicates that scholarly engagement with this topic extends beyond traditional journal articles, supporting knowledge exchange across both technical and communication-oriented communities.

The prominence of visual communication–focused publication venues suggests that research in this domain increasingly emphasizes visual representation technologies and

image-based methodologies. This pattern reflects the growing relevance of visual communication approaches within contemporary scientific inquiry. At the same time, the presence of artificial intelligence and computer science–oriented outlets indicates sustained engagement from technical disciplines. Taken together, these trends imply that while computational frameworks provide essential methodological foundations, current scholarly attention appears to be more strongly oriented toward visual communication applications. This distribution highlights an evolving research landscape in which visual communication serves as a central interface for the practical implementation of artificial intelligence.

The distribution of publication formats indicates that scholarly communication in the fields of visual communication and artificial intelligence is primarily channeled through journals and conference proceedings, emphasizing the importance of rapidly disseminated research outputs in this technologically driven domain. Conference-based publications appear to play a key role in fostering interdisciplinary exchange, providing platforms where emerging methodologies and applications are actively discussed. In contrast, book-based formats remain comparatively less prominent, suggesting that the field is currently more oriented toward timely empirical contributions than toward consolidated theoretical syntheses. Additionally, the presence of ambiguously classified publication types highlights ongoing challenges in categorizing hybrid or nontraditional scholarly outputs, underscoring the need for clearer documentation standards in future bibliometric investigations. Overall, these patterns reflect a research landscape characterized by dynamic knowledge circulation and an emphasis on practice-oriented dissemination channels.

The keyword co-occurrence analysis conducted using VOSviewer reveals a structured thematic landscape in which visual communication and artificial intelligence form the conceptual core of the research domain. The color-based temporal visualization indicates a progressive evolution of research interests, with more recent themes emerging alongside established technical concepts. This shift reflects the increasing integration of advanced computational approaches with visual communication practices over time. Moreover, the dispersion of keywords across multiple thematic clusters highlights the interdisciplinary nature of the field, encompassing not only technological dimensions but also design, educational, and application-oriented perspectives. The presence of diverse research themes within the network suggests that artificial intelligence functions both as a methodological framework and as an enabling mechanism for innovation across visual communication contexts. Overall, the VOSviewer based visualization supports the interpretation of this field as a dynamic and multi-layered research landscape characterized by continuous thematic expansion.

The bibliographic coupling analysis highlights meaningful variations in both content proximity and interaction patterns across the examined literature. The findings indicate that citation frequency does not necessarily correspond to structural centrality within the

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bibliographic network. While some highly cited studies exhibit relatively limited shared references with other documents, other publications demonstrate strong bibliographic connections despite receiving fewer citations. This pattern underscores that scholarly influence cannot be fully captured through citation counts alone. Instead, bibliographic coupling provides complementary insights by revealing content-based relationships and thematic alignment among studies. These results emphasize the value of employing multiple bibliometric indicators to better understand knowledge structures, collaboration patterns, and intellectual connectivity within the field. From a broader perspective, this approach contributes to a more nuanced interpretation of scientific impact by integrating both quantitative visibility and qualitative relational dimensions.

Overall, the findings indicate that research on visual communication and artificial intelligence is primarily driven by technical and application-oriented perspectives, reflecting the central role of computational methodologies in shaping the field. At the same time, the presence of contributions from areas such as communication, education, art, and health highlights the emerging multidisciplinary character of this research domain. This evolving configuration suggests that while technological development currently constitutes the dominant framework, broader theoretical and applied perspectives are gradually gaining visibility. Taken together, these trends point to a research landscape characterized by increasing interdisciplinarity, offering opportunities for deeper integration between technical innovation and communication-oriented inquiry.

The geographic and authorship distribution of publications suggests that research on visual communication and artificial intelligence has developed within an increasingly global academic landscape, although contributions remain uneven across regions. While certain countries demonstrate strong research visibility, other contexts appear underrepresented, indicating untapped potential for broader international engagement. In parallel, keyword co-occurrence and bibliographic coupling analyses confirm that visual communication and artificial intelligence constitute the conceptual and structural core of the literature. At the same time, the relatively limited presence of review-based and theory-oriented studies points to an emerging field in which empirical and technical investigations currently predominate. These findings underscore the importance of strengthening systematic theoretical frameworks to support more integrated and cumulative knowledge development.

In conclusion, this bibliometric analysis demonstrates that research on visual communication and artificial intelligence is predominantly driven by technical and application-oriented approaches, with artificial intelligence largely positioned as a methodological tool. At the same time, emerging contributions from communication, design, and social sciences reflect the growing interdisciplinary character of the field. Keyword and bibliographic coupling analyses confirm the conceptual centrality of visual communication

and artificial intelligence, while also revealing a limited presence of theory-oriented studies. Overall, the findings suggest a rapidly evolving research landscape shaped primarily by computational innovation, highlighting the need for stronger theoretical integration and broader cross-disciplinary collaboration to support the field's long-term development.

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