Introduction to the Fifth Annual Lifelog Search Challenge, LSC'22

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ABSTRACT

For the fifth time since 2018, the Lifelog Search Challenge (LSC) facilitated a benchmarking exercise to compare interactive search systems designed for multimodal lifelogs. LSC'22 attracted nine participating research groups who developed interactive lifelog retrieval systems enabling fast and effective access to lifelogs. The systems competed in front of a hybrid audience at the LSC workshop at ACM ICMR'22. This paper presents an introduction to the LSC workshop, the new (larger) dataset used in the competition, and introduces the participating lifelog search systems.

CCS CONCEPTS

• **Human-centered computing** → *Empirical studies in interaction design*; • **Information systems** → **Mobile information processing systems**; **Search interfaces**.

KEYWORDS

Lifelog, Interactive Retrieval Systems, Benchmarking

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1 INTRODUCTION

Providing effective access methodologies for personal lifelogs can trace its beginning back to the seminal MyLifeBits software [5] that indexed Gordon Bell's lifetime of digital data. In order to motivate and facilitate the development of effective lifelog search systems, the Lifelog Search Challenge (LSC) was founded in 2018 as a comparative benchmarking workshop with the aim of fostering scalable and effective retrieval technologies for large lifelog datasets. The LSC workshop provides participants with a multimodal lifelog dataset and a set of common information needs to solve. Competing teams must find a result from the lifelog archive that addresses a text information need within a limited time period. In this paper, we introduce LSC'22, the fifth iteration of the Lifelog Search Challenge.

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2 LSC'22 WORKSHOP CONFIGURATION

LSC'22 utilised a new eighteen month multimodal lifelog dataset gathered by one active wearer (lifelogger) between January 2019 and June 2020. The dataset contains over 725,000 point-of-view wearable camera images, redacted in 1024×768 resolution, captured using a narrative clip wearable camera. The images were captured from morning until night for the eighteen months. All images were screened by the lifelogger in a manual process to remove any images that were of poor quality (e.g. field-of-view mostly occluded) or images that he preferred not to share. Approximately 6% of all images were removed in this process. Since LSC is a multimodal search challenge, the images were provided with metadata including time stamps, music listening history, biometrics, and location information [6, 7], all aligned to UTC time. Associated with each image was a list of visual concepts extracted using the Microsoft Computer Vision API[1] and OCR text that was extracted from the images. Prior to release, all faces and screens were redacted from the images in a fully-automated process. An initial training set (one month of data) was released six months in advance, with the full dataset being released eight weeks before the workshop.

Traditionally, the LSC workshop has taken place during the ACM ICMR conference and in 2022, the LSC workshop also featured as the ICMR Grand Challenge. In 2022, ICMR was organized in Newark, NJ and facilitated hybrid participation for both the conference and associated workshops. The LSC workshop began with an inspiring keynote '*An Introduction to retrieval and reminiscence from Lifelog Archives at NTCIR*" by Prof. Frank Hopfgartner. For the competition, 24 topics were prepared in advance in the form of textual information needs and their corresponding matching items identified manually (where possible). The topics were prepared by the lifelogger who donated the dataset and the ViRMA VR lifelog search

[1] https://azure.microsoft.com/en-us/services/cognitive-services/computer-vision

engine [4] was used to support the topic generation process, which facilitated the lifelogger to find potentially challenging topics by supporting exploratory inquiry across the collection. Topics were of three different types (ad-hoc/conventional topics, single/few known item topics and Q&A-type topics). A single relevant image was required for each topic and potentially relevant images were submitted to the evaluation server [14] by participating teams. Submissions were immediately checked against a pre-computed ground-truth, or judged in real-time, depending on the topic type. The score reward for each topic was given by a formula combining both time and precision into one overall score, which was averaged over all topics during the competition.

3 PARTICIPATING SYSTEMS

Nine teams (with interactive lifelog search engines) participated in the LSC'22 challenge, with eight of the teams having participated at least once previously [6, 7]. At LSC'21, the CLIP model had been shown to provide effective retrieval (e.g SOMHunter [11] and Memento [1]), so for LSC'22, several systems integrated the CLIP model (developed by Open AI).

The MyScéal retrieval system [17], participated with an enhanced version of the top-performing system from LSC'20 and LSC'21 [16]. Enhancements focused on integrating the CLIP model for retrieval and providing a novice user-friendly search interface. The vitrivr system, a general purpose multimedia data indexing and retrieval framework [8], supported lifelog search using a number of fundamental techniques, such as text embedding, visual similarity search, classical Boolean operators as well as supporting lifelog-specific enhancements such as dynamic result sequencing and faceted filtering. Built on-top of the vitrivr stack was vitrivr-VR [15], which provided a VR-based access mechanism to the lifelog dataset. The vitrivr-VR system for LSC'22 featured a number of enhancements over the LSC'21 system and supported three different interfaces (or views) designed to support lifelog data access.

A revised lifeXplore system [10] featured improvements to the search result ordering, semantic geo-location data enrichment, as well as a number of improvements to the system's interface. LifeSeeker 4.0 [12] was redesigned to support use by a novice searcher. It featured improved visual enrichment using a CLIP model, as well as emotion-based indexing using music as clues and event clustering to optimise the user interface. Similarly, Voxento 3.0 [3] supports voice query input and control. It was improved by the addition of an enhanced text search feature, new filter integration based on the provided metadata, an enhanced CLIP model for additional visual annotation and an enhanced speech-to-query mechanism. FIRST 3.0 [9] participated again with an enhanced system that allows close representation of similar textual/visual data, an extension for external search engine to assist retrieval of unfamiliar concepts, and an option to use query-by-example. It also enhances its user interface to accommodate the new features while maintaining simplicity. Memento 2.0 [2] utilised a weighted ensemble approach to CLIP integration, which significantly improved the performance over the LSC'21 system and it also introduced a number of updates to the UI to enhance user efficiency.

A new system developed for LSC'22 was Memoria [13] which focused on keyword search and a filter-rich interface with enhanced visual annotations incorporating quality selection and various CNNs for richer visual annotation of the visual data. At the time of writing, it is not yet known which of the participants will have the top-performing system. The LSC'22 Challenge Workshop proceedings are available at: https://dl.acm.org/citation.cfm?id=3512729.

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