



# VitaChronicle 2.0: A Dual-Mode UX-Centered Approach to Lifelog Image Retrieval for Novice and Expert Users

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## Abstract

Retrieving meaningful information from lifelog data remains a complex task due to its large volume, diversity of modalities, and the need for intuitive user interaction to support effective memory search. Despite advancements in retrieval techniques, user interface (UI) design remains underexplored, often limiting accessibility for diverse user groups. To address this gap, we present VITAChronicle 2.0, a redesigned retrieval framework that focuses on improving the previous system's interface and user experience (UX) for better lifelog search performance. The proposed framework features a dual-mode interface, offering simplified navigation or advanced query capabilities as needed. Novice mode minimizes interface complexity to reduce cognitive load, while expert mode enables parameterized queries, compact views, and advanced navigation tools. In VITAChronicle 2.0, new functionalities include voice-activated search, mode selection, and intelligent suggestions for queries and images. This updated version is developed with user-centric design principles and validated through iterative testing, contributing a scalable and user-adaptive framework for visual lifelog retrieval.

## CCS Concepts

• **Information systems** → *Search interfaces*; • **Human-centered computing** → *User centered design*; *User interface design*;

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**Interface design prototyping**; *Interaction design theory, concepts and paradigms*; *Accessibility design and evaluation methods*.

## Keywords

Lifelogging, User Interfaces, Visual Search, Human-centered Design, Image Retrieval, Dual-mode Interaction; Usability; UX Design

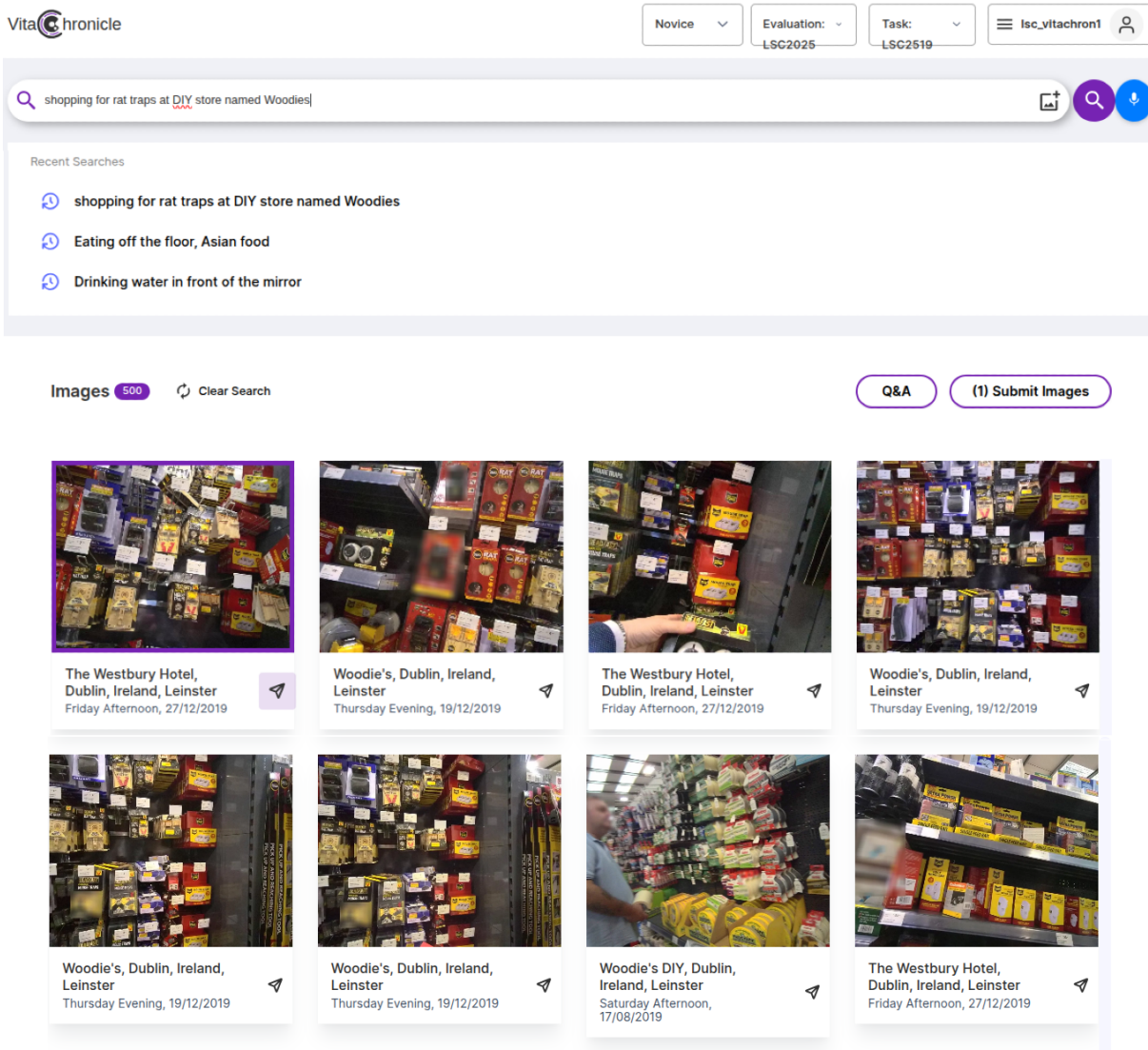
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## 1 Introduction

Interactive retrieval of multimedia content has become more and more important as the volume of user-generated content on online platforms grows rapidly. Modern search systems must bridge the gap between textual queries and rich visual semantics, accurately interpreting user intent and aligning it with corresponding features extracted from large-scale datasets. The affordability and ubiquity of digital recording devices have further accelerated this trend, enabling effortless capture and sharing of multimedia on social platforms. Consequently, traditional search engines struggle to effectively manage and present relevant information from the vast amounts of visual and textual data available. This highlights a critical need for new retrieval systems that combine powerful, large-scale processing with user-friendly interfaces.

Specifically, lifelog retrieval emerges as a challenging and impactful subdomain, ranging from academic research (e.g., healthcare



**Figure 1: Novice mode user interface of VITACHRONICLE 2.0. New functionalities include voice-activated search and a Q&A button. Recent searches are displayed along with in-frame submit buttons for more efficient interaction.**

monitoring) to daily applications (e.g., security surveillance). Advances in wearable sensors and image-capturing technologies now permit continuous, large-scale documentation of daily experiences with minimal user intervention [11, 14, 41]. Lifelogging systems empower individuals to archive and revisit personal events, supporting memory reinforcement, self-reflection, and the recall of contextual information [37, 39]. Studies in cognitive psychology and human-computer interaction have demonstrated that such external memory tools can support autobiographical memory and facilitate users' understanding of behavioral patterns and time allocation [17]. Addressing the demands of lifelog search thus requires interactive retrieval mechanisms tailored to the unique temporal and semantic characteristics of personal multimedia logs. Despite the constant development of advanced retrieval systems [22, 24, 28], the UI and UX components of such frameworks remain underexplored. Many approaches are technically sophisticated but offer

limited usability, particularly for non-expert users who may be unfamiliar with advanced search techniques or overwhelmed by complex visual layouts [31, 36]. Interface overload, lack of adaptive interaction, and poor scalability across user skill levels are persistent issues that hinder the broader utility of these lifelogging platforms.

To address these challenges, we present VITACHRONICLE 2.0, a substantially improved version of the original VITACHRONICLE system [27] created for the ACM Lifelogging Search Challenge (LSC) 2025 [13]. This updated version is implemented in a user-centric design [7] and enhanced by empirical insights from the performance of other lifelogging search systems and by reviewing our previous version [27] during the live LSC'24 competition. The proposed retrieval framework aims to make lifelog interactions more accessible, adaptive, and task-effective for a wider range of users.

One of the most significant innovations in VITACHRONICLE 2.0 framework is the introduction of a dual-mode interface, which benefits both newcomers and professionals. This bifurcation reflects an evidence-based recognition of the diverse cognitive and technical capabilities of users [3, 18]. Novice mode minimizes visual density and enlarges key interface elements with a voice-activated search option. Moreover, the system offers simplified filters and integrates a suggestion mechanism to guide query formulation. These design decisions align with the established principles for reducing cognitive load and improving early-stage system engagement [26, 35]. Expert mode, in contrast, provides a high-density image view, advanced parameter input, multi-view display options, and command-based search interactions, which prioritizes control and efficiency for experienced users.

Beyond interface customization, VITACHRONICLE 2.0 introduces multi-image selection and the ability to compose structured answers to visual search tasks. These updates are developed by the frequent requests of other participating users. Such capabilities are especially valuable in time-sensitive lifelog challenges, enabling more comprehensive user responses and faster task completion. Figure 1 and Figure 3 illustrate the overall user interface of our proposed system for novice and expert users, respectively.

In general, our contributions in this paper are threefold:

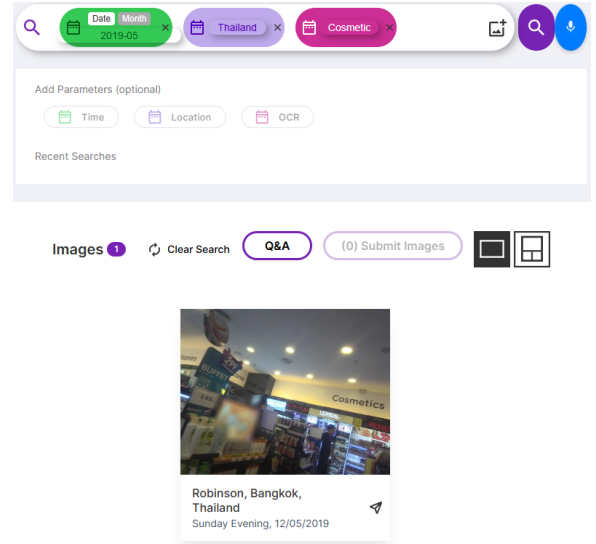
- A dual-mode lifelogging interface designed to support both novice and expert users.
- A set of new interaction features that enhance retrieval flexibility and user control.
- A human-centric evaluation framework that demonstrates the effectiveness and adaptive UX strategies in a competitive retrieval context for the Lifelog Search Challenge [13]

## 2 Related Work

The development of lifelogging systems is at a crossroads of multimedia information retrieval, human-computer interaction, and cognitive support technologies. This section first briefly describes lifelogging search systems and discusses the challenges in designing their user interfaces. Next, we revisit VITACHRONICLE [27] with observations from LSC'24 [12] and present our approach to addressing its shortcomings. Finally, we adapt our design method for other systems by introducing dual-mode interfaces and adaptive search.

### 2.1 Lifelogging Search and Interface Design Challenges

Since the first edition in 2018, the Lifelog Search Challenge has driven research in semantic, interactive retrieval of personal lifelogs, where the task involves locating a specific moment in a large visual archive based on a vague, natural language description. LSC, along with other multimedia retrieval competitions [16, 38, 42], put the focus on simulating real-world memory recall and emphasizing support for ambiguous queries, real-time response, and multimodal data integration (e.g., images, GPS, time, and activity). As a result, various effective approaches [6, 21, 23] were introduced that prioritize users' interaction and system interface. Recent researches demonstrate innovation in four key areas:



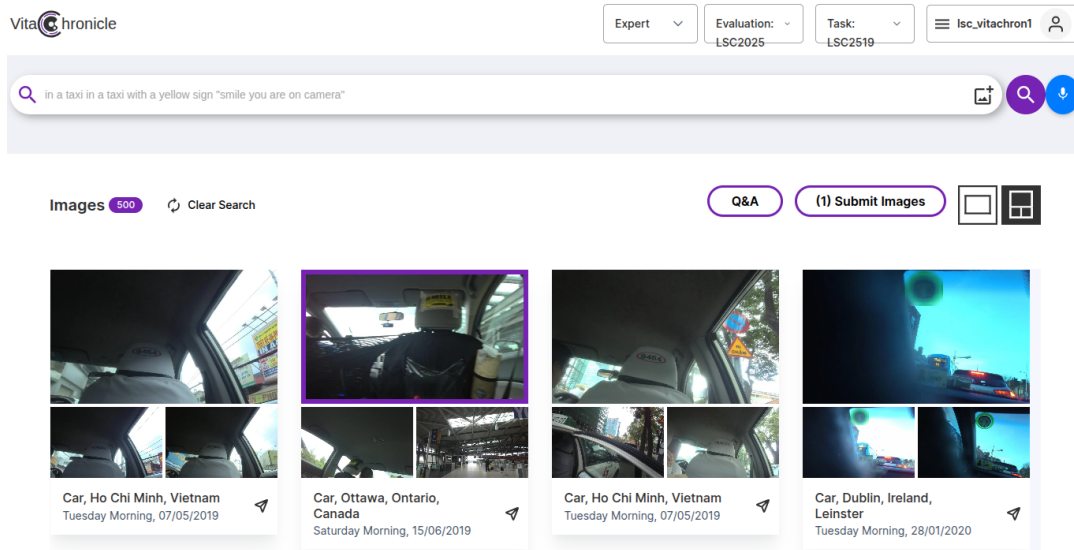
**Figure 2: Example of a parameterized query.**  
VITACHRONICLE 2.0 offers the combination search of time, location, and OCR.

- (1) Query formulation has improved through minimalist and task-oriented interfaces. For example, LifeLens [37] adopts a decluttered UI to reduce cognitive load and streamline navigation, Voxento [1] explores voice-driven search to improve accessibility for novice users, and Exquisitor [19] uses iterative relevance feedback, enabling the system to adapt to user intent through continuous interaction.
- (2) Result presentation now includes timeline and concept-based visualizations. For example, T@Retrospect [34] adds structured timelines, concept highlights, and better novice support. Life-Seeker 6.0 [20] combines keyword and location filters with improved UX refinements.
- (3) Usability-focused design is emphasized by systems like VITACHRONICLE [27], which explicitly applies human-computer interaction heuristics to support user navigation and search success.
- (4) Immersive interfaces such as VRLE [9] and vitivr-VR [33] offer spatial-temporal memory exploration in virtual environments. These systems illustrate how lifelog retrieval has moved toward more usable, intuitive, and context-aware interaction, in line with LSC's long-term goals.

### 2.2 Revisiting VitaChronicle: LSC'24 Observations and Improvements

The original VITACHRONICLE system [27], introduced as part of the LSC'24 in Phuket, Thailand, implemented timeline-based navigation, free-text search, and basic filtering. While its clean visual layout was positively received, post-competition analysis revealed substantial usability gaps, particularly among novice users. Reports from LSC'24 users' logs, recording, and observational data showed repeated instances of slow movements and difficulty orienting and executing the given tasks. Users unfamiliar with filtering options struggled to construct effective queries and often relied on trial-and-error scrolling through visual timelines. The VITACHRONICLE team,





**Figure 3: In expert mode, VITAChronicle 2.0 introduces the adjacent layout for each retrieved candidate for fast checking. Additionally, multiple images submission is supported.**

as professional users, had a hard time with a lack of features such as multi-image selection and the possibility to answer the Q&A tasks given during the competition. The redesigned VITAChronicle 2.0 directly addresses these issues by integrating user-centered design practices [7, 26] and empirical findings from LSC'24 performance. In particular, the new system introduces a dual-mode interface that separates the experience of novice and expert users. This redesign is grounded in the principles of cognitive fit, where system functionality is aligned with user goals and skills [18]. Novice mode presents a simplified layout, showing fewer images per row, using larger text, and integrating search suggestions and history to help initiate queries. Expert mode, in contrast, enables denser image layouts, multi-view display options, and support for parameter-based search inputs via multiple shortcuts [27] (such as time, location, and OCR search), providing experienced user-generated control.

In addition, VITAChronicle 2.0 introduces voice-activated search to support faster, hands-free input, particularly in novice scenarios where keyboard-based search may increase cognitive load or interrupt user flow. In fact, voice input can improve task efficiency and reduce entry barriers for users unfamiliar with traditional input methods, especially in mobile or visually intensive contexts. Figure 2 demonstrates the interface of a complex custom search.

### 2.3 Designing for User Diversity: Dual-Mode Interfaces and Adaptive Search

Designing systems that scale across user experience levels has been a longstanding challenge in human-computer interaction. Traditional lifelogging platforms have generally adopted a one-size-fits-all approach, offering the same interaction model to novices and experts alike. However, research in adaptive interfaces has demonstrated that tailoring interaction complexity to the user's cognitive and experiential profile leads to improved efficiency and satisfaction [3, 10]. Dual-mode design, in which users select or are

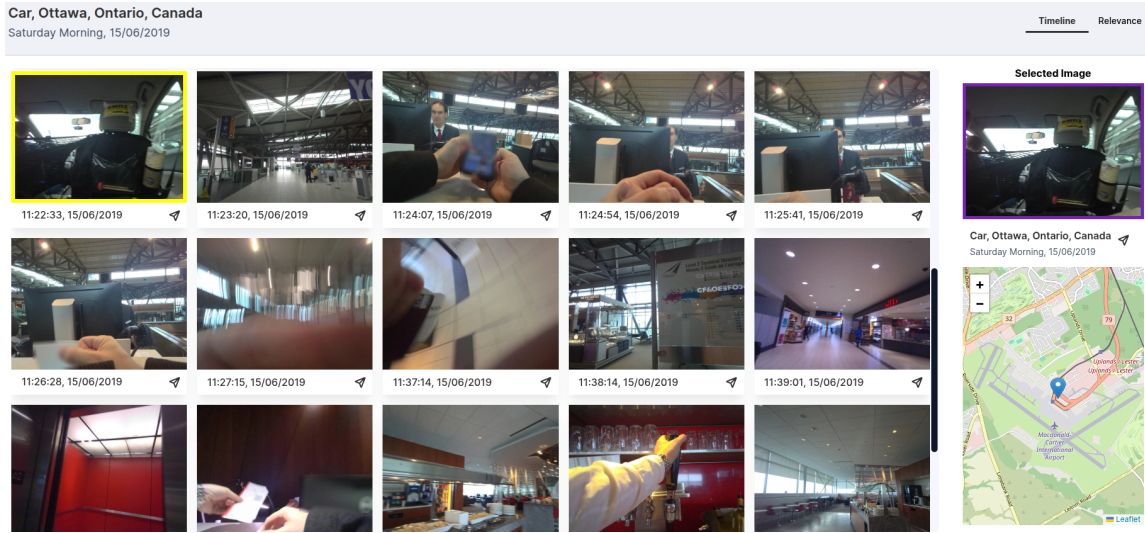
guided into simplified or advanced interfaces, offers a practical way to address diverse user needs across levels of expertise. These designs have been widely adopted in productivity applications, development environments, and visual analytics platforms to reduce cognitive load for novices while maintaining flexibility for expert users [15, 32]. However, such adaptive interaction models remain underexplored in multimedia retrieval contexts, and are particularly rare in lifelogging systems.

In VITAChronicle 2.0, the dual-mode interface is not simply a visual toggle but a structural divergence in how the system supports information seeking. Novice mode in VITAChronicle 2.0 suppresses non-essential filtering tools, complex adjacent layout, and increases the visual prominence of primary interaction areas. These design decisions are informed by prior work in search interface design and multimedia retrieval, which shows that users, particularly novices, benefit from simplified layouts and prominent guidance elements [2, 15]. Research on visual attention and layout optimization indicates that when too many interactive options are presented simultaneously, users tend to overlook peripheral controls and experience decision fatigue [5]. By simplifying the layout and emphasizing core interaction points, our proposed system aims to reduce cognitive load and support efficient retrieval, particularly for users unfamiliar with lifelogging image retrieval tools. Moreover, by leveraging both LSC'24 feedback based on results and findings from related work, VITAChronicle 2.0 demonstrates how iterative design, guided by empirical data, can produce an interface that is inclusive, scalable, and grounded in cognitive and UX/UI principles. Figure 3 presents the UI of expert mode, which is mainly used during the LSC'25 competition.

## 3 Proposed system: VITAChronicle 2.0

### 3.1 Overview

VITAChronicle 2.0 is an improved way of working with lifelogging data, designed for both novice and expert users. It is a new and



**Figure 4: Detailed information is displayed when users click on a retrieval image, including map location, time, date, and other lifelogging images on the same day, or images with semantic similarity.**

upgraded version of VITACHRONICLE [27], with a primary focus on usability, efficiency, and accessibility. The system has been re-designed to make navigation easier, reduce the number of choices, and offer a more user-friendly experience for all types of users.

Several improvements have been made to optimize usability, navigation, and overall user experience. The interface has been refined to reduce complexity and make interactions more intuitive, while new features have been introduced to better support users with different levels of experience. Features like voice interaction, different modes, Q&A function, and top hits based on the user’s search have been included. In addition, the system has been updated with a modern design, ensuring clarity and ease of use. The following subsection will go through the design choices of the proposed system. In this updated version, we deployed Milvus<sup>1</sup> as the vector database for scalable similarity search. Regarding the assistive voice search, Whisper [30] is utilized to transcribe what the user says into text, before feature extraction via the CLIP model [29].

### 3.2 Interface Analysis

VITACHRONICLE 2.0 has introduced different modes to accommodate all types of users with varying levels of experience. This approach ensures that the system remains both efficient and accurate. By capturing the user’s attention and providing an intuitive experience, the system makes it easy to understand how things work. With a simple design and a balanced number of functions, the goal is to ensure smooth and effective use, even for those who are unfamiliar with the system. In line with Hick’s law [40], we have chosen a design that minimizes the number of visible choices, preventing cognitive overload, especially for new users. This approach ensures that the interface remains intuitive, with just enough visible options to guide the user experience without overwhelming them.

The search bar in VITACHRONICLE 2.0 operates consistently across all user types. The search bar is initially located in the middle

of the page for the first search. Once a search is performed, it moves to the top center of the page to make space for the displayed images. This placement ensures accessibility for both users and follows the principle of Visibility [8]. The search bar features well-known icons, allowing users to choose between voice interaction or manual input search. While speaking, the voice interaction icon will blink, indicating that it is actively recording audio from the user to perform the search. These design choices are intended to make the search process intuitive and straightforward for users.

Maintaining the frequent use as in last year’s VITACHRONICLE, users can view their previous searches after clicking on the search bar. This aims to simplify the search process, with the search parameters remaining the same but having been relocated above the search bar to make room for past searches. Parameter icons have been updated to align better with their text. These changes, inspired by user feedback from LSC’24, follow the principle of Recognition rather than Recall [25].

The search results display key metadata, including lifelogging location, time of day, and date, assisting users when this information is relevant to their query (as shown in Figure 4). Additionally, hovering over an image enlarges it, making details easier to quickly examine. Besides the location and time data, an arrow icon allows for quick image submission. In the *Adhoc video search* part of the LSC competition, users can select multiple frames, which are highlighted in purple to indicate selection. A reset option is also available, allowing users to refine their search efficiency if the desired images do not appear. When a user submits an image, they receive feedback, confirming the successful submission along with the number of images submitted.

In the top right corner of the image, an icon appears, providing a shortcut to the timeline page. This page displays images before and after the selected one, along with a detailed overview of all record times. Additionally, a map in the bottom-right corner shows the location where the photo was taken. Figure 4 shows an example of the detailed image panel. To ensure novice users can view and

<sup>1</sup><https://milvus.io/>

register all images, the design in novice mode displays four images horizontally, making it easier for them to navigate. In contrast, expert users can see five images on the timeline page suited to their experience level. This adjustment helps accommodate different user needs. The color scheme has been adjusted, with a purple tone used for buttons, icons, and details, ensuring clarity and reducing distractions. While picking colors, maintaining good contrast according to WCAG guideline 1.4.3 [4] was a key consideration to ensure accessibility and readability for all users.

## 4 Conclusion

In this paper, we introduced VITACHRONICLE 2.0, an enhanced lifelog retrieval system that adopts a dual-mode interface to better support users with varying levels of expertise. By drawing on user-centred design principles and incorporating feedback from LSC'24, we addressed key usability challenges observed in earlier lifelog systems. The improvements include voice-activated search, a simplified novice mode, expert-oriented command input, and multi-image selection, demonstrating how adaptive UX strategies can improve task efficiency and user satisfaction in complex retrieval contexts. The effectiveness of these enhancements was validated at the LSC'25 in Chicago, USA, where VITACHRONICLE 2.0 placed 4th overall, a significant improvement from our 10th place showing at LSC'24 in Phuket, Thailand. This result affirms that the design and development decisions behind VITACHRONICLE 2.0 were well-founded and impactful. Future development aims to provide a scalable, accessible, and cognitively-aware lifelog interaction system that empowers both novice and expert users in exploring personal visual data effectively.

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