

Turning Chaos into Comprehension: AI-Powered Chat Summary of K-pop Live Stream Chat for Global K-pop Fans

Mahek Patel
School of Computer Science
University of Guelph
Guelph, ON Canada
mahek@uoguelph.com

Stacey D. Scott
School of Computer Science
University of Guelph
Guelph, ON Canada
stacey.scott@uoguelph.com

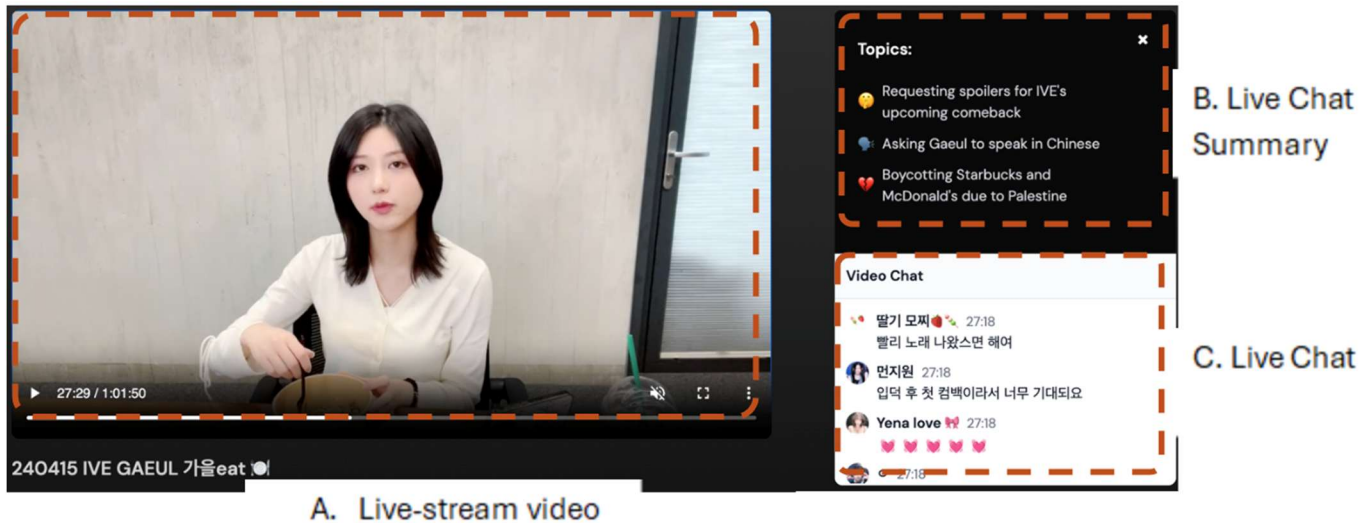


Figure 1: Live Chat Summary interface prototype: live stream video (A), the Live Chat Summary (topics summary version) (B) that summarizes key topics from the live chat, and the default Live Chat (C).

ABSTRACT

Live stream broadcasts on platforms like YouTube and Instagram are now widespread across news, politics, gaming, and entertainment. These events often attract large, global audiences. A key feature is real-time chat, enabling interaction between hosts and viewers. However, high activity can cause chats to scroll too quickly, reducing usability. Multilingual messages from global audiences can also hinder comprehension. To address these issues, we developed a custom live stream prototype built atop the YouTube platform. It retains YouTube's default video and chat and adds an Artificial Intelligence (AI)-generated chat summary that updates regularly. The summary displays key discussion by fans in two formats, topics and paragraph. Google's AI tool, Gemini, is used to translate and

summarize live chat content.

CCS CONCEPTS

User interface design • User centered design • Interface design prototype • User studies

KEYWORDS

Live stream, social media design, Artificial intelligence (AI), Machine translation, Korean popular music

ACM Reference format:

Mahek Patel, Stacey D. Scott. 2026. Turning Chaos into Comprehension: AI-Powered Chat Summary of K-pop Live Stream Chat for Global K-pop Fans. *Poster at Graphics Interface 2026 (GI'26)*, June 9–12, 2026, Waterloo, ON, Canada.

1 Introduction

User-generated digital content, including photos, especially “selfies”, videos, audio, and text posts, is central to modern social media platforms and foster connections between users. Much of this content is archival, but a growing trend is to support live

Permission to make digital or hard copies of part or all of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. Copyrights for third-party components of this work must be honored. For all other uses, contact the owner/author(s).
Graphics Interface, June, 2026, Waterloo, ON, Canada
© 2026 Copyright held by the owner/author(s).

streaming, or user-hosted broadcasts of real-time video or audio content. Today, most social media platforms offer this feature, leading to many user communities and commercial industries leveraging live streaming capabilities to connect with others online, to create and connect with fans, and to generate revenue [1,4]. Platforms are continually experimenting with different user interaction features to serve their users.

A common feature provided by most live streaming platforms is a real-time chat feature, or “live chat”, where live stream viewers can post messages for the live streamer, or host, and other viewers. Many hosts will read and verbally respond to chat messages and viewers often respond to each other’s messages also. This can create a more engaging experience for viewers than the typical one-way broadcasting experience of traditional media like television or video streaming.

The global reach of live streaming platforms enables broadcasts to attract audiences spanning diverse geographic regions, cultures, and languages. For instance, professional sports, eSports, and gaming streams frequently draw large, multilingual viewerships [3]. Similarly, live streams hosted by Korean popular music (K-pop) artists, called idols, engage global, multilingual audiences. Notably, many fans participate having little to no understanding of the primarily Korean dialogue. Yet, this language barrier does not deter engagement; loyal fans regularly join live streams from their favourite K-pop idols.

In prior work involving interviews and surveys with avid global K-pop fans, we found that fans often rely on translations shared by multilingual fans in the live chat to help interpret the stream content [2]. However, fans also reported difficulties keeping up with the chat content due to volume and complexity of multilingual content.

We present work-in-progress research focused on the use of artificial intelligence (AI), particularly large-language models (LLMs), to address the language barriers and minimize the chaos of the live chat during K-pop live streams. We design an AI-powered summary to sit atop the live chat feature, that updates in real-time to follow the conversation.

In parallel with this research, many social media platforms have introduced AI-powered summaries of message forums. Thus far, these summaries have appeared in short paragraph format. In this research, we explore various formats of presenting this chat summary design concept, especially for the real-time nature of live streams, recognizing that a viewers visual and cognitive attention may be split between different aspect of the live stream interface throughout the live stream.

2 AI-Powered Live Chat Summary

To explore novel interface designs aimed to enhance the live stream experience in different contexts, including cross-cultural, multilingual context such as K-pop Lives, we developed a web-based custom live stream platform (Figure 1). Our platform uses React framework for the frontend, and Node.js for the backend. Google’s Gemini application programmer’s interface (API) is used to generate summaries every thirty seconds. We use prompt-engineering to produce real-time translation and content summarization.

Our platform leverages YouTube native content, with live content delivered through the YouTube API. This allows us to

integrate YouTube’s live stream content, including the video component and associated live chat competent, directly into our interface, along with any custom interface components we wish to provide to enhance the user’s live stream user experience. An advantage of this approach, as opposed to creating our own live stream platform from scratch, is that YouTube content can attract both authentic fans and a critical mass needed to conduct studies of global, multilingual social interactions via live chat. As an initial exploration of enhancing the user experience within a cross-cultural, multilingual live chat context, we designed an AI-powered Live Chat Summary module to sit atop the existing YouTube live chat (Figure 1(B)).

To improve the user experience of a K-pop fan who does not speak Korean, we developed two alternative Live Chat Summary designs: topic and paragraph summaries.

Topics summary: The topics summary includes details and keywords from the live chat (Figure 1(B)). This version is designed to be informative but brief. It also includes emojis to reinforce the casual ambience of a Live.

Paragraph summary: The paragraph summary of the live chat content presents summarized content in brief paragraph form, similar to existing summarizes offered in commercial platforms. This simply displays a detailed summary with no visual aspect, such as emojis.

Both summary formats are designed to provide the following user benefits:

- Addresses language barriers by summarizing content in the user’s preferred language (e.g. English only),
- Minimizes visual searching by displaying the summarized content in a static (i.e., non-scrolling), fixed area, and
- Eliminates the chaotic noise of the live chat (excessive emojis, and repetitive expressions e.g., “I love you”, “marry me”) and focuses on meaningful and unique content.

4 Preliminary Results and Future Work

Preliminary results from a comparative user study of our live stream platform with the “topics” and “paragraph” live chat summaries, as well as a “no summary” baseline, shows a trend of fan preference for the *topics* live chat summary, with fans reporting that it is easy to read and follow.

Future work includes exploring different LLMs, including customized models that recognize key words relevant to K-pop subculture, and continued development of novel design features to enhance the live streaming viewing experience.

REFERENCES

- [1] P. Lessel and M. Altmeyer. 2019. Understanding and empowering interactions between streamer and audience in game live streams. *Interactions* 27, 1, 40–45.
- [2] J. Matulis, M. Patel, M. H. Butt, S. Kuo, S. D. Scott, (2025). AI-Powered Chat Summaries for Multilingual Live-stream Chats. Poster at GI 2025.
- [3] S. Oh, J. Kim, H. Ji, E. Park, J. Han, M. Ko, and M. Lee. 2020. Cross-cultural comparison of interactive streaming services: Evidence from Twitch. *Telematics and Informatics* 55.
- [4] D. Y. Wohn and G. Freeman. 2020. Live Streaming, Playing, and Money Spending Behaviors in eSports. *Games Cult* 15, 1 (2020), 73–88.