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Academic English Writing

A comparative genre analysis between journals and magazines in application of computer science

Abstract

In our Academic English Technical Writing class, we have learned about various types of publications and their structures. However, we were still curious about the differences in structure and style between journals and magazines. Thus, we conducted research, comparing the IMRD structure, article title and abstract, use of references, and article terms between a journal and a magazine. We selected a journal and a magazine as data for analysis, comparing their structure and style differences and analyse what leads to these differences.Our findings suggest that while academic journals and magazines have differences in structure and style, they both emphasize the importance of accurate titles and abstracts. Journals follow the IMRD format, while magazines prioritize content arrangement and reader comprehension. Studying the similarities and differences between academic journals and magazines can provide valuable insights for authors and promote effective communication of research findings.

1. Introduction

When we consider academic research and publishing, there are two main types of publications: academic journals and magazines. They look similar but have respective characteristics. Journal and magazines cater to different audiences, and have different publishing purposes and quality requirements. In order to strengthen our understanding of the two academic types of publications, we choose the *The Emergence of Edge Computing* and *Computer vision reveals hidden variables underlying NF-κB activation in single cells* for further study.

After a brief read of the two articles and in combination with our research purposes, we raise four research questions as follows:

1. What are the style features about citations and sentences of The Emergence of Edge Computing and Computer vision reveals hidden variables underlying NF-κB activation in single cells?
2. What are the structure features about abstract, title and whole article of The Emergence of Edge Computing and Computer vision reveals hidden variables underlying NF-κB activation in single cells?
3. Are there any similarities and differences between them?
4. What do these similarities and differences suggest?

2. Methods

As all four members of our group are majoring in computer science, we discussed and decided to select journals and magazines related to computer applications. Through a meticulous screening process, we ultimately selected the following two articles.

Table 1. Basic information of the publications

Publications	Journal or magazine	Source (Database)	Authority
The Emergence of Edge Computing	magazine	IEEE Xplore	1270 Paper Citations
Computer vision reveals hidden variables underlying NF-κB activation in single cells	Journal	Science Advances	2,538 Total Downloads

To ensure the credibility of our sources, we carefully selected two articles from authoritative journals - IEEE Xplore and Science Advances. Additionally, we took into account the frequency of their citations to gauge their authority. Specifically, The *Emergence of Edge Computing* has received 1270 citations and *Computer vision reveals hidden variables underlying NF-κB activation in single cells* has been downloaded a total of 2,538 times. The high number of citations and downloads ensures the quality of the articles.

The following sections describe how the data was collected and how the research was carried out.

2.1. Structure Features

We analyze articles' structural features by studying the two questions: "Do articles in the selected publications adhere to the IMRD structure?" and "What components are included in abstracts and titles?"

2.1.1. Do articles in the publications follow lMRD structure?

We gained a comprehensive understanding of the IMRD structure after the teacher's explanation in class and further investigation. Then we applied this knowledge to analyze the structure of Emergence of Edge Computing and Computer vision reveals hidden variables underlying NF-κB activation in single cells.

To do so, we analyze how the article unfolds after we read through the whole text. The structure of the article is IMRD structure (including the Introduction, Methods, Results, and Discussion sections), or according to the content? Then we analyze whether the narration of the article is clear, easy to understand and logical, combined with the structure and development of the article.

2.1.2. What are included in abstracts and titles?

We know that the title and abstract are closely related to the article, when analyzing the title and abstract. Therefore, we read the text first to understand what the text says. Then we combine the content of the article to analyze the title and abstract.

We read the title and thought what the content of the title is and its connection with the content of articles. When analyzing the abstract, we first analyze its structure to see if it conforms to the general structure of the abstract (what is "introduction, method, results, discussion, conclusion") Compare with the content of the article to analyze whether the abstract is general and relevant to the content of the article. Otherwise, the title and abstract are the key factors that attract readers to the article. We also analyze the attractiveness and readability of the title and abstract of the article.

2.2. Style Features

Similarly, we analyze style features by studying the two questions: "How sources are cited? Documentation style?" and "How about sentence length, structure and voice?"

2.1.1. How sources are cited? Documentation style?

We first looked at the usual citation formats in academic papers, such as "APA","MLA" or "Chicago". Then analyze the format of reference of the article. Often the different fields in which a paper is written have their own format. Social science will use the APA citation format, which can be used to estimate the format of citations in an article. Then it analyzes the role of citations according to the content of the article.

2.1.2. How about sentence length, structure and voice?

First of all, we select a representative text in the article for analysis. Here are some of the factors we consider in our selection: Are there contents in the text? Does this text list data? Does this paragraph reflect the style of the article?

After selecting the text, we analyze it from different aspects. In terms of sentence length, we mainly use quantitative analysis, and we counted and analyzed the length of all sentences. In terms of language characteristics, we qualitatively analyze the use of words, such as the use of technical terms, the use of accurate and rigorous vocabulary and so on. We obtained the style features of the articles' sentences based on the above analysis.

2.3. Similarities and differences between Journal and Magazine

We gathered the results of our research on the first two questions. Then we matched the analysis of every aspect of journal's and magazine's features one by one, and looked for similarities and differences. At last, we considered the significance of these similarities and differences between journals and magazines and came to the conclusion.

3. Results

IMRD structure refers to the Introduction(Problems that need to be studied and solved in the paper), Method(Specific methods used to solve problems), Results(Research results obtained according to the research method) and Discussion(General rules that can be obtained according to the research results).The first question intends to solve the problem that whether these two publications follow the IMRD structures, and analyze the structure composition including title and abstract at the same time. The second question focuses on style based on citations and sentence length.

3.1. *Computer vision reveals hidden variables underlying NF-κB activation in single cells* (Journal)

3.1.1. Structure Features

Most of the journals have a similar structure and we select one of the publications to analyze. This article follows the IMRD structure, which includes four parts, Introduction, Results, Discussion and Methods attached at the end of the passage. From a technical perspective, the title clearly and concisely states the topic of the research, followed by the specific focus on the activation of the immune pathway NF-κB in single cells using computer vision. The abstract follows a typical structure, starting with the context of the problem and the need for a solution, followed by the specific objective and methodology used. The authors explain the use of an image-based support vector machine learning model to uncover

the variables responsible for NF-κB activation in single cells. The abstract then provides a summary of the findings, including the identification of the specific variables and how they control activation probability in cells. The authors also explain their mechanistic modeling approach and the significance of their results in understanding cellular heterogeneity and activation under proinflammatory stimuli. The abstract concludes with a clear statement of the significance of their findings in demonstrating the application of computer vision to uncover hidden mechanisms in single cell biology. Overall, the title and abstract effectively provide a clear and concise summary of the research topic, methodology and findings.

3.1.2. Style Features


2 U. Ben-David, B. Siranosian, G. Ha, H. Tang, Y. Oren, K. Hinohara, C. A. Strathdee, J. Dempster, N. J. Lyons, R. Burns, A. Nag, G. Kugener, B. Cimini, P. Tsvetkov, Y. E. Maruvka, R. O'Rourke, A. Garrity, A. A. Tubelli, P. Bandopadhayay, A. Tsherniak, F. Vazquez, B. Wong, C. Birger, M. Ghandi, A. R. Thorner, J. A. Bittker, M. Meyerson, G. Getz, R. Beroukhim, T. R. Golub, Genetic and transcriptional evolution alters cancer cell line drug response. *Nature* **560**, 325–330 (2018).

CROSSREF • PUBMED • ISI • GOOGLE SCHOLAR

Fig 1. reference from Journal

Figure1 shows that the reference is written in the Vancouver style, which is commonly used in biomedical and health sciences. It includes the names of all authors in the order they appear in the original article, followed by the article title, the name of the journal, the volume, the page numbers, and the year of publication.

As for the style of the article, the citation suggests that it is a highly technical and evidence-based research article. The specific details included in the citation highlight the research focus on genetic and transcriptional evolution in cancer cell lines and its impact on drug response. The results of the study are likely based on complex data analysis and experimentation, and the article may include technical terminology and statistical analysis. Overall, the citation suggests a rigorous and detailed approach to scientific research.

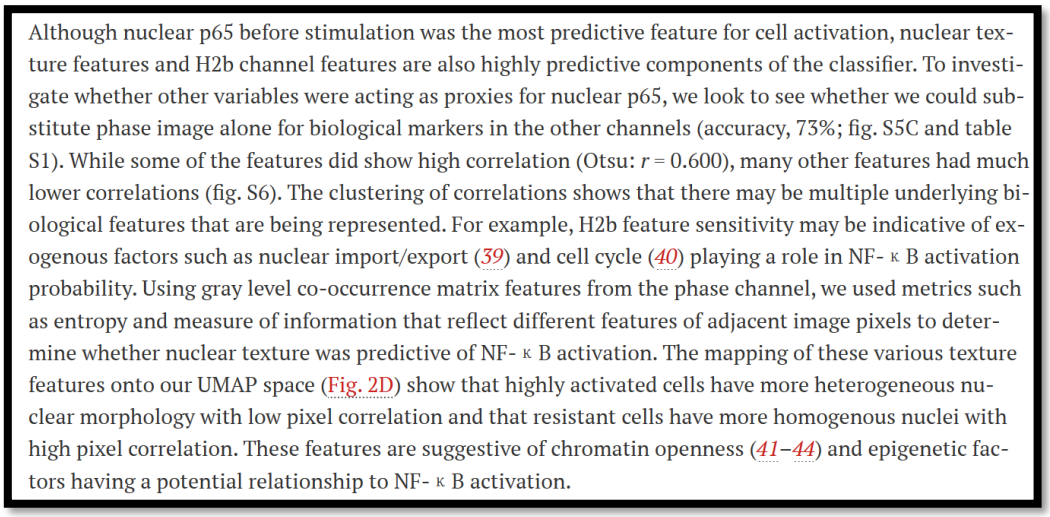

Although nuclear p65 before stimulation was the most predictive feature for cell activation, nuclear texture features and H2b channel features are also highly predictive components of the classifier. To investigate whether other variables were acting as proxies for nuclear p65, we look to see whether we could substitute phase image alone for biological markers in the other channels (accuracy, 73%; fig. S5C and table S1). While some of the features did show high correlation (Otsu: $r = 0.600$), many other features had much lower correlations (fig. S6). The clustering of correlations shows that there may be multiple underlying biological features that are being represented. For example, H2b feature sensitivity may be indicative of exogenous factors such as nuclear import/export (*39*) and cell cycle (*40*) playing a role in NF-κB activation probability. Using gray level co-occurrence matrix features from the phase channel, we used metrics such as entropy and measure of information that reflect different features of adjacent image pixels to determine whether nuclear texture was predictive of NF-κB activation. The mapping of these various texture features onto our UMAP space (Fig. 2D) show that highly activated cells have more heterogeneous nuclear morphology with low pixel correlation and that resistant cells have more homogenous nuclei with high pixel correlation. These features are suggestive of chromatin openness (*41*–*44*) and epigenetic factors having a potential relationship to NF-κB activation.

Fig 2. Journal paragraph analysis

This paper mainly discusses the predictive features and related components in identifying the activation of NF-κB. In terms of language features, the paper uses relatively professional terms, such as "nuclear texture features", "H2b channel features", "gray level cooccurrence matrix features", etc. (Patel et al., 2021)

We selected a paragragh from the publication, which is authoritative, professional and concise, citation features are more obvious. These terms in figure2 are helpful for deeper understanding of the text, but may require the reader to have a relevant disciplinary background in order to understand the text better. In terms of sentence length, the paper has a certain sentence length, but most sentences are close to 20 to 30 words in length, which is conducive to readers' quick grasp of the thesis and research conclusion, and improves the readability of the paper. In terms of language expression, the author uses objective, accurate and professional wording. For example, "... most predictive feature for cell activation ", "... highly predictive components of the classifier, "... substitute phase image alone for biological markers ", "... reflect different features of adjacent image pixels " (Patel et al., 2021)and other phrases, such terms and expressions have a certain technical nature, which helps ensure the rigor and science of the research. In short, the paper is technical and professional, using professional terms and language expressions, while maintaining a certain readability, which helps readers to have a deeper understanding of the research conclusions and relevant Revelations.

3.2. *The Emergence of Edge Computing* (Magazine)

3.2.1. Structure Features

This article does not follow the IMRD structure.In the process of writing this paper, it is not divide d according to the introduction, method, result and discussion. The structure of the paper is divided by content.Firstly,the background and content of the research are introduced, and then the different parts o f the research body are elaborated.Beyand that,the title of this article indicates its main research subject s.Then, analyze the abstract of this article from five aspects,the abstract explains that the research is car ried out against the background of the industry's investment in and research interest in edge computing, and it describes what edge computing is and its potential benefits, including responsive cloud services a nd IoT scalability.Although the abstract does not state the reason for the research or how it was conduct ed, it highlights the potential benefits of edge computing and provides proof-of-concept Videos demonstrating its practical applications. Overall, edge computing has significant potential to improve c loud services and IoT scalability,which could have important implications for various industries.

3.2.2. Style Features

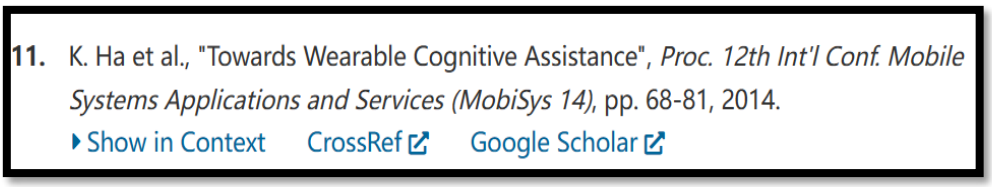


Fig 3. reference of the magazine

Figure3 shows that the reference is written in the IEEE citation style, which is commonly used in Engineering, computer science, and related fields. It includes the names of the authors, the title of the

article, the conference proceedings in which it was published, the page numbers, and the year of publication. For the style of the article, the citation suggests a technical and research-focused paper presented at a conference. The specific details included in the citation highlight the research focus on wearable cognitive assistance and its application in mobile systems. The paper is likely based on a com bination of experimentation, data analysis, and theoretical models, and the article may include technical terminology and mathematical formulas. Overall, the citation suggests a rigorous and in-depth approach to research in the field of mobile systems and cognitive assistance.

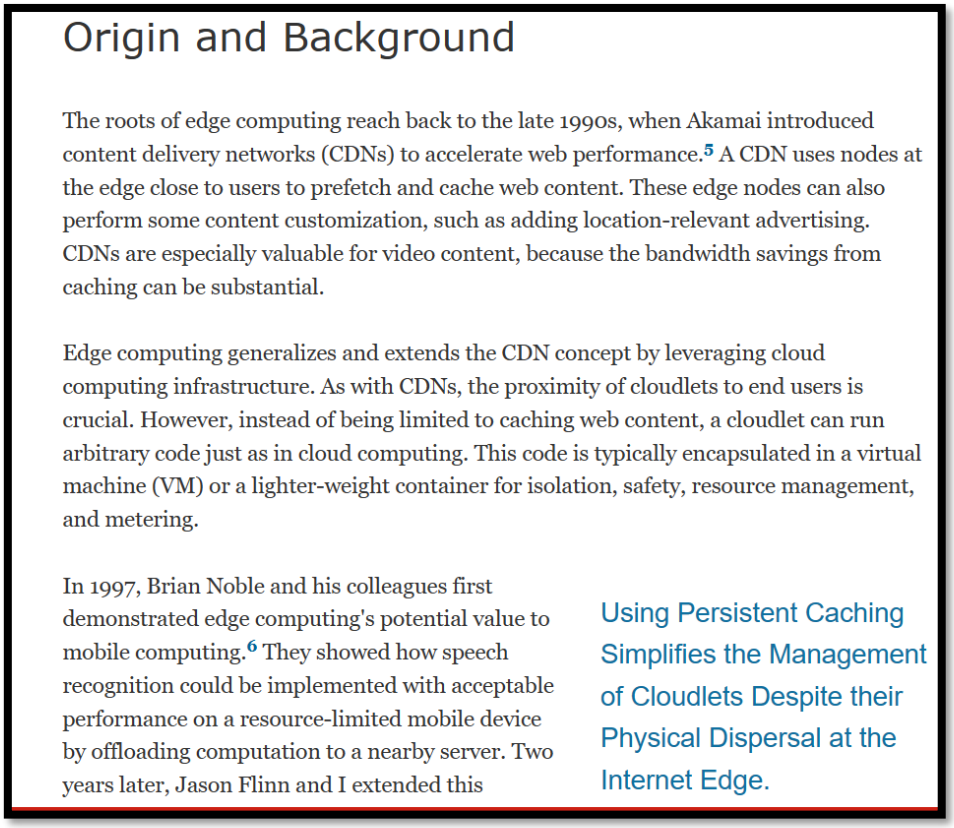
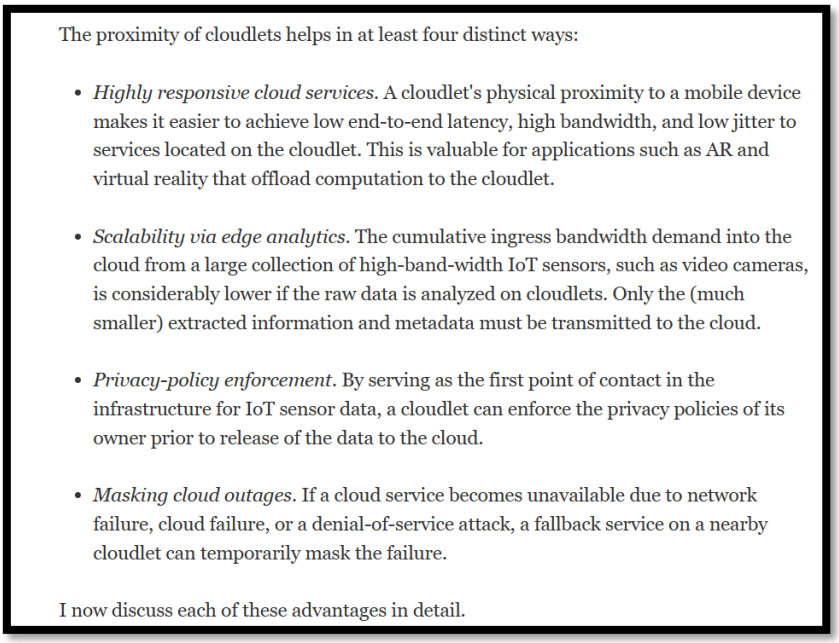


Fig 4. Origin and background of the magazine

Figure4 from a computer science paper is characterized by technical language and specialized ter minology, reflecting the author's expertise in the field. The sentences are generally of moderate length, with some longer sentences providing more detailed information. The author uses academic language, s uch as "conceptual foundation" and "advocated," which adds to the formal tone of the writing. Technic al terms such as "CDNs," "cloudlets," and "fog computing"(Satyanarayanan,2017) are used consistentl y throughout the text, indicating that the author assumes a certain level of familiarity with the subject m atter among readers.



The proximity of cloudlets helps in at least four distinct ways:

- *Highly responsive cloud services.* A cloudlet's physical proximity to a mobile device makes it easier to achieve low end-to-end latency, high bandwidth, and low jitter to services located on the cloudlet. This is valuable for applications such as AR and virtual reality that offload computation to the cloudlet.
- *Scalability via edge analytics.* The cumulative ingress bandwidth demand into the cloud from a large collection of high-band-width IoT sensors, such as video cameras, is considerably lower if the raw data is analyzed on cloudlets. Only the (much smaller) extracted information and metadata must be transmitted to the cloud.
- *Privacy-policy enforcement.* By serving as the first point of contact in the infrastructure for IoT sensor data, a cloudlet can enforce the privacy policies of its owner prior to release of the data to the cloud.
- *Masking cloud outages.* If a cloud service becomes unavailable due to network failure, cloud failure, or a denial-of-service attack, a fallback service on a nearby cloudlet can temporarily mask the failure.

I now discuss each of these advantages in detail.

Fig 5. The magazine lists the benefits of cloudlets helps

Figure5 excerpt uses technical language and specialized terminology, reflecting the author's expert ise in computer science. Sentences are generally moderate in length, with some longer ones providing d etailed information, such as the first sentence explaining cloudlet advantages. Technical terms like "clo udlet," "end-to-end latency," and "ingress bandwidth demand" are used, along with academic

language like "cumulative" and "enforcement,"(Satyanarayanan,2017) adding to the formal tone. The c onsistent use of these terms and style throughout suggests readers have a certain level of familiarity wit h the subject matter.

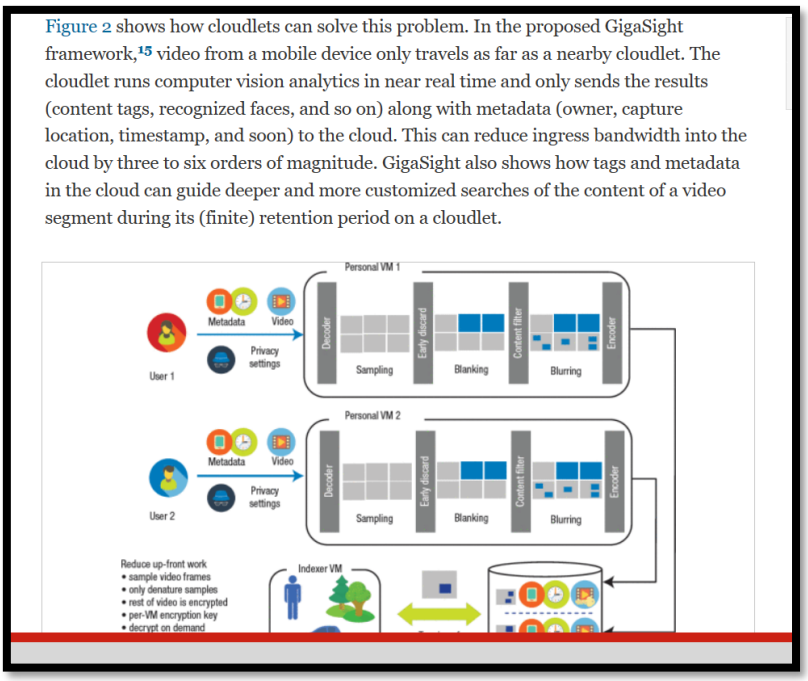


Figure 2 shows how cloudlets can solve this problem. In the proposed GigaSight framework,[15] video from a mobile device only travels as far as a nearby cloudlet. The cloudlet runs computer vision analytics in near real time and only sends the results (content tags, recognized faces, and so on) along with metadata (owner, capture location, timestamp, and soon) to the cloud. This can reduce ingress bandwidth into the cloud by three to six orders of magnitude. GigaSight also shows how tags and metadata in the cloud can guide deeper and more customized searches of the content of a video segment during its (finite) retention period on a cloudlet.

Fig 6. Magazine figure caption

The style of this passage is concise and objective. The sentence structure is short and precise, most ly composed of simple and parallel sentences, using professional terminology and abbreviations.

4. Discussion

Publications	Types of publication	Volume & Issue & Date	Sentence length	Language feature	Structure feature
Computer vision reve als hidden variables underlying NFκB acti vation in single cells	Journal	2021.10.22	Relatively short	Objective accurate	Follow the IMRD structure
The Emergence of Ed ge Computing	Magazine	2017.1.5	Generally moderate	Formal concise	Do not follow t he IMRD struct ure

Table 3. Discussion based on research question2&3 *Style Features*

In table3, the first research question of the study was asked to discuss the style features about citations and sentences of The Emergence of Edge Computing and Computer vision reveals hidden variables underlying NF-κB activation in single cells. To address the problem, we divided style features into two aspects: sentence length and language features to discuss. For sentence length, the results suggested that it was relatively short, mostly approaching 20-30 words for the journal, which is beneficial for readers to quickly grasp the paper and research conclusions, improve the readability of the paper. In contrast, the sentence length of the magazine was generally moderate, some longer sentences providing detailed information. So it can help readers to understand more accurate and comprehensive information.

Additionally, as the second dimension of the study, we compared the language feature of the two types of publications. Firstly, in the common part, both have the characteristics of technical language and professional terminology. Therefore, it is necessary to have a relevant disciplinary background to understand. Besides, in the different parts, journal terminology is more objective and accurate, using a large amount of data and annotations as evidence and professional wording. This is conducive to ensuring the rigor and scientificity of research. However, the language of magazines is more formal and concise, with using more abbreviations and specialized terminology. Moreover, part of the content is presented in the form of charts and figures, which is more conducive to readers' understanding.

When looking at the results related to similarities and differences of structure features between academic journals and magazines, we found something interesting and meaningful. For similarities, on the one hand, both emphasize the importance of accurate and eye-catching titles and abstracts in academic articles. On the other hand, they also emphasize how abstracts play a crucial role in summarizing the main content and promoting readers' understanding of core ideas. Of course, there are also many differences between the two publication. The journal follows the structure of IMRD, including the introduction, results, discussion, and methodology sections. On the contrary, the magazine do not follow the IMRD structure, but instead divided the paper

according to its content. Besides, the focus of the two articles is also completely different. For example, the journal provides a detailed introduction to the purpose, methods, findings, and significance of the research, but the magazine focuses more on introducing the potential advantages and applications of edge computing.

To sum up, although the research directions of both articles are related to the application of computer science, there are many differences between the two due to different types of the publications, and the differences are closely related to their language style and structural features. Therefore, when we conduct academic writing in the future, we are supposed to distinguish the differences between the journal and magazine in order to improve the details and make it more academic normative and authoritative.

5. Conclusion

The similarities and differences highlighted in our paper reveal important insights into the structure and style of academic publications, which can have significant implications for conducting and communicating research. The emphasis on the importance of accurate and attention-grabbing titles and abstracts in both journals and magazines highlights the need for authors to effectively communicate the main ideas of their research in a concise and compelling manner. This ensures that readers can quickly and easily understand the focus and significance of the study. The differences between journals and magazines in terms of structure and content can provide valuable guidance for authors seeking to publish their research.

By following the IMRD structure in a journal article, authors can provide a clear and well-organized presentation of their research, while the non-IMRD structure of a magazine article allows for greater flexibility and creativity in structuring the content. Additionally, the focus on introducing potential advantages and applications of edge computing in magazines illustrates the importance of discussing the broader implications of research. This can help to generate interest in the findings and highlight the relevance of the research to real-world problems. In summary, understanding the similarities and differences between academic journals and magazines can help authors to effectively communicate their research and highlight its significance for broader audiences. By tailoring their approach to the structure and style of the publication, authors can optimize their chances of publishing their research and maximizing its impact.

Author contributions

Liang Yaoxin:

Responsible for searching journal articles, conducting comprehensive evaluations of journal citation rates and reliable data, analyzing article structures and styles, mainly drafting the results and conclusion sections, and also responsible for creating project presentations in the initial stages.

Zhu Xinghui:

Responsible for searching magazine articles, analyzing the credibility and citation data of magazine texts, and combining problem analysis to analyze the structure and style of articles. Mainly writing the result and author contributions sections, as well as creating the project presentations in the middle stages..

Wang Ye:

Responsible for writing the preliminary presentation script, mainly drafting the Introduction and Method sections. Also responsible for formatting the article and conducting revisions in the later stages.

Zhang Qirui:

Search for appropriate research methods and develop a research plan. Responsible for writing the writte n report on discussion and conclusion, and conducting two classroom PowerPoint presentations.

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Satyanarayanan, M. (2017). *The Emergence of Edge Computing*. Computer, 50(1), 30-39. doi: 10.1109/MC.2017.9.